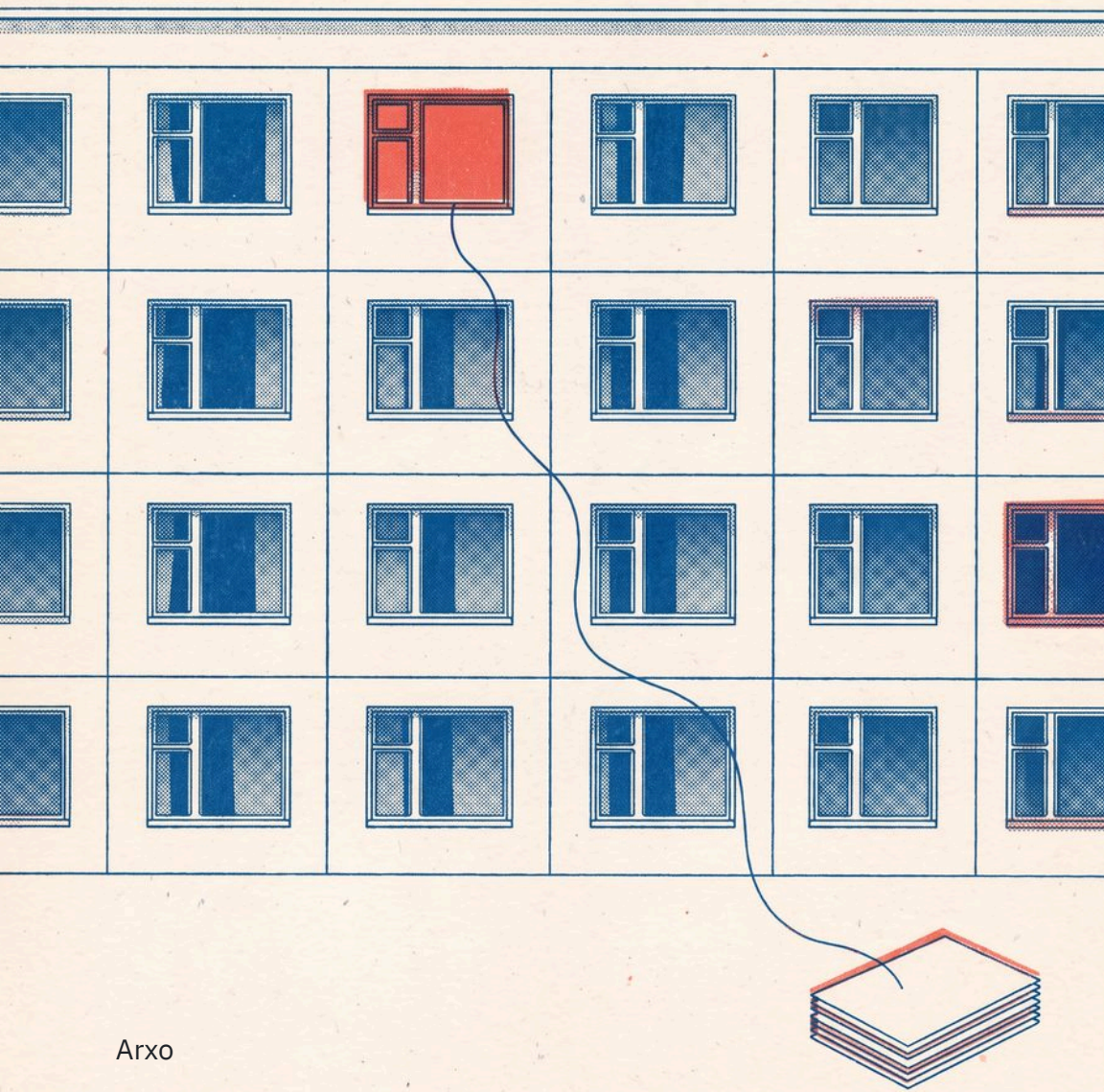


LAW AS CODE BY COUNTRY · VOLUME 1

Law as Code in Practice: French Family Benefits

One Family, One Executable Model — and What It Gives the Fund



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Law as Code by Country · Volume 1

First of all a demonstration of what modelling legislation with Arxo can do: an independent model built from published French law; it does not claim legal accuracy or completeness, it is not an implementation by or for the Cnaf, and its answers are not legal advice. The families and cases in this book are fictional.

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Preface: Why France, and Why One Family

This book is first of all a demonstration of what modelling legislation with Arxo can do. Its model is an independent reading of published French law, built for teaching; it does not claim legal accuracy or completeness, it is not an implementation by or for the Cnaf, and its answers are not legal advice. For a real file, rely on the official texts and on the fund.

France is one of the best places in the world to learn law as code. Its legislation is published as open data. Its family benefits are defined in detail by codes, decrees and yearly instructions, and the family allowance funds — the Cafs, under the national fund, the Cnaf — pay them to millions of households. And its research and public-service teams built some of the field's foundations: Catala, from Inria, showed that a statute can be written as code beside its own text; OpenFisca has modelled French taxes and benefits since 2011; LexImpact helps Parliament see what an amendment would do. This book stands on that work, and its acknowledgements say how.

The book follows one fictional family, the Garniers, through a benefits file: the text that applies on a given day, the amount, the duties of each side, the question only an authority can answer, and what happens next. Other fictional households join where a chapter needs them. Every answer in the book comes from a run of an executable model of the published rules, and every answer can be traced to its facts, the article behind each rule and the pinned editions of its sources.

That model is an independent Arxo model built from published French law. It is not an implementation by or for the Cnaf, and nothing in this book describes how the Cnaf or any Caf processes a file.

What the book is for

The model answers more than “how much”. A family file raises questions a calculator does not: which edition of the text applies on the date of the question, what happens when a fact is missing, who must decide when the law calls for a judgment, which reading of an ambiguous text was chosen, what the fund and the household each owe, and how a decision is explained to the person who receives it. Each chapter takes one of these questions and shows what the rules establish, what remains open, and who must act next.

The book is written for the people who build and run such systems together: lawyers and policy staff, programme analysts, and developers. You do not need to know Arxo, and basic French helps but is not required: every French term is glossed in English where it first appears, and a glossary at the end lists them all.

What the book is not

This is not legal advice, and it is not a guide to anyone’s entitlement. The families are fictional. The amounts are answers to dated questions about stated facts: a different date, a different fact, or a later edition of a text can give a different answer, and the book shows exactly how.

Dates

Every question in this book is asked at a legal date — usually a day in April 2026 — against the editions of the texts in force on that day. Where a chapter shows a recorded run, it gives the date of the recording as well. The two are different: a question about 15 April 2026 can be asked again years later and must give the same answer from the same texts.

An online edition

The same text is also an online course, with links to recorded scenes of a demonstration workbench. The book and the course are one text in two forms; corrections reach both.

How to Read This Book

Chapters are numbered from 0, like the lessons of the online course, so a reference to “Chapter 9” means the same thing in both. Each chapter opens with a question, quotes the French text that answers it, shows the part of the model that carries it, and ends with what the answer gives the fund and an exercise. Solutions are at the end of the book: try the exercise first.

Three ways through

Read the book in order if you can. If you come with one job in mind, these paths keep the thread:

- **Lawyers and policy staff** — Chapters 0, 1, 4, 7, 8, 9, 12 and 13: which article decides each answer, where the text is silent, which reading was chosen, where a human must decide, and how a decision is explained.
- **Programme analysts** — Chapters 0, 3, 4, 5, 10, 11, 14 and 15: which fact changes an answer, how parameters and revaluations work, what a family’s file does over time, and what a draft reform does to stated files.
- **Developers** — Chapters 0, 2, 4, 5, 16, 17 and 18: how a rule becomes a question you can ask, how a scenario is written, how an answer is reproduced, and how an existing rulebook is migrated.

Every chapter opens with a short note naming what each of these readers should take from it.

Reading an answer

The model's answers are more precise than “yes” and “no”. Each answer has two statuses, with the same names in every volume of the series. The first says what follows from the facts and rules:

- **Established** — the facts and rules support the statement and do not support its opposite. The answer names the rule and the article behind it.
- **Not established** — they support neither the statement nor its opposite. This is not zero and not a refusal: often a fact is missing, and the model names the open premise.
- **Refuted** — they support the opposite and do not support the statement. Not met in this book.
- **Contradiction** — they support both, for example because two records of the file disagree. The answer keeps both, with their sources, for review instead of choosing silently. Not met in this book; Volume 2 shows one (Chapter 8).

The second says whether the model could answer at all. Usually it could — the answer is computed, and the first status applies. If not, the answer says why:

- **Requires judgment** — the rules reserve a question for an authority, such as the paying body. The answer names the question and the authority it is addressed to.
- **Refused** — the model will not compute an amount where the text leaves a choice it has not been given, such as how to round an inexact division. The answer names the missing choice.
- **A reading must be chosen** — the answer depends on readings the file has not chosen between; the answer says which group of readings is open (Chapter 8).

The two go together: in Chapter 9, before the housing is assessed, the right is *not established* and the answer *requires judgment*.

Duties carry their own states: a duty can be **active** (it applies), **satisfied** (it has been met), **violated** (it has been breached) or **undetermined** (the evidence shows neither). An active duty is not a breached one: whether a duty exists and whether it has been performed are separate questions, and only evidence answers the second.

Readings

Where a text can be read in more than one way, the model declares the readings and the file chooses one by name. A chapter that depends on such a choice names it — for example, the reading that rounds each row of a published scale to the cent.

Commands

Some chapters end with the questions behind their answers, in the form `law ask <case package> --case ... --query-json ...`. The appendix on reproduction explains how to run them, and how `law eval` evaluates the saved answer again — without the source files or a rebuild — and must give the same bytes.

The households in this book

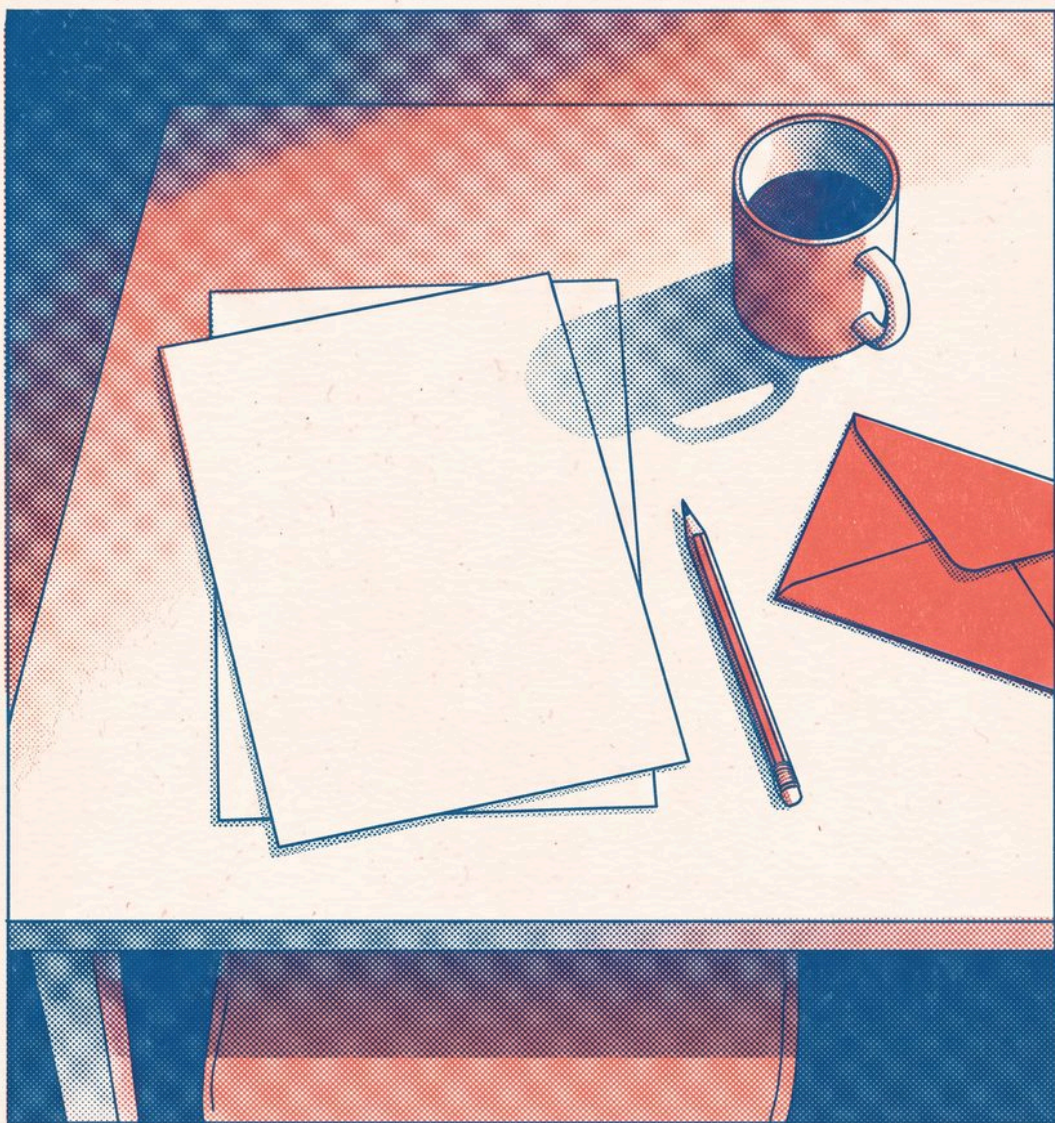
All the households are fictional. Each chapter says which file it uses; where a chapter switches files, it says so.

Household	Chapters	What it shows
The Garniers — Nadia and Thomas, three children	0, 4, 9, 10	The running example: family allowances of €425.57, housing aid, the start of the right, the duties of each side, a change in May and the decency assessment
A single tenant	1	Two files, December 2020 and January 2021, read under two editions of the resource rule
The Moreaus	2, 5, 17, 18	The birth grant on teaching inputs: resources equal to the ceiling, a missing fact, a scenario, a replay and a migration register
Martin, Bernard and Petit	3, 14, 15, 16, final exercise	Family allowances for two, three and four children: a revaluation, a draft reform, a screen and, for Martin, an assistant’s answer
Durand	15	A household with one child that the screen does not pass
A retired couple in a residence	6	The K coefficient of the housing formula for a <i>logement-foyer</i>

Household	Chapters	What it shows
A single resident	7	A division by twelve that the text does not say how to round
A synthetic single-person test card	8	Two readings of the minimum personal contribution
The household of <i>FamilleDansLeTemps</i>	11	Payments, deductions and a time-barred debt, 2024 to 2026
The Fontaines	12, 13	A remission request, its deadlines and an attached notice; three children, €40,000 resources, no age supplement, family allowances of €349.06 — a different file from the Garniers'
Two <i>prime d'activité</i> files	12	Recovery during a challenge, with and without a suspensive appeal
People in the duty scenarios	10	A pregnancy declaration sent in time or late; a fee charged to a maintenance creditor

PART I

The Task



What CNAF Pays, and Why It Is a Law-as-Code Problem

By the end of this chapter you will know what one family receives, which articles decide it, what each side must do next — and why one cent deserves a chapter of its own.

Lawyer: which articles decide a family's answer.

Analyst: which facts the answer depends on.

Developer: what an answer from the model contains.

1. The fund

The Cnaf (*Caisse nationale des allocations familiales*) and its network of local funds, the CAFs, pay about €110 billion a year to more than 13.6 million households ([Cnaf-Inria press release, 8 June 2026¹](#)). Behind that figure sit many separate benefits, each with its own conditions, amounts, dates and procedure:

- **family allowances** (*allocations familiales*, AF), the family supplement (CF), the back-to-school allowance (ARS) and the family support allowance (ASF);
- **early childhood:** the birth grant and the basic allowance of the PAJE, and help with childcare costs (CMG);
- **care:** the allowance for a disabled child (AEEH), the daily parental presence allowance (AJPP) and the caregiver allowance (AJPA);

¹<https://caf.fr/professionnels/presse/publications/la-cnaf-et-inria-s-engagent-ensemble-pour-developper-catala-une-solution-souveraine-de-calcul-des>

- **housing aid:** APL, ALF and ALS;
- **minimum income and work:** the RSA, the *prime d'activité*, and the allowance for disabled adults (AAH);
- and more: support after the death of a child, the collection of child maintenance, and specific rules for the overseas departments and Mayotte.

Each of these has its own package in the model this book follows. You do not need the acronyms today: the Garniers' case uses two, AF (family allowances) and ALF (*allocation de logement familiale*, family housing allowance).

2. One family, one question

Meet the Garniers — a fictional family. Nadia and Thomas have three children: Inès (15), Hugo (10) and Léa (5). Since 14 March 2026 they have rented a five-room house from a private landlord in zone II — one of the three rent zones used for housing aid — for €1,320 a month, and they applied for housing aid on 20 March. The household's resources are €24,600 a year. The file enters this figure twice, as two separate calculation bases — one for family allowances and one for housing aid — that happen to have the same value; how each base is built is not shown here.

Their question in April 2026: *what do we receive, on which basis, and what must each side do next?*

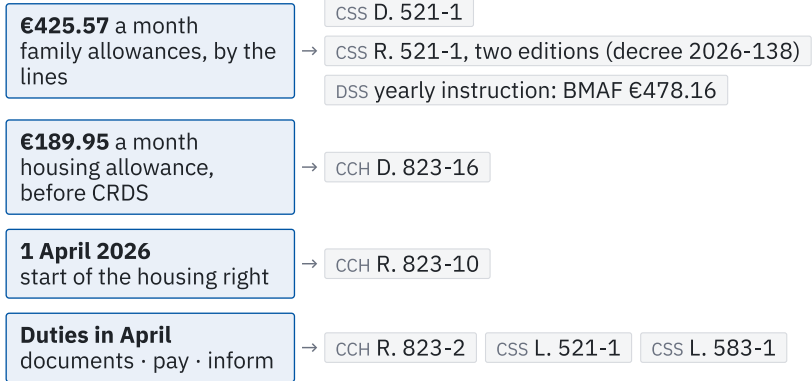
Before you read on, make a prediction: does their housing aid start in March, when they moved in, or in April?

Question	Model’s answer (recorded 11 October 2026)	Rule and article
Family allowances, by the lines of the yearly instruction	€425.57 a month (349.06 for three children + 76.51 age supplement)	D. 521-1 of the social security code (CSS); age supplement R. 521-1 CSS, editions before and from 1 March 2026 (decree 2026-138)
Housing allowance (ALF), as calculated	€189.95 a month before the CRDS deduction	D. 823-16 of the construction and housing code (CCH)
Start date under the timing rule	1 April 2026	R. 823-10 CCH
Duties active in April	the household attaches supporting documents; the fund pays the net family allowances and informs the recipient	R. 823-2 CCH; L. 521-1 CSS; L. 583-1 CSS

The housing calculation gives €189.95295 before the CRDS deduction, shown here as €189.95. The right itself still needs the paying body’s assessment that the housing is decent — Chapter 9 is about that.

THE GARNIERS’ APRIL ANSWER

TEXTS BEHIND IT



CSS — social security code; CCH — construction and housing code; DSS — the yearly instruction of the social security directorate. Each article is pinned in its edition in force on the date of the question; decree 2026-138 is cited through the two editions of R. 521-1 it produced.

One family’s April answer draws on several texts; each article is pinned in its edition in force on the date of the question.

In May, Thomas loses his job on 18 May. The teaching file records this as a change affecting the right; that is an assumption of the file, not a legal finding, and the specific rules on unemployment, such as R. 822-14 CCH, are not modelled in this case. On that assumption, the model answers that the change takes effect on **1 June 2026** (R. 823-13 CCH) and that the household must justify the change with its request for review (R. 823-3 CCH).

Look closely at the first line. Article D. 521-1 sets the allowance as percentages of a monthly base, the BMAF (€478.16): 73% for three children, and 16% as an age supplement for Inès. She turned fourteen before 1 March 2026, so she keeps the former age threshold; children who turn fourteen on or after 1 March 2026 qualify at eighteen (article 2 of decree 2026-138), and the model holds both editions of R. 521-1. Chapter 1 is about exactly such changes of edition. Computed exactly, the monthly amount is €425.5624. The model returns **€425.56** when it rounds the total to the cent, and **€425.57** when it sums the lines of the yearly instruction of the social security directorate, which prints each line already rounded — 349.06 and 76.51. It keeps both answers apart and marks 425.57 as the result of a *named reading*. A one-cent difference, and a question every benefits programme meets: who chose the rounding, and on what basis? Chapter 7 is about exactly that.

3. What an answer contains

Every answer from the model carries four things:

1. **the data used** — the family's facts, each with its origin;
2. **the parameters applied** — amounts and rates, each anchored in the pinned text of the instruction or decree;
3. **the operations** — a proof graph, rule by rule, from the facts to the result;
4. **the article behind each rule** and the pinned editions of its sources.

These records support the explanation French law requires when an individual administrative decision relies on algorithmic processing (article R. 311-3-1-2 of the code on relations between the public and the administration): the data and their sources, the parameters applied to the person's situation, and the operations carried out. The administration

must also explain how, and to what extent, the algorithm contributed to its decision. Chapter 13 shows what a notice must contain and how the file attaches it. The model shows the content of an answer; it does not by itself certify that a decision is lawful.

4. Why this is a law-as-code problem

A family's answer does not live in one article. In the Garniers' case it draws on the social security code, the construction and housing code, an ordinance on the CRDS deduction, decrees, ministerial orders and a yearly instruction that revalues the amounts. On top of that:

- **the text changes with time** — the right answer depends on the edition in force on the date;
- **the text is sometimes silent** — it divides an amount without saying how to round;
- **some conditions need a person** — whether housing is decent is decided by the paying body, not by a formula;
- **an amount comes with duties** — the fund must pay and inform; the household must justify changes;
- **decisions can be contested** — a recipient can ask for a debt to be waived or challenge a decision.

The amount is one part of the family's question. The rest — dates, silences, human assessments, duties, procedure — is what this book is about.

5. Standing on French shoulders

France is one of the best places to learn this. Its consolidated legislation is open data. OpenFisca has modelled French taxes and benefits since 2011. In 2021, the Catala team showed that a statute can be written as code beside its own text — and that doing so finds real discrepancies. The 2016 Digital Republic Act requires an administration to tell people when an individual decision about them relies on an algorithm, and to explain its rules on request. The acknowledgements give each of these its due.

6. What this book adds

New to law as code? Skim this table now and come back to it after Chapter 4.

Arxo makes these legal distinctions part of the executable model. The table says where each one appears in the book, and how CATALA 1.3.0 — one of the founding tools of law as code — handles the same need. CATALA's strengths come first: exact decimals, money and dates, exception trees that make the general case and its exceptions explicit, literate files that keep the law beside the code, tests and execution traces.

In Arxo	Chapter	In Catala 1.3.0
A missing fact is <i>not established</i> , and the answer names the missing premise	4, 9	Optional values (absent or present) are built in (Catala book, ch. 5.2²); the caller decides what to pass for an unknown fact
Two records that disagree give a <i>contradiction</i> status, kept for review (Appendix A); where grounds compete, a declared priority settles them	12	Two applicable definitions that are not exceptions to each other stop evaluation with a conflict error (Catala book, ch. 2.2³); keeping contradictory evidence as a case status needs a data model written for it
A question reserved for an authority's judgment becomes a request addressed to it — decent housing is for the paying body	9	Such a value is an input supplied by the caller; there is no built-in form for a pending decision or its addressee
Competing readings of one text are declared and chosen by name; when a choice is required, the answer says so	7, 8	Exceptions are expressed directly; competing interpretations can be modelled through inputs or separate scopes, but named readings are not a language construct
Amounts stay exact; where a division has no finite decimal result, the model requires a named reading that says how to round	7	Decimals are exact; converting a decimal to money rounds to the nearest cent (Catala book, ch. 5.2⁴)
Duties, prohibitions and powers are part of the model, with states: satisfied, violated, undetermined	10–12	The language computes values; it has no built-in form for duties
Sources are pinned by the fingerprint of their bytes with the case materials; an answer carries fingerprints of the programme, the case and the result and can be replayed from them	1, 13, 17	The law text sits beside the code and execution traces are available; the Catala book describes no binding of an answer to the hash of a pinned publication

Arxo builds missing facts, conflicting evidence, requests for human judgment, named readings and duties into the executable model, so a

²<https://book.catala-lang.org/en/5-2-types.html>

³<https://book.catala-lang.org/en/2-2-conditionals-exceptions.html>

⁴<https://book.catala-lang.org/en/5-2-types.html>

caseworker can see what is established, what needs review, which reading and text applied, and who must act next.

7. A few French terms

French	English	Meaning in this book
<i>allocataire</i>	benefit recipient	the person the fund pays
<i>foyer, ménage</i>	household	the people whose situation and resources count together
<i>ressources</i>	resources	income counted under the rules of a given benefit — not one universal “income”
BMAF	monthly base for family allowances	the base amount most family benefits are a percentage of, revalued every year
APL, ALF, ALS	housing aid	three housing benefits with different conditions
CRDS	social debt repayment contribution	a 0.5% deduction taken from family benefits and housing aid before payment
<i>indu</i>	overpayment	an amount paid that was not due
<i>remise</i>	remission	waiving all or part of a debt

8. Explore recorded scenarios

The [French Benefits Lab](https://french-benefits.law.arxo.io/)⁵ shows recorded runs of the same model: the path [from text to decision](#)⁶, the [Garnier case](#)⁷, a [decision notice built from an answer](#)⁸ and an [instruction checked before it is signed](#)⁹.

Exercise

Use the April table in section 2.

1. Which article fixes the date from which the housing right starts, and what is that date?

⁵<https://french-benefits.law.arxo.io/>

⁶<https://french-benefits.law.arxo.io/#view=journey>

⁷<https://french-benefits.law.arxo.io/#view=cases&case=famille-trois-enfants-loyer>

⁸<https://french-benefits.law.arxo.io/benefit-decision-notice/>

⁹<https://french-benefits.law.arxo.io/benefit-instruction-check/>

2. Which duty in April belongs to the household, and which two belong to the fund?
3. Why does the family allowance have two amounts, €425.57 and €425.56?

PART II

How the Model Is Built



Sources and Editions: Which French Text Applies on Which Date

By the end you can distinguish the date a question concerns from the date it was recorded, and identify the publication behind an answer.

Lawyer: which edition applies.

Analyst: which income window changes.

Developer: how a result remains attached to its source bytes.

The family's question

The Garniers ask: “If you reopen an older month, do you use today’s rules?” Predict the answer before reading on. To isolate the change, we switch cards to a fictional single tenant, with two files: *TenantDecembre* and *TenantJanvier*. These are resource questions, not a calculation of the housing payment.

The dated text

Article R. 822-3 CCH, in the pinned edition applying in December 2020, says:

L’année civile de référence est l’avant-dernière année précédant la période de paiement.

English gloss: the reference calendar year is the second year before the payment period. *Ressources retenues* → resources counted → `ressources_retenues`.

For the salary records used here, point 1° of the January 2021 edition uses the following reference period. Other income categories follow the periods specified in points 2° and 3°:

courant du treizième au deuxième mois précédant la date d'ouverture ou de réexamen du droit à l'aide personnelle au logement

English gloss: from the thirteenth to the second month before the right is opened or reviewed. The editions are separate pinned publications: [December text](#)¹⁰ and [January text](#)¹¹.

In the model

The post-reform tenant rule includes an effective window:

```
rule RessourcesRetenuesCalculeesLocatif(m: Menage, debut:
  Date, fin: Date, montant: Money) strict {
  effective [@2021-01-01, infinity);
  when secteur_locatif(m) and ressources_du_menage_
    calculee(m, debut, fin, montant);
  then ressources_retenues(m, div_round(montant, 100.0, 0,
    "CEILING") * 100);
}
```

Labels and source anchors are left out. The rule's start date prevents this construction from applying to the December question. Each file has its own `legal_time`; recording both files today does not change their legal dates.

¹⁰https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000038878997/2019-09-01

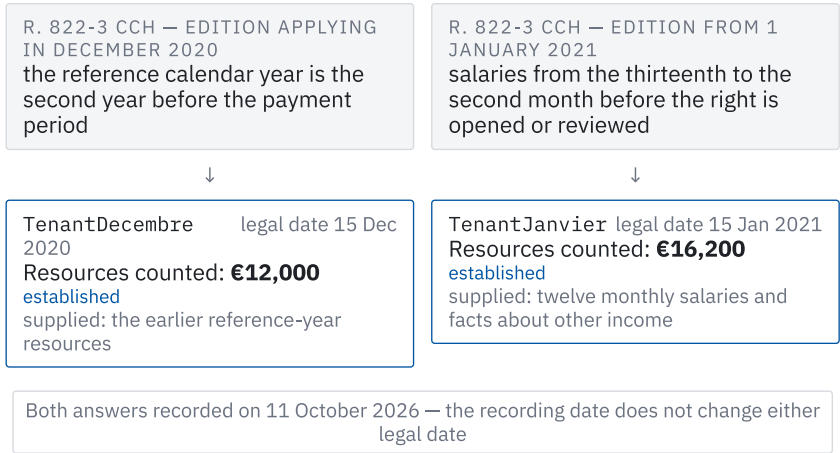
¹¹https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000041419142/2021-01-01/

Two answers

File and legal date	Resources established	What was supplied
TenantDecembre, 15 December 2020	€12,000	The earlier reference-year resources
TenantJanvier, 15 January 2021	€16,200	Twelve monthly salaries and explicit facts about other relevant income

- Recorded on 11 October 2026 with law 0.1.12.

The January file contains six monthly salaries of €1,000 and six of €2,000; the model applies the resource construction and deduction. These amounts are not the tenant’s APL payment. This is a before/after illustration of the reference method, with different representations of the relevant income, not a controlled experiment changing the date alone.



Resource questions for a fictional single tenant, not the housing payment. The two files also represent income differently: this is a before/after illustration of the reference method, not an experiment changing the date alone.

Two legal dates, two editions of R. 822-3, two resource answers; the recording date is a third, separate date.

Change one thing

Open the January resource file beside the December file. The new edition needs monthly records for the reference window; changing a date without supplying those records does not establish the new resource total. That is

the practical answer to the Garniers: an older question keeps the edition applicable to its month, and the evidence needed by that edition.

What this gives the fund

A reviewer can ask which text and income window produced an answer without relying on the current screen or on someone's recollection. The case materials preserve both R. 822-3 editions with SHA-256 fingerprints. Read those publication records alongside the dated query and the proof of the calculation.

Where Catala stands on this

Catala keeps legal text beside executable code and supports dates ([Catala book, introduction](#)¹² and [ch. 5.2](#)¹³). Arxo provides built-in declarations for source anchors and pinned publications. The Catala 1.3.0 book does not describe that publication-binding form. In this example, the edition records are preserved with the case materials; the saved answers demonstrate the calculations. A fingerprint identifies saved bytes; legal interpretation requires a separate review. The fund can preserve the publication records with the dated file and distinguish later source changes without relying on recollection.

Explore the recorded files

The [housing-resource reform scene](#)¹⁴ shows the same source transition, recorded on 9 October 2026. The two questions above were run again locally:

From a local checkout with `law` and Python 3.12+ installed, start at the repository root:

¹²<https://book.catala-lang.org/en/>

¹³<https://book.catala-lang.org/en/5-2-types.html>

¹⁴<https://french-benefits.law.arxo.io/apl-resources-reform/>

```
cd corpus/laws/fr/apl/examples/editions-2021
law ask . --case TenantDecembre --query-json \
  queries/TenantDecembre-resources-tenantdecembre.json \
  --out "$(mktemp -d)"
law ask . --case TenantJanvier --query-json \
  queries/TenantJanvier-resources-tenantjanvier.json \
  --out "$(mktemp -d)"
```

In this edition the examples run from case packages in a checkout of the Arxo repository (Appendix D).

Exercise

1. Does €16,200 tell you the housing payment?
2. Which date selects the edition: the question's legal date or today's recording date?
3. What must accompany an edition change besides a new date?

The Birth Grant: First Rule, First Answer

By the end you can read the premises of one rule and distinguish an unestablished right from a refusal.

Lawyer: what “do not exceed” includes.

Analyst: what fact is missing.

Developer: how the same query works on neighbouring files.

A different family card

We switch from the Garniers to the fictional Moreau household, expecting a child in July 2025. To make the first arithmetic easy to inspect, this case uses the canon’s teaching inputs: a €30,000 base ceiling and a €400 BMAF. These are artificial inputs, not the published annual barème for this household.

The question: “Our resources equal the ceiling. Does equality qualify?” Predict the answer; then consider what happens if the resource record is absent.

The text and vocabulary

Article L. 531-2 CSS, pinned edition from December 2020, says:

dont les ressources ne dépassent pas un plafond, pour chaque enfant à naître

English gloss: whose resources do not exceed a ceiling, for each expected child. *Prime à la naissance* → birth grant → `droit_prime_naissance`; *plafond* → ceiling → `plafond_prime`; *ressources annuelles* → annual resources → `ressources_annuelles`.

Article D. 531-2 I, pinned April 2021 edition, sets the rate at 229,75 % de la base mensuelle de calcul des allocations familiales. English gloss: 229.75% of the monthly family-benefit base. The 2026 DSS table also prints that rate; this chapter does not use its published grant amount.

The common family-benefit vocabulary defines people and households; the income model supplies resources under the applicable reference-year rules, often $N-2$. In this small case, the annual resource figure is an input. It is not interchangeable with the twelve-month housing-resource method from Chapter 1.

The rule

```
rule DroitPrimeNaissance(m: Menage, e: Enfant, ressources:
    Money, plafond: Money) strict {
    effective [@2021-01-01, infinity);
    when attente_naissance(m, e)
        and ressources_annuelles(m, ressources)
        and plafond_prime(m, plafond)
        and ressources <= plafond;
    then droit_prime_naissance(m, e);
}
```

Labels and source anchors are left out. Read when as a checklist: pregnancy, annual resources, ceiling, comparison. The amount rule then uses the established right and the BMAF:

```
rule MontantPrimeNaissance(m: Menage, e: Enfant, bmaf:
    Money) strict {
    effective [@2021-01-01, infinity);
    when droit_prime_naissance(m, e)
        and bmaf_applicable(m, bmaf);
    then montant_prime_naissance(m, e, montant_prime_
        calcule(bmaf, TauxPrimeNaissance));
}
```

Labels and source anchors are left out. The parameter `TauxPrimeNaissance` is 2.2975; Chapter 3 shows how that rate carries a source and a validity window.

Three answers

Moreau file	Annual resources	Right / €919 award claim
PlafondEgal	€35,841	Established / established
PlafondDepasse	€35,841.01	Not established / not established
RessourcesAbsentes	No resource record	Not established / not established; the separate <code>why_not</code> graph identifies <code>ressources_annuelles</code>

- Recorded on 11 October 2026 with `law 0.1.12`.

Under the model, 119.47% of the teaching base gives the €35,841 ceiling; 229.75% of €400 gives €919. The award file also supplies the examination date. No authority's judgment is invented here.

"Not established" means the query has neither support nor support for its opposite. In the second file the comparison fails; in the third, the comparison cannot be made from the supplied facts. The accompanying `why_not` question identifies the unsupplied annual-resource premise in its explanation graph; the truth answer itself has an empty `missingInputs` list. Neither answer is a complete administrative rejection notice.

Change one thing

The second file adds one cent to resources and keeps the other facts. The third removes the resource assertion. Compare the grounds, not the status label alone: the fund needs a different next action in each situation.

What this gives the fund

A rule becomes a readable checklist. Equality is handled consistently, the amount has explicit grounds, and an incomplete file can name the information it needs before someone treats it as an adverse decision.

Where Catala stands on this

Catala 1.3.0 supports exact decimals, money and optional values, so missing information can be represented explicitly (Catala book, ch. 5.2¹⁵). Arxo provides a built-in truth status and a separate `why_not` query. Here, truth returns `NEITHER`; the `why_not` graph identifies `ressources_annuelles` as an unresolved premise. The Catala 1.3.0 book does not describe this query interface; applications can define their own result types and explanations. For the fund, the two questions distinguish whether the right is established from why it has not been established, and identify the next evidence to request.

How the answers were recorded

From a local checkout with `law` and Python 3.12+ installed, start at the repository root:

```
cd \
  corpus/laws/fr/pf-paje/examples/prime-naissance-moreau
law ask . --case RessourcesAbsentes --query-json \
  queries/droit.json --out "$(mktemp -d)"
law ask . --case RessourcesAbsentes --query-json \
  queries/pourquoi-droit.json --out "$(mktemp -d)"
python3 check.py --law "$(command -v law)" --out \
  "$(mktemp -d)"
```

The case package includes all three files, saved questions, declared tests and a hand computation. These commands assume a checkout of the Arxo repository and a suitable Python interpreter (Appendix D).

Exercise

1. Does the displayed comparison include equality?
2. Does the absent-resource file establish that resources exceed the ceiling?
3. What evidence should the caseworker request next?

¹⁵<https://book.catala-lang.org/en/5-2-types.html>

Parameters and Revaluation: The BMAF and the Yearly Instruction

By the end you can distinguish a legal rate, an annual base and a family's case input.

Lawyer: the text behind a value.

Analyst: which benefits move with the base.

Developer: a parameter's type, time axis and validity window.

The Garniers' question

“Why did the base change in April, when our household did not?” Predict which thing must change: the family's facts, the percentage in the birth-grant rule, or the annual BMAF.

Base mensuelle de calcul des allocations familiales → monthly base for family allowances → BMAF. The revaluation model calls its computed value `bmaf_revalorisee`; the family-allowance file receives the retained base as `bmaf_retenu`.

The published instruction

The pinned DSS/2B/2026/46 instruction says, for 1 April 2026:

le coefficient de revalorisation de la base mensuelle des allocations familiales (BMAF) ... est fixé à 1,008

English gloss: the coefficient revaluing the BMAF is set at 1.008. Its table specifies *Arrondis au centième d’euro le plus proche*: rounded to the nearest euro cent. This instruction applies the mechanism of L. 161-25 and L. 551-1 CSS; it does not give its author freedom to choose a different statutory mechanism.

From coefficient to base

```
rule BmafChaine(e: Exercice, base: Money, c: Decimal) strict
{
  effective [@2016-01-01, infinity);
  when bmaf_precedente(e, base) and coefficient_retenu(e,
    c);
  then bmaf_revalorisee(e, round(base * c, 2, "HALF_UP"));
}
```

Labels and source anchors are left out. A preceding rule retains the coefficient at its nominal value when it is at least one; another raises a coefficient below one to one. The source anchors bind that statutory floor and the instruction’s published coefficient to their texts.

Question	Established answer
Coefficient retained for 2026	1.008
Revalued BMAF from €474.37	€478.16
Martin, two children, no age supplements	€153.01 monthly AF
Bernard, three children, no age supplements	€349.06 monthly AF
Petit, four children, no age supplements	€545.10 monthly AF

● Recorded on 11 October 2026 with law 0.1.12.
The BMAF chain is tested separately. The three fictional households use the named reading `fr.pf.af::ArrondiLignesDss`. Their answers concern gross monthly AF before CRDS. Each household file supplies the BMAF as an input; these queries do not establish entitlement to every benefit.

A parameter is more than a number

Return to the birth-grant rate from Chapter 2. Here is a shortened JSON record from its parameter dataset:

```

{
  "parameter": "urn:fr:corpus:clir:pf-
    paje#TauxPrimeNaissance",
  "timeAxis": "legal_time",
  "coverage": {
    "start": "2021-01-01",
    "endExclusive": null
  },
  "values": [
    {
      "valid": {
        "start": "2021-01-01",
        "endExclusive": null
      },
      "value": {
        "kind": "value",
        "type": {
          "name": "urn:law:std#Decimal"
        },
        "value": "2.2975"
      },
      "anchors": [
        "urn:fr:corpus:clir:pf-paje#CSS_D531_2_ED2015_01",
        "urn:fr:corpus:clir:pf-paje#CSS_D531_2_ED2021_04"
      ]
    }
  ]
}

```

This excerpt leaves out the dataset identifier and labels. `legal_time` selects the row. The end is open; the two source anchors identify the pinned editions of D. 531-2. The annual BMAF and the grant percentage have different jobs: a new base can change an amount without changing the rate rule.

Change one thing

Compare three separate household files. Their child counts and annual resources differ, although all three fall within the full-rate band. With the same BMAF and no age supplements, their monthly AF amounts follow the rates for their respective child counts. Chapter 14 changes the base in copies of the same three files and measures the consequences; today we establish where the parameter and the base come from.

What this gives the fund

The annual instruction can be checked once against its legal mechanism, then the retained value can be traced in each household calculation. A reviewer can distinguish a rate change, a base change and a data-entry change before investigating an amount.

Where Catala stands on this

Catala supports [exact decimal arithmetic](#)¹⁶ and a documented [testing workflow](#)¹⁷. Arxo provides a built-in parameter dataset with validity windows and source anchors. The Catala 1.3.0 book does not describe this dataset form; teams can represent values and dates in their programs and document the legal sources. For reviewers, Arxo brings the value, validity window and source references together in a parameter record. The fund can inspect whether an amount changed because of a new row, a revised base or a household input before reviewing the calculation.

Recording the answers

From a local checkout with `law` installed, start at the repository root:

```
law test corpus/laws/fr/revalorisation --file \
  tests/bmaf-chaine-2026.lawtest --json
cd corpus/laws/fr/pf-af/examples/cohorte-revalorisation
law ask . --case Martin --query-json \
  queries/Martin-amount.json --out "$(mktemp -d)"
```

The [instruction scene](#)¹⁸ preserves the 9 October 2026 demonstration. Today's local checks used the current declared scenario and the three saved cohort files.

Exercise

1. Which value is a percentage rate: 2.2975 or €478.16?
2. Does the cohort run prove that every benefit was updated automatically?

¹⁶<https://book.catala-lang.org/en/5-2-types.html>

¹⁷<https://book.catala-lang.org/en/3-3-0-test-ci.html>

¹⁸<https://french-benefits.law.arxo.io/benefit-instruction-check/>

3. What identifies the text behind the parameter row?

One Family, One Decision: The Garnier Household in April 2026

On a first read, follow the family's questions and answers and come back to the code afterwards. By the end of this chapter you will be able to read one decision from the model: the facts it used, the rule that applied, the article behind it, the duties it creates — and what moves when a fact or a reading changes.

Lawyer: which article fixes each answer, and where the text leaves a choice.

Analyst: which facts the answers depend on, and how a change in May moves the dates.

Developer: how a case holds facts and questions, and what comes back.

1. The question

You met the fictional Garnier family in Chapter 0: Nadia and Thomas, three children aged 15, 10 and 5, renting a five-room house in zone II for €1,320 a month since 14 March 2026, with resources of €24,600 a year — two separate bases, for family allowances and for housing aid, entered with the same value. They applied for housing aid on 20 March.

Make two predictions before you read on:

1. Their family allowances in April 2026 — closer to €350 or to €425 a month?

2. Thomas loses his job on 18 May, and the teaching file treats this as a change affecting the right. From which date does the model count that change for their housing aid?

2. How the case is built

A *case* holds the facts of one situation and the questions asked about it. The rules are not in the case: they come from the canons it depends on — the family-allowance canon, the housing-aid canon, the common vocabulary of family benefits and the payment stage; a fifth canon lends its deadline calendar. The case records who the family is, what is known about it, on which date, and which readings it chooses.

This excerpt shows the date, the selected readings and a few facts; the full case also sets the decision and knowledge times and lists every fact.

```
case Garnier2026Avril {
  context {
    legal_time @2026-04-15;
    ...
    timezone "Europe/Paris";
    deadline_policy fr.pf.cmg::CMG_MOIS_CALENDRAIRE;
    interpretation fr.apl::PpPlancherFinal;
    interpretation fr.apl::ArrondiCentimeHalfUp;
    interpretation fr.pf.af::ArrondiLignesDss;
  }

  assert "af-enfants": fr.pf.af::nb_enfants_charge(entity_ref("urn:law:examples:fr:garnier:nadia"), 3) { origin case_input; }
  assert "af-bmaf": fr.pf.af::bmaf_retenu(entity_ref("urn:law:examples:fr:garnier:nadia"), 478.16 EUR) { origin case_input; }
  assert "al-conditions": fr.apl::date_conditions_reunies(entity_ref("urn:law:examples:fr:garnier:menage"), @2026-03-14) { origin case_input; }
  assert "al-demande": fr.apl::date_demande(entity_ref("urn:law:examples:fr:garnier:menage"), @2026-03-20) { origin case_input; }
  ...
}
```

Three things to notice:

- **The date of the question is part of the case.** `legal_time` says which law applies: the editions in force on 15 April 2026.
- **Every fact says where it comes from.** Here all of them are case inputs. Published amounts such as the BMAF — the monthly base most family benefits are a percentage of, €478.16 from 1 April 2026 — enter with a note pointing to the line of the yearly instruction they were copied from. In this case the number of age supplements — one, for Inès — is also entered as a fact.
- **Readings are chosen openly.** Where the text leaves a choice — how to round — the case names the reading it adopts, so the choice is visible in the case itself.

3. One article, two rules

Take the start date of the housing right. Article R. 823-10 of the construction and housing code says, in its edition in force in April 2026:

Les aides personnelles au logement sont dues à compter du premier jour du mois civil suivant celui au cours duquel les conditions d'ouverture du droit sont réunies. Toutefois, lorsque ces conditions sont réunies antérieurement au mois de la demande, l'aide est due à compter du premier jour du mois au cours duquel la demande est déposée.

In English: housing aid is due from the first day of the calendar month *after* the month in which the conditions are met — but if the conditions were met *before* the month of the application, it is due from the first day of the month of the application.

Two sentences, so the model has two rules, each tied to the article and to every edition of it:

```
rule OuvertureApresConditions(m: Menage, conditions: Date,
    demande: Date) strict {
    when date_conditions_reunies(m, conditions) and date_
        demande(m, demande)
        and month_start_of(conditions) >= month_start_
            of(demande)
        and hors_hebergement_temporaire_823_11(m)
        and hors_insalubrite_peril_823_11(m);
    then droit_commence_le(m, add_calendar_period(month_
        start_of(conditions), 1 calendar_month));
```

```

}

rule OuvertureMoisDemande(m: Menage, conditions: Date,
  demande: Date) strict {
  when date_conditions_reunies(m, conditions) and date_
    demande(m, demande)
    and month_start_of(conditions) < month_start_
      of(demande)
    and hors_hebergement_temporaire_823_11(m)
    and hors_insalubrite_peril_823_11(m);
  then droit_commence_le(m, month_start_of(demande));
}

```

(Labels and source anchors are left out here.) The two lines about R. 823-11 keep the exceptions of the next article out of this rule: temporary accommodation and housing declared unfit have their own start dates.

The Garniers met the conditions on 14 March and applied on 20 March — the same month. The first rule applies. Asked whether the right starts on 1 April 2026, the model answers that this is established and the opposite is not, and gives its grounds: the rule *OuvertureApresConditions* with the pinned text of R. 823-10, and four facts of the case — conditions met on 14 March, application on 20 March, and the two exclusions of R. 823-11 ruled out. So the right starts on **1 April 2026** — not in March, when they moved in.

4. The decision

Here is what the model answers for April. *Established* means the model derives the claim from the facts and the rules; *not established* means that neither the claim nor its opposite is derived — which is not a refusal. Some amounts below carry more decimals than a bank transfer: that is deliberate, and explained right after the table.

Question	Answer	Rule — article
Resource band for family allowances	band 1 (24,600 ≤ 86,644)	Bande1 — D. 521-1 I 1° CSS
Family allowances, by the lines of the yearly instruction	€425.57 a month — established; €425.56 under this reading — not established	MontantMensuelLignes, Arrondi LignesMetropole — D. 521-1 CSS; MontantDu — L. 521-1 CSS
Family allowances after the CRDS deduction (a 0.5% levy taken before payment)	€423.44215	RetenueCRDSAF, NetApresCRDSAF — ordinance 96-50, art. 14 and 19
Personal contribution to housing costs	€402.1515	ParticipationPersonnelle — D. 823-17 CCH
Housing allowance (ALF), as calculated	€189.95295 a month; €190.59 without the step down to the euro — not established	DegressiviteProportionnelle Arrondie, MinorationForfaitaire Appliquee, AideMensuelleMetropole — D. 823-16 CCH and the ministerial order
Housing allowance after the CRDS deduction	€189.00318525	PrecompteCRDSMetropole — ordinance 96-50
Start of the housing right	1 April 2026	OuvertureApresConditions — R. 823-10 CCH
Duties active in April	the household attaches supporting documents; the fund pays the net family allowances and informs the recipient	JoindrePiecesJustificatives — R. 823-2 CCH; PayerAfNet — L. 521-1 CSS and ordinance 96-50; Informer Allocataires — L. 583-1 CSS

Three things stand out.

The amounts keep their digits. €189.95295 is not a typo: the model rounds where a rule or a selected reading says so, and nowhere else.

The other amount is answered too. The model establishes €425.57 under the selected reading; asked about €425.56, it answers *not established*. In the same way it applies the step “rounded down to the euro” written in D. 823-16: the €190.59 that skipping the step would give is

not established. A refusal to compute is a different outcome — section 6 shows one.

The decision includes duties. The answer to “what must each side do now?” comes from the same model as the amounts: the household must attach supporting documents; the fund must pay and inform. The full answer also lists the fund’s duty to pay the family allowances due, and its freedom to help collect child maintenance (L. 581-1 CSS). The fund’s duty to *pay housing aid* is not among them yet, because that right also needs the paying body’s assessment that the housing is decent — the subject of Chapter 9.

5. Why this answer

Follow the family allowances from facts to amount:

1. **Band.** The ceiling of band 1 for three children is $66,652 + 3 \times 6,664 = €86,644$, both figures from the published instruction. €24,600 is below it: band 1, the full rates.
2. **Lines.** Under the chosen reading, each line of the instruction’s table is rounded to the cent before adding: three children, 73% of €478.16 = 349.0568 → 349.06; one age supplement, 16% of €478.16 = 76.5056 → 76.51.
3. **Total.** $349.06 + 76.51 = €425.57$. That settles your first prediction: closer to €425 than to €350.

SAME HOUSEHOLD FACTS
three children · one age supplement · BMAF €478.16 · band 1



**BY THE LINES OF THE YEARLY
INSTRUCTION**

reading ArrondiLignesDss · file
Garnier2026Avril

$73\% \times 478.16 = 349.0568 \rightarrow \mathbf{349.06}$
 $16\% \times 478.16 = 76.5056 \rightarrow \mathbf{76.51}$
 $349.06 + 76.51 = \mathbf{€425.57}$ established



ROUNDING THE TOTAL
no rounding reading · file
Garnier2026AvrilTexteSeul

$349.0568 + 76.5056$
 $= 425.5624$
the amount due, rounded as
a total

€425.56

The cent comes from where the rounding happens, not from different facts. Under the line reading, €425.56 is not established.

Where one cent comes from: the same facts, rounded line by line or as a total.

The rule behind steps 2 and 3, shortened:

```
rule MontantMensuelLignes(p: fr.pf.core::Personne, n:
  Integer, kp: Integer, kd: Integer, b: BandeRessources,
  bmaf: Money) strict {
  effective [@2015-07-01, infinity);
  when af_droit_ouvert(p) and nb_enfants_charge(p, n) and
    n >= 2
    and nb_majorations_pleines(p, kp) and nb_
      majorations_demi(p, kd)
    and bande_ressources(p, b) and bmaf_retenu(p, bmaf);
  then montant_mensuel_af(p, ligne_base_af(n, taux_
    rang2(b), taux_rang3plus(b), bmaf)
    + ligne_dss(taux_majo(b), bmaf) * kp + demi_
      ligne(taux_majo(b), bmaf) * kd);
}
```

This rule belongs to a declared reading. The reading is marked as disputed, and it lists exactly which rules it switches on:

```
pub interpretation ArrondilignesDss {
  status disputed;
  ...
  include ArrondilignesMetropole;
  include MontantMensuellignes;
  include MajorationMontantPleinLigne;
  ...
}
```

Every answer carries this chain: the facts with their origin, each rule applied, and the article behind each rule with the pinned editions of its sources. The case also comes with a hand computation of every amount, so a reviewer can redo the arithmetic on paper. That is what a reviewer needs to retrace the decision; Chapter 13 shows what a notice to the family must contain and how the file attaches it.

6. Change one thing

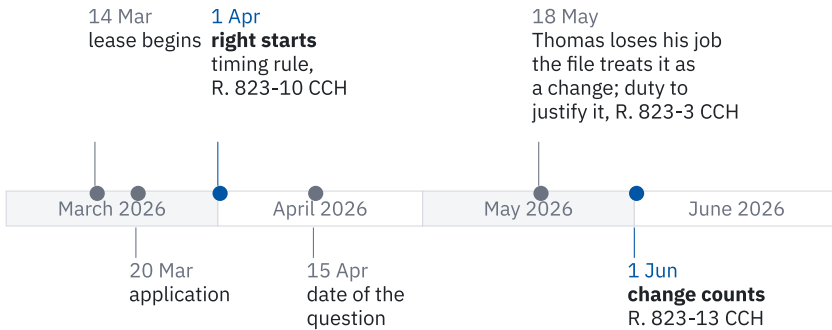
The case package has two more versions of the Garniers' file: one removes the rounding readings, the other moves to May.

Remove the rounding readings. The file *Garnier2026AvrilTexteSeul* keeps a single reading — the one the housing canon requires a choice for (Chapter 8 explains why) — and drops the two rounding readings:

- family allowances: the exact monthly product is **€425.5624**; the amount due, which the model rounds as a total, is **€425.56**;
- housing allowance: the model **refuses** with `INEXACT_DIVISION`. Article D. 823-16 says the aid *décroît proportionnellement au dépassement de ce plafond* — it decreases in proportion to how far the rent exceeds the ceiling — without saying how to round that proportion. The quotient has no finite decimal value, so the model stops and says why, instead of picking a rounding for you.

Move to May. In the file *Garnier2026Mai*, Thomas has lost his job on 18 May, and the case records this as a change affecting the right. That qualification is an assumption of the teaching file, not a legal finding: the specific provisions on how unemployment changes the resources taken into account, such as R. 822-14 CCH with its own conditions and dates, are not modelled in this case. On that assumption, the model derives

the effective date: **1 June 2026**. Article R. 823-13 applies the opening rule of R. 823-10 to any change that modifies the right: the first day of the following month. A new duty appears: the household must **justify the change** with its request for review (R. 823-3 CCH), while the duty to attach supporting documents stays active. That settles your second prediction. The May file does not recompute the amount: it shows the date and the duty.



The Garniers' dates: the right starts on the first day of the month after the conditions are met, and a change counts from the first day of the following month. That Thomas's job loss is such a change is an assumption of the teaching file. The right still awaits the decency assessment of Chapter 9.

7. What this gives the fund

One case, one place: the amounts, the articles behind them, the start date, the duties of each side, and the points still open — the decency assessment and the reading behind each rounding. A caseworker can see what is established, what is pending and who must act next. The same answer is the raw material for the notice the family receives (Chapter 13) and for testing a reform on case files before it is signed (Chapter 14).

8. Where Catala stands on this

Catala's pioneering work brought legal text and executable rules together, and Catala 1.3.0 handles amounts like these with exact arithmetic, exceptions written beside the text, dates and execution traces. What Arxo adds on this case is the decision around the amount, as built-in

declarations: the duties of the fund and the household — who owes what to whom, and in what state — and the selected reading behind €425.57. In Catala 1.3.0 these have no dedicated built-in form and need modelling written for each application; its money type has cent precision, and converting a decimal to money rounds to the nearest cent ([Catala book, ch. 5.2¹⁹](#)). Where D. 823-16 gives no rounding rule, this model stops with a reason instead. For a caseworker that is the difference between a number and a file: who must act next, from which date, under which reading. France’s published legal texts are what make a worked example like this possible.

9. Explore the recorded case

The [Garnier case in the French Benefits Lab²⁰](#) shows these answers as recorded runs, with the facts, the rules and the articles. Every answer in this chapter was recorded with the same command form:

```
law ask <case package> --case Garnier2026Avril \
    --query-json queries/al-mensuelle.json
law ask <case package> --case Garnier2026Avril \
    --query-json queries/positions.json
```

The first asks one question — here, the monthly housing allowance. The second asks for every active duty, power and freedom, with who holds it and towards whom. The text-only and May answers use `--case Garnier2026AvrilTexteSeul` and `--case Garnier2026Mai`. These answers were recorded again on 11 October 2026 with law 0.1.11.

Exercise

1. Suppose the Garniers had moved in on 14 March but submitted their application on 5 May. Using the text of R. 823-10 and the two rules in section 3, from which date would the housing right start?
2. In the file without the rounding readings, which answer shows that the model does not guess a rounding, and what does it return instead?

¹⁹<https://book.catala-lang.org/en/5-2-types.html>

²⁰<https://french-benefits.law.arxo.io/#view=cases&case=famille-trois-enfants-loyer>

3. In May, which duty is new for the household, and which article creates it?

How a Scenario Is Written

By the end you can read one scenario and explain what its successful execution does and does not establish.

Lawyer: whether the expectation follows the displayed wording.
Analyst: which boundary the case exercises.
Developer: facts, question, expectations and declared test world.

The family's question

The Garniers ask: “How do you check a rule before applying it to our file?”
Predict whether a successful scenario proves every possible household correct.

Use the Moreau birth-grant card from Chapter 2 for a small example. Article L. 531-2 CSS, pinned December 2020 edition, uses *ressources ne dépassent pas un plafond*: resources do not exceed a ceiling. *Scénario* → worked test situation → a `.lawtest` file. The equality boundary is a useful first scenario because the phrase includes equality.

Facts, question, expectation

This is the complete equality-right test in the Moreau case package; the file's language, package and namespace header is omitted:

```
test "PlafondEgal-droit" {
  given {
    context { legal_time @2025-07-15; decision_time
      @2025-07-15T12:00:00Z; knowledge_time
      @2025-07-15T12:00:00Z; timezone "Europe/Paris"; }
    assert "grossesse": fr.pf.paje::attente_
      naissance(entity_ref("urn:law:examples:fr:moreau:
        menage"), entity_ref("urn:law:examples:fr:moreau:
        enfant")) { origin case_input; }
    assert "base": fr.pf.paje::plafond_base_taux_
      plein(entity_ref("urn:law:examples:fr:moreau:menage"),
        30000 EUR) { origin case_input; }
    assert "bmaf": fr.pf.paje::bmaf_applicable(entity_
      ref("urn:law:examples:fr:moreau:menage"), 400 EUR)
      { origin case_input; }
    assert "examen": fr.pf.paje::date_examen_
      situation(entity_ref("urn:law:examples:fr:moreau:
        menage"), entity_ref("urn:law:examples:fr:moreau:
        enfant"), @2025-07-01) { origin case_input; }
    assert "ressources": fr.pf.paje::ressources_
      annuelles(entity_ref("urn:law:examples:fr:moreau:
        menage"), 35841.00 EUR) { origin case_input; }
  }
  evaluate truth(fr.pf.paje::droit_prime_naissance(entity_
    ref("urn:law:examples:fr:moreau:menage"), entity_
    ref("urn:law:examples:fr:moreau:enfant")));
  expect truth_status == TRUE_ONLY;
  expect evaluation_status == COMPUTED;
}
```

Read it in three passes. `given` supplies the dated situation and the origin of each fact. `evaluate` asks about the right. `TRUE_ONLY` requires support for the proposition and no support for its opposite. `COMPUTED` means that evaluation completed; it does not certify legal correctness. The examination date is a supplied file fact here, not an invented reply to a judgment request.

Recorded check	Outcome
Equality: birth-grant right	Established
Equality: €919 award claim	Established
Above ceiling: right and award claims	Not established
Missing resources: right and award claims	Not established; a separate <code>why_not</code> query identifies the unresolved annual-resource premise

- Recorded on 11 October 2026 with law 0.1.12.

These are artificial teaching inputs, as explained in Chapter 2.

The declared world

A test must also say which model it runs against. The manifest names the suite and the world, starting with the case package:

```
[[tests]]
family = "examples.fr.pf.paje.prime_naissance_moreau#cas"
regression = false
suites = ["tests/prime-naissance.lawtest"]
world = ["examples.fr.pf.paje.prime_naissance_moreau",
         "fr.pf.paje"]
```

The case package imports the benefit canon; it does not copy the grant rule. The saved law ask questions and the declared scenarios cover the same family files.

Change one thing

The neighbouring test adds a cent above the ceiling. Another removes annual resources. Both ask the same proposition. They check different risks: a boundary comparison and an incomplete file. A single successful equality test would leave both risks untested.

A second reading and a hand computation

The case's hand computation records the arithmetic independently of the result: the ceiling comes from the base and statutory rate; the award comes from the BMAF and grant rate. A reviewer can recompute those steps with fractions, then inspect the answer's applied rules and source anchors.

A useful method is a blind second reading: give another reader the pinned text and case facts before showing the expected answer. Compare their reading, including exclusions and dates, with the proposed test. Agreement on arithmetic is a different check from agreement on the legal construction.

The package's `check.py` also checks the rule identifiers in the proof and the annual-resource premise in the `why_not` graph, then runs the declared tests. Testing the status alone would miss an answer reached on unintended grounds.

What this gives the fund

A reviewable example connects a legal phrase to its boundary, supplied facts and expected outcome. The fund can preserve that expectation through a change and explain why a new result should be investigated. Passing it does not establish legal correctness for every file or certify the entire benefit model.

Where Catala stands on this

Catala has a mature testing workflow: `clerk test` discovers scope tests and command-output tests, with backend checks available ([Catala book, ch. 3.3](#)²¹). This is shared ground: both approaches preserve examples and expectations. Arxo adds built-in query statuses and a `why_not` graph whose missing premises the check can inspect. Catala 1.3.0 has no dedicated built-in form for the “not established, missing this premise” query answer; an application can define its own checks for absent inputs. For the fund, a scenario can preserve the reason a file is incomplete as well as the amount on a complete file.

Run the scenario

From a local checkout with `law` and Python 3.12+ installed, start at the repository root:

```
cd \
  corpus/laws/fr/pf-paje/examples/prime-naissance-moreau
law test . --json
python3 check.py --law "$(command -v law)" --out \
  "$(mktemp -d)"
```

²¹<https://book.catala-lang.org/en/3-3-0-test-ci.html>

These local commands use the case package from Chapter 2 and its installed checkout dependencies. The declared tests preserve expectations; the saved questions preserve full answer documents for inspection.

Exercise

1. Which block holds the family facts?
2. Which assertion covers the equality boundary?
3. Why inspect the applied rule in addition to the truth status?

PART III

Where the Text Is Hard



Housing Aid: The APL Formula and the K Coefficient

By the end you can distinguish the formula amount from the amount after subsequent adjustments, and identify the reading used for K.

Lawyer: the legal source of the formula.

Analyst: which component is being compared.

Developer: exact arithmetic and source-linked operations.

A new housing card

The Garniers rent an ordinary house. Their ALF calculation is not the formula for a *logement-foyer* — a collective residence. We switch to a fictional retired couple in a general-category residence autonomy, zone II, no dependants, paying €495 a month, with annual resources of €12,500. The legal month is March 2026.

Predict: can rounding K upward instead of downward change Af?

The text

Article D. 832-24 CCH, in the pinned edition applicable in March 2026, gives $Af = K \times (E - EO)$. *Coefficient de prise en charge* → share covered by aid → `coefficient_prise_en_charge`; *Équivalence de loyer et de charges locatives minimale* → minimum rent-and-charges equivalent → `equivalence_loyer_minimale`. E is the eligible rent-and-charges equiv-

alent after applying its ceiling; in this case $E = €495$. Thus $Af = 0.52 \times (€495 - €218.12546) = €143.9747608$.

Article D. 832-25 describes K as:

arrondi à deux décimales par défaut

English gloss: rounded down to two decimal places. The formula itself is published as an image. This model uses the text of the repealed R. 351-61 and R. 351-61-1 to read that formula, retaining both source references. That is a working reading; it is not a verification that the image and the earlier text have identical content.

The model

```
rule CoefficientPriseEnChargeAPLGeneral(m: Menage, parts:
  Decimal, ressources: Money) strict {
  when secteur_logement_foyer(m) and aide_demandee(m, APL)
    and type_logement_foyer(m, GENERAL)
    and nombre_parts(m, parts) and ressources_
      retenues(m, ressources);
  then coefficient_prise_en_charge(m, coefficient_k_
    general(ressources, parts));
}
```

Labels and source anchors are left out. The general-category function follows the working formula $K = 0.95 - (R - r \times N)/(cm \times N)$, with the statutory downward rounding and cap. The household supplies facts, while the canon supplies dated parameters and operations.

Component	Established value
Number of parts N	1.8
Minimum rent equivalent E0	€218.12546
K after downward rounding	0.52
Formula amount Af	€143.9747608
Monthly aid after the fixed reduction, minimum-expenditure check and contribution-representative rounding step; before CRDS	€138.694873804

- Recorded on 11 October 2026 with law 0.1.12.

N and K are checked in the proof of the formula answer. These are

calculated components, not a claim that the fund transfers every displayed decimal to a bank account.

NUMBER OF PARTS N household facts	1.8	
COEFFICIENT K working formula read from the repealed R. 351-61 and R. 351-61-1; rounded down to two decimals, D. 832-25	0.52	
MINIMUM RENT-AND-CHARGES EQUIVALENT E0 established component; its division by twelve is Chapter 7's subject	€218.12546	COMPARISON QUERY K = 0.53, rounded upward Af = €146.7435062 not established The wording says downward; the model does not replace it.
FORMULA AMOUNT Af = K × (E – E0), D. 832-24 CCH; E = €495, the eligible equivalent after its ceiling	€143.9747608	
MONTHLY AID, BEFORE CRDS after the fixed reduction, the minimum-expenditure check and the rounding step	€138.694873804	

Calculated components, not a bank transfer. A question about K can be examined at its own step, apart from the CRDS deduction.

From the number of parts to the monthly aid: each component can be examined at its own step.

Change one thing

A neighbouring query proposes €146.7435062, corresponding to K = 0.53 rounded upward. Rounding this case's unrounded K to the nearest hundredth would also give 0.52. The proposed amount is not established. It is a comparison query, not a second run adopting a different K reading. The displayed wording specifies the downward direction; the model does not replace it with nearest rounding.

What this gives the fund

A reviewer can follow each component separately: the parts, the coefficient, the minimum equivalent, the formula amount and the later adjustments. A question about K can be investigated at that step without confusing it with a CRDS deduction or a bank-payment presentation.

Where Catala stands on this

Catala's exact decimal arithmetic is well suited to a statutory formula, and its money conversion has a defined cent rounding (Catala book, ch. 5.2²²). In Arxo, the rule, dated parameters and pinned source anchors form part of the executable answer. Catala 1.3.0 has no dedicated built-in form binding the result to a pinned publication's hash; the team can maintain that archive in its application. Here the fund can inspect the source of K and the earlier-text working reading beside the component it produced. We do not compare numerical results from another implementation in this chapter.

Record and inspect

These commands require a local repository checkout and an installed law executable. Start at the repository root.

```
cd corpus/laws/fr/apl/examples/foyer-coefficient-k
law ask . --case CoupleResidenceAutonomie --query-json \
    queries/aide-formule.json --out "$(mktemp -d)"
python3 check.py --law "$(command -v law)"
```

The local case package includes the five saved questions and a hand computation. Its check inspects N, K, applied rules and the formula's source anchors, then executes the declared test twin.

Exercise

1. Which direction does *par défaut* specify?
2. Is Af the amount after all adjustments?
3. Why does the model retain the repealed articles as well as D. 832-25?

²²<https://book.catala-lang.org/en/5-2-types.html>

When the Text Does Not Specify Rounding

By the end you can distinguish rounding written in the law from a named reading added to make a calculation executable.

Lawyer: what the wording specifies.

Analyst: the component whose rounding changes.

Developer: a refusal with a reason rather than an unrecorded choice.

The resident's question

Keep the residence card, but switch to a fictional single resident with no dependants, in zone II, paying €430 monthly, with annual resources of €9,600, in March 2026. “If the text says divide by twelve, what happens when the answer does not end?” Predict whether the model silently rounds.

Douzième → one twelfth → the division in the E0 construction. *Lecture nommée* → named reading → `ArrondiCentimeHalfUp`.

The pinned wording

Article D. 832-26 CCH, edition applicable in March 2026, says:

le total étant ensuite divisé par douze

English gloss: the total is then divided by twelve. The text specifies the division, without specifying the rounding of this intermediate result.

That silence is different from the express downward rounding of K in Chapter 6.

The model’s named reading

The canon has a rule that makes the cent rounding explicit:

```
rule EquivalenceLoyerMinimaleArrondie(m: Menage, type_oyer:
  TypeLogementFoyer,
                                     situation:
                                     SituationFamiliale,
                                     pac: Integer,
                                     ressources: Money)
  strict {
    effective [2022-07-01, infinity);
    when secteur_logement_oyer(m) and aide_demandee(m, APL)
      and type_logement_oyer(m, type_oyer)
      and situation_familiale(m, situation) and personnes_
        a_charge(m, pac)
      and ressources_retenues(m, ressources);
    then equivalence_loyer_minimale(m,
      equivalence_minimale_arrondie(type_oyer, situation,
        pac, ressources));
  }
```

Labels and source anchors are left out. This rule belongs to `fr.apl:ArrondiCentimeHalfUp`, a disputed named reading. The selected construction rounds to the cent with halves upward. We call it a reading of the model; this chapter does not establish it as the Cnaf’s operational practice.

The answers

File	E0 question	Monthly aid before CRDS
ResidentSansLecture	Refusal: <code>RUNTIME_ERROR</code> , cause <code>INEXACT_DIVISION</code>	No established amount; the same refusal applies
ResidentLectureD82	€164.76, established	€132.664624, established

● Recorded on 11 October 2026 with `law 0.1.12`.

The second amount is the modelled aid after the housing-formula

adjustments and before the CRDS deduction. €164.76 is the minimum rent equivalent, not the aid. A refusal is different from a computed “not established” answer.

Change one thing

The two files hold the same household facts; the second adds the named rounding reading. The answer’s grounds identify the selected rule. Removing the reading returns to the recorded refusal; it does not imply the household lacks a right to aid.

What this gives the fund

The file records which rounding reading is selected and which component it affects. These example files do not identify the person or authority responsible for selecting it. A caseworker can separate a calculation awaiting a reading from a decision refusing a benefit, and send the legal question to the appropriate reviewer.

Where Catala stands on this

Catala supports exact rational decimals and gives decimal-to-money conversion a defined rounding to the nearest cent ([Catala book, ch. 5.2²³](#)). That provides a clear computational convention. Arxo builds named readings into the language: here the calculation refuses until the case selects the cent reading used for this operation. Catala 1.3.0 has no dedicated built-in named-reading construct; a programme can expose a choice through an input or scope. For the fund, the choice travels with the answer and can be reviewed separately from the household’s facts.

Explore the recording

The [rounding scene](#)²⁴ preserves the demonstration recorded on 9 October 2026. Today’s local check repeated both files and their declared tests:

These commands require a local repository checkout and an installed `law` executable. Start at the repository root.

²³<https://book.catala-lang.org/en/5-2-types.html>

²⁴<https://french-benefits.law.arxo.io/housing-aid-rounding/>

```
cd corpus/laws/fr/apl/examples/douzieme-sans-arrondi
law ask . --case ResidentSansLecture --query-json \
  queries/equivalence-loyer-minimale.json --out \
  "$(mktemp -d)"
law ask . --case ResidentLectureD82 --query-json \
  queries/equivalence-loyer-minimale.json --out \
  "$(mktemp -d)"
```

Exercise

1. Which displayed amount is E0?
2. Does the refusal deny the housing right?
3. In `ResidentLectureD82`, remove `interpretation fr.apl::ArrondiCentimeHalfUp`; while keeping the other context entries. Predict the E0 and monthly-aid responses.

One Text, Two Readings

By the end you can recognise a disputed reading as a choice in the file, not a fact about the household.

Lawyer: where the floor attaches in the wording.

Analyst: when the readings agree.

Developer: the declared reading group and the response without selection.

The Garniers' question

“What if two reviewers read the same formula differently?” Predict whether the model should choose one silently. To isolate the issue, we switch to a synthetic single-person test card for June 2024: zone II, no dependants, zero rent and €4,000 resources. Zero rent is a deliberate test input, not a realistic housing-aid application.

The text

Article D. 823-17 CCH, pinned edition applying in June 2024, gives $Pp = P0 + Tp \times (R - R0)$ and says $P0$:

ne peut être inférieure à un montant minimum défini par arrêté

English gloss: cannot be below a minimum fixed by order. *Participation personnelle* → personal contribution → `participation_personnelle`. The text's minimum applies to $P0$ itself. The model keeps two readings. The literal one (`PpLiteral`) applies the formula as written, $Pp = P0 + Tp \times (R - R0)$, with no further floor. The working one (`PpPlancher`

Final) also keeps the final Pp from falling below P0: $Pp = \max(P0, P0 + Tp \times (R - R0))$. Neither label establishes the competent authority's preferred reading; the Garniers' file selects the working reading, and that choice is the file's, named in its context.

The named choices

The following declarations are in the housing canon; labels are left out:

```
pub interpretation PpPlancherFinal {
  status disputed;
  ...
  include ParticipationPersonnelle;
}

pub interpretation PpLitteral {
  status disputed;
  ...
  include ParticipationPersonnelleLitterale;
  include ParticipationPersonnelleLitteraleAlias;
}

interpretation_group SensMinimumPp {
  alternatives PpPlancherFinal, PpLitteral;
  selection exactly_one;
}
```

The literal rule writes the same contribution relation as the working reading:

```
rule ParticipationPersonnelleLitterale(m: Menage, p0: Money,
  taux: Decimal, ressources: Money, abattement: Money)
strict {
  when participation_minimale(m, p0) and taux_
    participation(m, taux)
    and ressources_retenues(m, ressources) and
    abattement_r0(m, abattement);
  then participation_personnelle(m, p0 + taux *
    (ressources - abattement));
}
```

Labels and source anchors are left out. A downstream aid formula therefore follows the selected contribution; the choice is not confined to an explanatory note.

Three responses

June 2024 test selection	Personal contribution	Formula aid component
PpPlancherFinal	€37.91	€20.17
PpLitteral	€4.3462	€53.7338
No selection	INTERPRETATION_REQUIRED	INTERPRETATION_REQUIRED

● Recorded on 11 October 2026 with `Law 0.1.12`.

These are isolated formula-test results, not complete entitlement or payment decisions. The no-selection response requests the declared choice even though the question proposes a concrete amount.

CHAPTER 7 — THE TEXT IS SILENT
single resident, March 2026 · D. 832-26
CCH: *divided by twelve*

No rounding reading
refusal: `RUNTIME_ERROR`, cause `INEXACT_DIVISION`
no established amount — not a refusal of aid

Named reading
`ArrondiCentimeHalfUp`
EO **€164.76** · aid **€132.664624**
before CRDS
`established`

CHAPTER 8 — ONE TEXT, TWO READINGS
synthetic test card, June 2024 · D. 823-17 CCH · group `SensMinimumPp`, exactly one

PpPlancherFinal
contribution **€37.91** · formula component **€20.17**

PpLitteral
contribution **€4.3462** · formula component **€53.7338**

No selection
`INTERPRETATION_REQUIRED` — the answer asks for the choice

Different files, dates and questions. Chapter 7 adds a rounding the text does not give; Chapter 8 chooses between two constructions the model keeps. The amounts are formula components, not payments.

Two different gaps in a text: a rounding it does not give (Chapter 7) and a choice between two constructions the model keeps (Chapter 8).

Under D. 823-16, $Af = L + C - Pp$. This synthetic test uses $L = €0$ and the standard charges allowance $C = €58.08$. Subtracting Pp gives €20.17 under `PpPlancherFinal` and €53.7338 under `PpLitteral`. These are formula components; the test does not establish entitlement or a payment.

Change one thing

The neighbouring synthetic tests raise resources to €5,800. Both readings then establish a €55.2862 contribution and a €2.7938 formula component. Agreement in that file does not settle the legal question: the floor does not bind there. A discriminating scenario is the below-threshold file where the readings diverge.

The AAH canon uses the same mechanism for a different legal issue: *MaintienTantQue* and *RenouvellementStrict* declare readings of renewal after a lapse under article 2 of decree 2022-1694. Keep that question distinct from the housing floor; a reading name records a legal construction, not a universal rounding or renewal preference.

What this gives the fund

Two reviewers can preserve competing constructions without changing the household's evidence. The case makes the selected reading visible; a missing selection becomes an explicit next step. A reviewer can also choose a test that distinguishes the readings rather than relying on a file where their amounts coincide.

Where Catala stands on this

Catala makes general rules and exceptions explicit, with conflicting applicable definitions reported as an evaluation error ([Catala book, ch. 2.2](https://book.catala-lang.org/en/2-2-conditionals-exceptions.html)²⁵). Competing legal constructions can be represented through inputs or separate scopes. Arxo builds named readings and a required-selection group into the language; Catala 1.3.0 has no dedicated built-in form for that group. For the fund, the unresolved choice becomes a result the file can retain and route for review, and downstream questions share the selected reading.

Record the scenarios

These commands require a local repository checkout and an installed `law` executable. Start at the repository root.

²⁵<https://book.catala-lang.org/en/2-2-conditionals-exceptions.html>

```
law test corpus/laws/fr/apl --file \
    tests/finish-lecture-pp.lawtest --json
```

The declared suite tests both readings below the threshold, agreement above it, and the absence of a selection. The case snippets in earlier chapters use qualified reading names because they belong to another package.

Exercise

1. Which response occurs without a selection?
2. Does agreement above the threshold settle the reading below it?
3. Are the table's amounts complete bank payments?

A Human Must Decide: Decent Housing

You will follow three versions of one family's file: assessment pending, housing found decent, housing found not decent. By the end you will know what the model answers when a condition rests on a person's assessment, whom it asks, and how each answer changes the file — including the duties and the protection that arise when the housing is found not decent.

Lawyer: who assesses decency, and what the law attaches to each answer.

Analyst: what the fund can already calculate, and what waits for the assessment.

Developer: how a request to an authority appears in an answer, and how the authority's answer enters a case.

1. The question

In Chapter 4 the model calculated the Garniers' housing allowance: €189.95295 a month. One condition was left open: the house must be decent. Whether it is depends on evidence about the dwelling — damp, heating, floor space, safety — not on a formula.

Make a prediction: before anyone has assessed the house, does the model say the family *is* entitled, *is not* entitled, or something else?

2. The text

Article L. 822-9 of the construction and housing code, in the edition in force on the case dates (from 31 December 2023; the text is unchanged in the edition of 1 July 2026), opens with:

Pour ouvrir droit à une aide personnelle au logement, le logement doit répondre à des exigences de décence...

In English: to open a right to housing aid, the dwelling must meet the decency requirements defined under article 6 of the 1989 law on rental relations, with details set by regulation. Decency is a legal standard assessed from evidence: the landlord provides a certificate (R. 823-2), and under L. 843-1 a finding of non-decency is made by the paying body or by a body it has accredited. This model addresses the decency question to the paying body.

Glossary: *décence* → decency → `logement_decent`; *organisme payeur* → paying body → `OrganismePayeur`; *allocation conservée* → the fund keeps the allowance → `conservation_en_cours`.

3. In the model: a question addressed to an authority

The model does not turn decency into a fact the case types in. It declares it as a *judgment* and names who gives it:

```
pub external judgment relation logement_decent(m: Menage) {
  authority OrganismePayeur;
  label fr official "le logement répond aux exigences de
    décence";
}

rule DroitOuvert(m: Menage) defeasible {
  when secteur_locatif(m) and occupation_residence_
    principale(m)
    and logement_decent(m);
  then droit_ouvert(m);
}
```

(Source anchors are left out here; both declarations are tied to L. 822-9, and the rule also to L. 822-2.) Within this model's scope, the rule opens the right for a tenant whose home is the main residence and whose

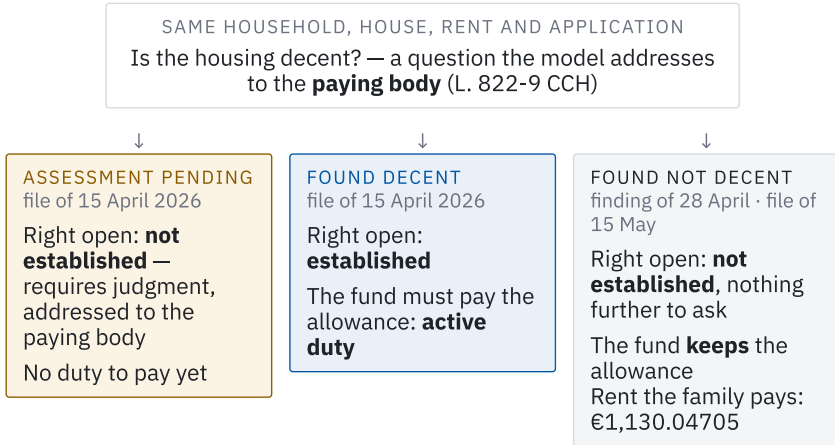
housing has been assessed as decent; other eligibility requirements sit in other rules. The first two conditions are facts of the case. The third is a question the model addresses to the paying body.

4. Three files, three answers

The case package for this chapter has three versions of the Garniers’ file. All three share the household, the house, the rent and the application. The first two are dated 15 April 2026; the paying body’s answer is the one thing that sets them apart. The third is dated 15 May 2026 and adds the finding of 28 April, zero recoverable charges, the allowance amount the fund has told the family, and the fact that the family was informed.

Question	Assessment pending	Found decent	Found not decent (28 April)
Is the right open?	<i>not established</i> — requires judgment , addressed to the paying body	established	<i>not established</i> , nothing further to ask
Housing allowance as calculated (€189.95295)	established	established	established
Does the fund keep the allowance?	not established	not established	established
Rent the family pays (€1,130.04705)	not established	not established	established
The fund must pay the allowance	—	active duty	—

Answers recorded on 11 October 2026 against the pinned canon fr. ap1 0.1.0.



The allowance as calculated is €189.95295 in all three files. The third file also adds the finding of 28 April, zero recoverable charges, the amount the fund told the family, and the fact that the family was informed. Established and not established are statuses of answers, not outcomes for the family.

One question reserved for the paying body; three files, three answers.

5. Before the assessment

With no answer yet, the model says *not established* — and, in the same answer, *why*. This is the recorded result, trimmed:

```
{
  "evaluationStatus": "REQUIRES_JUDGMENT",
  "truthStatus": "NEITHER",
  "judgmentRequests": [{
    "predicate": "urn:fr:corpus:clir:apl#logement_decent",
    "authority": "urn:fr:corpus:clir:apl#OrganismePayeur",
    "request": {
      "relation": "urn:fr:corpus:clir:apl#logement_decent",
      "args": [{ "kind": "entity_ref", "id": "urn:law:
        examples:fr:garnier:menage" }]
    }
  }]
}
```

(The request also carries its polarity, an id and a proof hash.) This is the point of the chapter. A pending assessment is not a refusal, and it is not a fact the family forgot to give. It is a question with an addressee:

a caseworker sees exactly what is open, for which household, and who must answer it.

Meanwhile, the rest of the file keeps working. The calculated amount, €189.95295, is established. The positions already in force are active: the household must attach the supporting documents (R. 823-2) and must not claim aid for several dwellings at once (R. 821-1); the landlord must provide a certificate that the housing is decent (R. 823-2) — the evidence the assessment starts from. The fund's duty to pay is not among them yet: the right it depends on is still open.

6. The paying body answers: decent

In this example the answer enters the case marked as an answer to a judgment:

```
assert "al-decence": fr.apl::logement_decent(entity_
  ref("urn:law:examples:fr:garnier:menage")) { origin
  adjudicated; }
```

The marker `origin adjudicated` admits it through the judgment channel; in this short form the case does not record which body gave it. Now the right is **established** by the rule `DroitOuvert`, and a new position appears: the fund **must pay** the housing aid due to the household (`VerserAideTheoriqueDue`). The same model, one more answer, and the file moves from “waiting” to “pay”.

7. The paying body answers: not decent

A finding of non-decency does not end the aid. Article L. 843-1 says, in three sentences:

Lorsque l'organisme payeur ou un organisme dûment habilité par ce dernier a constaté que le logement ne satisfaisait pas aux caractéristiques de décence mentionnées à l'article L. 822-9, l'allocation de logement est conservée par l'organisme payeur pendant un délai maximal fixé par voie réglementaire. L'organisme payeur notifie au propriétaire le constat ... et l'informe qu'il doit le mettre en conformité ... Durant ce délai, le locataire s'acquitte du montant du loyer et des charges récupérables diminué du montant des allocations

de logement, dont il a été informé par l'organisme payeur, sans que cette diminution puisse fonder une action du propriétaire à son encontre pour obtenir la résiliation du bail.

In English: for the family and social housing allowances (ALF, ALS), when the paying body — or a body it has accredited — finds the dwelling not decent, the paying body keeps the allowance for a period set by regulation. It notifies the owner of the finding and of the deadline to bring the dwelling up to standard in order to receive the kept sum. During that period, the tenant pays the rent plus recoverable charges, minus the allowance amount the paying body has communicated; that reduction gives the owner no ground to seek termination of the lease.

One article, four different things in the model — a rule, a duty, an amount and an immunity:

- **a rule:** the allowance is kept (ConservationDeclencheeALF);
- **a duty of the fund:** notify the owner of the finding (Notifier ProprietaireConstat), alongside its duties to inform the tenant (R. 843-3) and to tell the owner about help with the works (R. 843-4);
- **an amount:** the rent the family pays — €1,320 + €0 recoverable charges — €189.95295, the allowance amount the fund has communicated and the file records as a fact = **€1,130.04705** (LoyerReduit Conservation). The file takes that amount from Chapter 4's calculation, with all its decimals;
- **an immunity:** the household is protected against the landlord ending the lease over that reduction (NonResiliationBailNonDecence).

In the file, the finding of 28 April 2026 is entered twice — as the negative answer to the decency question, and as the dated finding that starts the conservation:

```
assert "al-decence": not fr.apl::logement_decent(entity_
  ref("urn:law:examples:fr:garnier:menage")) { origin
  adjudicated; }
assert "nd-constat": fr.apl::constat_non_decence(entity_
  ref("urn:law:examples:fr:garnier:menage"), @2026-04-28)
{ origin case_input; }
```

With that answer given, the question “is the right open?” is *not established* and carries no further request — the authority has answered. And the fund’s duty to pay is absent: the allowance is kept, not paid.

8. What this gives the fund

Arxo makes the pending assessment and its named authority explicit in the answer. The three files show how each answer, with the facts that come with it, changes duties, amounts and protections — with the article behind each one. That clear line between what the model computes and what a person assesses is also what French law asks an administration to explain about an algorithm’s part in a decision (Chapter 13).

9. Where Catala stands on this

Catala, a pioneering law-as-code language, expresses legal conditions and their exceptions beside the text they come from. Its scopes take inputs from the caller, and Catala 1.3.0 offers optional values for a fact that may be absent (Catala book, ch. 5.2²⁶) — a condition such as “the housing is decent” can be modelled that way. What its documented language does not have is a dedicated form for a judgment addressed to a named authority, or for the legal duties and immunities that follow; each would be modelling written for the application. Arxo provides these forms directly, in the language and in every answer. For a caseworker, that means the pending assessment, its authority and the resulting positions are visible in the file itself.

10. How the answers were recorded

```
law ask <case package> --case DecenceEnAttente \
  --query-json queries/droit-ouvert.json
law ask <case package> --case NonDecenceConstatee \
  --query-json queries/positions.json
```

The third case is DecenceReconnue; the other questions are aide-mensuelle, conservation and loyer-reduit. The case package’s check asks all twelve questions and runs a test twin with the same expectations.

²⁶<https://book.catala-lang.org/en/5-2-types.html>

Exercise

1. In the file with no assessment yet, what is the status of the right, and to whom does the model address its question?
2. Which sentence of L. 843-1 becomes an immunity in the model, who holds it, and against whom?
3. Before the assessment, the family asks how much its housing allowance would be. What does the model answer?

PART IV

After the Amount



Duties of the Fund and the Household

By the end you can distinguish a duty that exists from a duty whose performance has been established.

Lawyer: who owes what to whom.

Analyst: the evidence needed to assess performance.

Developer: creation and assessment of a normative position.

The Garniers' question

“We have an amount. What must we do, and what must the fund do?”
Predict whether a duty shown as *active* means it has already been fulfilled.

Obligation → duty → a declared duty position. In the Garniers' recorded files, `JoindrePiecesJustificatives` concerns supporting documents; `PayerAfNet` concerns payment of net family allowances; `InformerAllocataires` concerns information; `JustifierChangements` concerns a request for review after a change. Chapter 9 adds `VerserAideTheorique` Due after the authority establishes decency.

The text

Article L. 583-1 CSS, pinned edition applying in April 2026, says:

Les organismes débiteurs des prestations familiales et leur personnel sont au service des allocataires. Ils sont tenus en particulier : 1°) d'assurer l'information des allocataires sur la nature et l'étendue de leurs droits...

English gloss: family-benefit paying bodies and their staff serve recipients and must inform them about the nature and extent of their rights. This is a continuing obligation; the model does not invent a single deadline for it.

In the model

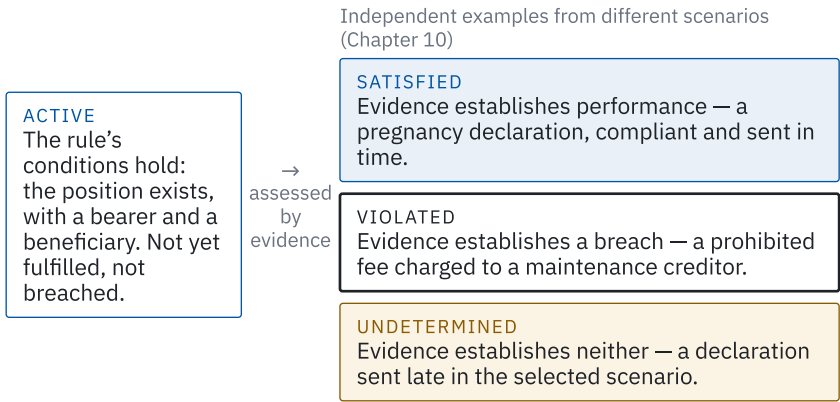
```
rule DevoirInformer(o: Organisme, p: Personne) strict {
  effective [@2021-01-01, infinity);
  when organisme_debiteur_pf(o, p);
  then duty InformerAllocataires {
    bearer o;
    beneficiary p;
    maintain information_fournie(o, p) during
      [@2021-01-01, infinity);
  };
}
```

Labels and source anchors are left out. The position names the bearer, beneficiary and what must be maintained. Its existence follows from the paying-body relation; the existence of a duty is a different question from whether evidence establishes its performance.

The recorded positions

File or scenario	Position	Recorded state
Garnier April	Supporting documents, AF payment, information	Active
Garnier May	Justify the change with the review request	Active
Decency recognised, Chapter 9	Pay the theoretical housing aid due	Active
Pregnancy declaration, compliant document and timely sending	DeclarerGrossesseEnDelai	Satisfied
Pregnancy declaration sent late in the selected scenario	DeclarerGrossesseEnDelai	Undetermined
Maintenance recovery, fee charged to creditor	NoChargeCreditor	Violated

The Garnier positions were recorded on 11 October 2026 with law 0.1.11 in Chapters 4 and 9. The three performance scenarios were recorded on 11 October 2026 with law 0.1.12. Their facts concern different fictional people and legal dates; they are examples of assessment, not later events in the Garniers’ file.



An active duty is not a breached one, and not yet a fulfilled one. A continuing duty, such as informing recipients, can stay active with no dated breach.

How evidence assesses a position: three independent examples from different scenarios.

Change one thing

Compare the timely declaration with the late-sending scenario. The late test expects *undetermined*, not *violated*. In this scenario, the evidence does not establish timely performance or explicit non-performance, so the expected assessment is **UNDETERMINED**. The maintenance example supplies the prohibited fee event, which establishes a violation.

What this gives the fund

An amount and a duty can be reviewed together without treating payment as already made. The file identifies who must act, towards whom and which evidence supports an assessment. A continuing information duty can remain visible even when no dated breach is established.

Where Catala and L4 stand on this

Catala brings legal text, exceptions and computation together, with tests available for the result (Catala book, ch. 3.3²⁷). Arxo builds duty and prohibition declarations and their assessment states into the language; Catala 1.3.0 has no dedicated built-in deontic position form. L4, a rules language from Legalese, also provides built-in obligations, permissions and prohibitions through MUST, MAY and SHANT, with FULFILLED and BREACH outcomes (official L4 documentation²⁸). For this fund example, the benefit calculation and the obligations of both sides can be inspected in the same answer, while performance remains dependent on evidence.

Record the performance scenarios

From a local checkout with law installed, start at the repository root:

```
law test corpus/laws/fr/pf-paje --file \
    tests/devoir-declarer-satisfait.lawtest --json
law test corpus/laws/fr/pf-paje --file \
    tests/devoir-declarer-envoi-tardif.lawtest --json
```

The maintenance scenario belongs to the canon `fr.pf.maintenance` and was recorded with its prohibition and facts as the canon declares them.

Exercise

1. Does *active* mean *satisfied*?
2. Does the displayed late-sending scenario establish a violation?
3. Which duty is continuing rather than assigned a single deadline here?

²⁷<https://book.catala-lang.org/en/3-3-0-test-ci.html>

²⁸<https://legalese.com/l4/reference/regulative>

A Family Over Time: Overpayments, Deductions, Prescription

By the end you can read a sequence of dated payment files without confusing an input gross amount with a newly calculated entitlement.

Lawyer: the grounds for recovery and limitation.

Analyst: gross amount, deduction and remaining payment.

Developer: separate snapshots of the same household over time.

A payment-stage family card

We switch from the Garniers' housing-right file to the fictional *FamilleDansLeTemps* household. The snapshots span 2024–2026. Gross benefit amounts, the PA amount before recovery, deduction amounts of €79.60, €180 and €70, and facts permitting recovery from another benefit are supplied inputs. The chapter follows how the payment rules use them.

The question: “A debt was recorded. Does every later payment have to be reduced?” Predict whether a prescribed debt and a debt still eligible for recovery have the same effect.

Indu → overpayment → *indu*; *retenue* → deduction → the recovery step; *prescription* → limitation of recovery → the dated conditions in the payment model.

The legal distinction

The pinned social security text, L. 553-1 CSS, uses:

L'action de l'allocataire pour le paiement des prestations se prescrit par deux ans.

English gloss: the recipient's action for payment is limited to two years. Its following wording also governs recovery of improperly paid benefits, with exceptions for fraud or false declarations. Limitation must be checked under the applicable rule and facts; it is not an instruction to subtract any recorded debt from any current payment.

A dated snapshot

The December case contains these actual inputs; other assertions and the file header are left out:

```
assert "af-brut": fr.pf.af::af_montant_du(entity_
  ref("urn:fr:case:famille:camille"), 320.00 EUR)
  { origin case_input; }
assert "taux": fr.prestations.versement::prelevement_
  mensuel_declare(entity_ref("urn:fr:case:famille:
  camille"), 79.60 EUR) { origin case_input; }
assert "taux-licite-0": fr.prestations.versement::
  report_rsa_sur_pf_licite(entity_ref("urn:fr:case:
  famille:camille")) { origin case_input; }
assert "taux-licite-1": fr.prestations.versement::
  report_pa_sur_pf_licite(entity_ref("urn:fr:case:
  famille:camille")) { origin case_input; }
...
```

This excerpt supplies facts to the payment canon. It does not compute the household's AF entitlement from ages and resources. Keeping that boundary explicit makes the sequence useful for reviewing deductions.

Recorded payment answers

Snapshot	Supplied amount and context	Established remaining amount
March 2024	AF gross €200, CRDS	€199
August 2024	ARS gross €400, CRDS	€398
July 2025	Birth-grant gross €1,000, CRDS	€995
December 2025	AF gross €320, CRDS; recoverable overpayment	€238.80
March 2026	AF gross €320, CRDS; earlier AF overpayment prescribed	€318.40
March 2026	RSA €600 with PF debt carried into recovery	€420
June 2026	PA amount before recovery: €280; own debt and RSA debt carried into recovery	€210

- Recorded on 11 October 2026 with law 0.1.12.

The seven saved questions establish the proposed amounts in the model’s payment stage. Gross amounts and the served PA are inputs, not an end-to-end calculation of entitlement. The housing → RSA → PA calculation is a separate scenario and is not claimed as executed by this household run.

	SUPPLIED INPUT		REMAINING AMOUNT
Mar 2024	supplied AF gross €200; CRDS	→	€199
Aug 2024	supplied ARS gross €400; CRDS	→	€398
Jul 2025	supplied birth grant gross €1,000; CRDS	→	€995
Dec 2025	supplied AF €318.40; recoverable overpayment	→	€238.80
Mar 2026	supplied AF €318.40; overpayment recovery time-barred (supplied finding)	→	€318.40
Mar 2026	supplied RSA €600; PF debt carried into recovery	→	€420
Jun 2026	supplied PA €280 before recovery; own and RSA debts	→	€210

Fictional household FamilleDansLeTemps. Gross amounts, deductions and the limitation finding are inputs; the model applies the payment rules to them. It does not calculate the entitlement or the limitation period, and the snapshots are checkpoints, not one experiment changing the date.

Seven dated checkpoints in the payment stage: supplied inputs on the left, the amounts the payment rules establish on the right.

Change one thing

Compare the December recovery question with the March prescribed-debt question. The household files have different dates and inputs; this is a sequence of checkpoints rather than an experiment changing the date alone. The March case supplies `action_prescrire`, stating that recovery of the AF overpayment is time-barred, and supplies zero RSA and PA debts carried over for recovery. The payment rules therefore preserve the full net instalment of €318.40 (€320 gross after CRDS). This case applies the supplied limitation finding; it does not calculate the limitation period.

What this gives the fund

A caseworker can distinguish the right calculated by a benefit owner, the amount passed into the payment stage and the supplied levy and deduction applied there. Review of an overpayment can focus on the grounds for recovery, the limitation finding and the deduction amount rather than treating a lower transfer as an unexplained change in entitlement.

Where Catala stands on this

Catala provides exact arithmetic and date operations, including explicit behaviour for ambiguous month additions ([Catala book, ch. 5.2²⁹](https://book.catala-lang.org/en/5-2-types.html)). Arxo supplies dated cases, normative positions and proof-bearing questions within the same model. Catala 1.3.0 has no dedicated built-in form for duties and their assessment states; an application can model its payment workflow around computed values. For the fund, a payment checkpoint can preserve the amount and its recovery grounds together, while a separate query examines what action is due next. The date alone does not prove a recovery is lawful.

Record the snapshots

From a local checkout with `law` installed, start at the repository root:

```
cd corpus/laws/fr/prestations-versement/examples
cd famille-dans-le-temps
python3 check.py --law "$(command -v law)" --out \
    "$(mktemp -d)"
law ask . --case Famille2025_12 --query-json \
    queries/af-rec-2025-12.json --out "$(mktemp -d)"
```

The package README identifies all seven queries and their supplied inputs. The local run uses the dependencies of a checkout of the Arxo repository (Appendix D).

Exercise

1. Is the €1,000 birth grant newly derived here from BMAF?
2. Which snapshot preserves the full AF instalment because of limitation?
3. Does the June answer demonstrate the complete RSA-to-PA entitlement calculation?

²⁹<https://book.catala-lang.org/en/5-2-types.html>

Remission of a Debt, Prior Review and Deadlines

By the end you can route a request to the right procedure and distinguish a deadline from a favourable decision.

Lawyer: remission, prior review and recovery dispute.

Analyst: acknowledgement and notification dates.

Developer: deadline questions and argumentation are separate outputs.

The Fontaines' question

“We accept that the housing debt exists, but cannot repay it. Is asking for a waiver the same as disputing the debt?” Predict whether all challenges use the same timetable.

We follow a different fictional family, the Fontaines, in the file *FontaineRemise*, dated 15 April 2026. It is not the Garniers' three-child file with an age supplement from Chapter 4. *Remise gracieuse* → discretionary remission → *demande_remise_gracieuse*; *recours administratif préalable obligatoire* → mandatory prior administrative review → RAPO; *commission de recours amiable* → amicable review commission → CRA.

The pinned text

Article R. 825-3 CCH, edition applicable in April 2026, begins with a remission request:

sans que soit contesté le bien-fondé de la dette

English gloss: without contesting whether the debt is well-founded. The paying body acknowledges it within fifteen days of receipt; the director has two months to notify the decision, after the CRA's opinion. The text also makes silence after that period an implied rejection and permits judicial challenge of that decision without prior administrative review. Do not transfer those rules to every appeal against a housing decision.

Two deadline rules

```
rule AccuseDueRemise(m: Menage, demande: Date) strict {
  when demande_remise_gracieuse(m, demande) and dette_
    bien_fonde_non_conteste(m);
  then accuse_due_avant_remise(m, add_calendar_
    period(demande, 15 calendar_day));
}

rule StatuerDueRemise(m: Menage, demande: Date) strict {
  when demande_remise_gracieuse(m, demande) and dette_
    bien_fonde_non_conteste(m);
  then statuer_due_avant_remise(m, add_calendar_
    period(demande, 2 calendar_month));
}
```

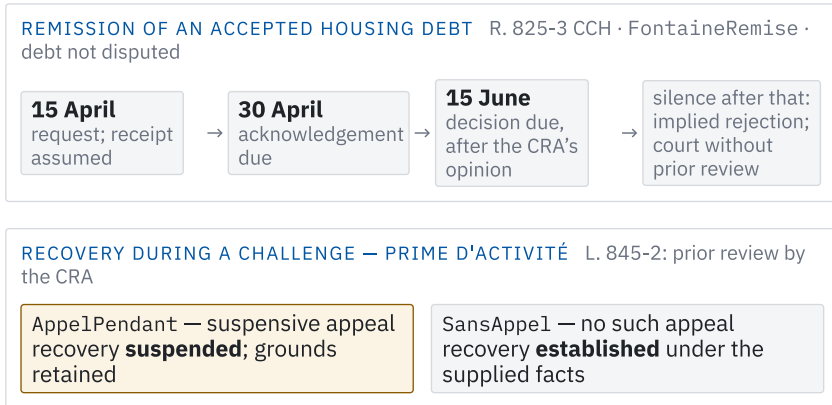
Labels and source anchors are left out. Both rules require the uncontested-debt fact. The case explicitly selects the calendar policy and uses 15 April as the request date. Reading the resulting dates as legal deadlines assumes that the paying body received the request that day.

Procedural question	Recorded answer
FontaineRemise: acknowledgement deadline, assuming receipt on 15 April	30 April 2026, established
FontaineRemise: decision deadline	15 June 2026, established
AppelPendant: PA recovery with a suspensive appeal	Suspension of recovery established; grounds retained
SansAppel: PA recovery without that appeal	Recovery established under the supplied facts

● Recorded on 11 October 2026 with law 0.1.12.

The last two rows are separate fictional prime-d’activité files. They con-

cern recovery during challenge, not a CRA decision about the substantive merits. The deadlines do not establish that remission will be granted.



The deadlines say what is due next; they do not establish that remission will be granted. The fifteen-day acknowledgement is not a deadline for every appeal against a housing decision.

Asking to waive an accepted debt and disputing recovery follow different procedures and timetables.

Change one thing

Compare *AppelPendant* with *SansAppel* in the [overpayment-appeal scene](#)³⁰, recorded on 9 October 2026. The suspensive appeal changes the grounds for proceeding with recovery. The scene's argument graph retains reasons and priority; it does not impersonate the commission's decision.

RAPO names a mandatory administrative review before court proceedings; CRA names the commission involved. For housing decisions under R. 825-1 and R. 825-2, the review goes through the CRA and the director gives a reasoned decision after its opinion. For prime d'activité, L. 845-2 requires prior review by the CRA. An uncontested housing-debt remission request follows R. 825-3. The recovery examples examine whether collection is suspended; they do not decide the underlying dispute.

³⁰<https://french-benefits.law.arxo.io/overpayment-appeal/>

What this gives the fund

The file can show which procedure applies, what is due next and the grounds that affect recovery. A caseworker sees a request awaiting a director's decision separately from a challenge that affects collection. This helps prevent a fifteen-day acknowledgement rule from being used as a universal appeal deadline.

Where Catala stands on this

Catala makes conditions and exceptions explicit and reports a conflict when competing applicable definitions lack an exception relationship ([Catala book, ch. 2.2](#)³¹). Arxo builds normative positions and argumentation queries into its model; Catala 1.3.0 has no dedicated built-in form for those procedural positions or an argument graph retaining competing grounds. Applications can define their own review workflow. For the fund, the same file can retain what action is due and why recovery is supported or defeated, without presenting those computational answers as the commission's substantive decision.

Recording the questions

From a local checkout with `law` installed, start at the repository root:

```
cd corpus/laws/fr/apl/examples/recours-remise-fontaine
law ask . --case FontaineRemise --query-json \
  queries/FontaineRemise-remise-receipt.json --out \
  "$(mktemp -d)"
cd ../../../../prime-activite/examples/recours-indu-cra
law ask . --case AppelPendant --query-json \
  queries/AppelPendant-argumentation.json --out \
  "$(mktemp -d)"
```

Both local packages include recorded questions, declared tests and procedural notes. A human must qualify the family's request and review the legal grounds.

³¹<https://book.catala-lang.org/en/2-2-conditionals-exceptions.html>

Exercise

1. Does R. 825-3 here concern a dispute over whether the debt exists?
2. Does the two-month deadline establish a successful remission?
3. Does the appeal scene decide the merits for the CRA?

PART V

What the Model Gives the Fund



Explaining a Decision to the Recipient

By the end you can distinguish a saved calculation, an attached notice and an administrative explanation.

Lawyer: the four disclosure headings.

Analyst: inputs and operations behind an amount.

Developer: attach a document without treating its prose as a new legal fact.

The Fontaines' file

“We received a number. Can you explain how you reached it?” Predict whether a proof of the amount also explains who made the administrative decision.

This chapter uses *FontaineRemise*, the Fontaine household in the recorded notice scene: three children, €40,000 resources, no age supplements, full-rate AF of €349.06. It is a different fictional file from the Garniers' in Chapter 4, not another reading of the same facts.

The four headings

The pinned [R. 311-3-1-2 CRPA](#)³², in force since 1 September 2017, includes:

³²https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000034195881

Le degré et le mode de contribution du traitement algorithmique à la prise de décision

English gloss: the degree and manner in which the algorithm contributes to the decision. R. 311-3-1-2 governs information supplied on request, in intelligible form and subject to legally protected secrets. Separately, L. 311-3-1³³ and R. 311-3-1-1 CRPA³⁴ distinguish the statement in a decision from the information disclosed on request. L. 311-3-1, introduced by the 2016 Digital Republic Act, requires an explicit statement when an individual decision is based on algorithmic processing, subject to its statutory exception. R. 311-3-1-1 specifies the statement's content, including the processing purpose and how to exercise disclosure rights. It is not a claim that a proof automatically fulfils every disclosure requirement.

Heading	What the demonstration can supply	What the administration must confirm
Contribution of the algorithm	Rules calculate the proposed amount and procedural dates	Actual human review, discretion and decision-making role
Data and sources	Fictional household facts, their provenance and pinned texts	Which administrative data were actually processed
Parameters and weights	BMAF and selected AF rounding reading	Applicable settings in the operational decision
Operations	Applied rules and proof steps	Intelligible explanation appropriate to the recipient

Traitement algorithmique → algorithmic processing; *notification* → notice → the attached Notification document. Explaining a benefit calculation does not explain selection for a control investigation: that requires the grounds and data of the selection process.

An attached document

This excerpt of the Fontaine case (FontaineRemise) records a document's identity and content fingerprint:

³³https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000033205535

³⁴https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000034195878

```
evidence Notification: vocab.source_records::Resource {
  id "fontaine-fictional-generated-notice";
  status presented;
  observed_at @2026-04-15T12:00:00+01:00;
  recorded_at @2026-04-15T12:00:00+01:00;
  uri "resources/documents/notification.fr.txt";
  content_hash "sha256:
    eb4175829493575f46e646c31c24f773
    08d54eab822111a5161c5e80f366f21f";
}
```

The attachment records the text presented with the case. It does not turn statements in the notice into adjudicated facts. A changed notice needs its own fingerprint and review.

The recorded file

Alongside the AF calculation, this fictional file contains a request for remission of a housing-aid overpayment debt whose merits are not disputed. To read the dates below as legal deadlines, assume that the paying body received the request on 15 April 2026, the case’s supplied request date. Under CCH R. 825-3, these dates concern the paying body’s acknowledgement and notification of its remission decision. They are not deadlines for awarding AF or for the recipient to lodge an appeal.

Question	Recorded answer
AF amount, without age supplements	€349.06 established
Acknowledgement deadline, assuming receipt on 15 April	30 April 2026 established
Decision notification deadline under the supplied request date	15 June 2026 established

The [decision-notice scene](#)³⁵ preserves the five questions and a full French verbalisation recorded on 9 October 2026, through the local MCP recording server 0.1.0. That is the server version, not a CLI version. The two deadline questions were repeated on 11 October with `law 0.1.12` in Chapter 12.

³⁵<https://french-benefits.law.arxo.io/benefit-decision-notice/>

The French notice is a demonstration. A native French legal reviewer has not qualified it as ready to send. Its record of a successful verbalisation is a technical result, not legal or editorial approval.

Change one thing

Add a new human determination or correct an input. Recalculate the relevant question, then regenerate and review the notice. Editing its prose alone does not update the calculation. For a decency question reserved to an authority, follow Chapter 9 before describing a favourable housing decision.

What this gives the fund

The recipient's explanation can be checked against the same saved answer used by the caseworker. The four headings also expose information that a calculation cannot supply: how the administration used it and what a person actually decided.

Where Catala stands on this

Catala 1.3.0 provides computation traces for inspecting intermediate steps ([Catala book, ch. 2.4](https://book.catala-lang.org/en/2-4-states-dynamic.html)³⁶), alongside scenario tests and continuous integration ([ch. 3.3](https://book.catala-lang.org/en/3-3-0-test-ci.html)³⁷). Arxo adds proof-bearing answers and content-hashed case documents as built-in forms; Catala 1.3.0 has no dedicated built-in case-document attachment form. An application can preserve and explain its results. Here the attachment connects a specific notice to the file; it does not establish CRPA compliance or supply the human role.

Exercise

1. Why is €349.06 different from the Garnier amount in Chapter 4?
2. Which heading specifically addresses the algorithm's contribution to the decision, including the human role?
3. Can the demonstration notice be sent as a legally approved template?

³⁶<https://book.catala-lang.org/en/2-4-states-dynamic.html>

³⁷<https://book.catala-lang.org/en/3-3-0-test-ci.html>

Testing a Reform Before It Is Signed

The draft instruction in this chapter is fictional: no such instruction was signed.

By the end of this chapter you will be able to take a draft change to the rules, check its formalisation, see what it computes and which rules it touches, and measure what it does to three families' allowances — before anyone signs it.

Lawyer: exactly which rule the draft changes.

Analyst: what it does to families' amounts, and what the impact report does and does not observe.

Developer: the four steps — check, evaluate, impact, run the cases.

1. The question

Every spring the social security directorate (DSS) publishes an instruction that revalues the BMAF — the monthly base most family benefits are a percentage of. The 2026 instruction (DSS/2B/2026/46) reads:

Au 1er avril 2026, le coefficient de revalorisation de la base mensuelle des allocations familiales (BMAF) ... est fixé à 1,008 soit un taux de revalorisation de la BMAF de 0,8 %.

So the BMAF moved from €474.37 to €478.16 on 1 April 2026. Now take a fictional policy experiment: multiply the published coefficient by 1.05, so 1.008 becomes 1.0584. In practice a yearly instruction applies the formula of article L. 161-25 and cannot change it; a departure like this

would need its own legal basis. Here it is a teaching device. Before such a draft is signed, a team wants four answers. Is the draft well-formed as a formalisation? What does it compute? Which rules does it touch? And what does it do to families?

Make a prediction: the fictional Bernard household — three children, first resources band, no age supplements — receives €349.06 a month in family allowances before the CRDS deduction. With the draft, roughly how much more?

2. The rule behind the revaluation

The instruction applies article L. 161-25 of the social security code:

La revalorisation annuelle des montants de prestations dont les dispositions renvoient au présent article est effectuée sur la base d'un coefficient égal à l'évolution de la moyenne annuelle des prix à la consommation, hors tabac ... Si ce coefficient est inférieur à un, il est porté à cette valeur.

In English: amounts that refer to this article are revalued each year by a coefficient equal to the change in average consumer prices excluding tobacco; if the coefficient is below one, it is raised to one.

In the revaluation canon, three short rules carry this: one raises a coefficient below one to one, one keeps a coefficient from one upward as it is, and one chains the BMAF from the previous year, rounded to the cent. The draft changes the second, by a single expression. The excerpts show the last two:

```
// in force
rule CoeffNominal(e: Exercice, c: Decimal) strict {
  when coefficient_annee(e, c) and c >= 1.0;
  then coefficient_retenu(e, c);
}

// draft (fictional): "nominal coefficient increased by five percent"
rule CoeffNominal(e: Exercice, c: Decimal) strict {
  when coefficient_annee(e, c) and c >= 1.0;
  then coefficient_retenu(e, c * 1.05);
}
```

```
rule BmafChaine(e: Exercice, base: Money, c: Decimal) strict
{
  when bmaf_precedente(e, base) and coefficient_retenu(e,
    c);
  then bmaf_revalorisee(e, round(base * c, 2, "HALF_UP"));
}
```

These are separate excerpts: the draft `CoeffNominal` replaces the rule in force; the two are shown together for comparison, not as one file. Labels, dates and source anchors are left out.

3. Step 1 — Is the draft well-formed?

The whole draft package — rules, sources, editions — is checked as an Arxo formalisation, in a sandbox apart from the canon in force. The recorded verdict:

EXPRESSIBLE — check is clean, lowering is complete, schema-valid. ...
A green check does not mean that the rules derive anything.

Expressible means that Arxo accepts the formalisation and translates it without omissions. It says nothing about legal validity or about who may sign. And the second sentence matters: a draft can be well-formed and still compute nothing useful. So the next step runs it.

4. Step 2 — What does it compute?

With the published inputs for 2026 — last year’s BMAF of €474.37 and the coefficient 1.008 — the draft derives:

	In force	Draft
Coefficient retained	1.008	1323/1250 (= 1.008 × 1.05 = 1.0584)
BMAF from 1 April 2026	€478.16	€502.07

The coefficient stays an exact fraction until the rule rounds the BMAF to the cent.

5. Step 3 — Which rules does it touch?

The impact report compares the draft with the canon in force:

- **one rule changed** — `CoeffNominal`; the change is semantic, not cosmetic;
- **the recorded impact run evaluated no scenarios**. It compared the two versions of the package and reports the changed rule as unobserved — and it refuses to read that as “no effect”: in its words, *absence of observation, not a conclusion*.

This is the line to read first: the report names the changed rule and says what it has not observed. The canon’s own test suite does exercise `CoeffNominal`; running it against the draft is a separate step. In this chapter, Step 2 executed the changed rule with explicit inputs, and Step 4 brings the resulting BMAF into the families’ files.

6. Step 4 — Run the families

Meet three fictional households from the book’s revaluation cohort: Martin, Bernard and Petit. All are in metropolitan France, in resources band 1 (the full rates), with no age supplements or forfait. Each file is evaluated for 15 April 2026 twice: with the BMAF in force, €478.16, and with the draft’s BMAF, €502.07 — nothing else changes.

Family	Children	In force	Draft	Difference
Martin	2	€153.01	€160.66	+€7.65
Bernard	3	€349.06	€366.51	+€17.45
Petit	4	€545.10	€572.36	+€27.26

Each amount is the family allowance due for the month, before the CRDS deduction, computed by the model with its rule and article: 32%, 73% and 114% of the BMAF for two, three and four children, under the reading each case selects by name, `ArrondilignesDss` — each row of the scale rounded to the cent, as the yearly instruction publishes its amounts (*arrondis au centième d’euro le plus proche*), with an exact half-cent rounded up. The differences were computed by the engine too. That answers your prediction: about €17 more for three children.

Recorded on 9 October 2026 in the French Benefits Lab; the six family amounts were run again on 11 October 2026 with `law 0.1.11` and came out the same.

STEP 1
Is the draft well-formed?

EXPRESSIBLE — accepted and translated without omissions. Says nothing about legal validity, nor that the rules derive anything.

STEP 2
What does it compute?

Coefficient retained:
1.008 → $1323/1250 = 1.0584$
BMAF from 1 April 2026:
€478.16 → **€502.07**

STEP 3
Which rules does it touch?

One rule changed: `CoeffNominal`. The recorded impact run evaluated no scenarios — *absence of observation, not a conclusion*.

STEP 4
Run the families — 15 April 2026, family allowances before the CRDS deduction; resources band 1, no age supplements

family	children	in force → draft	
Martin	2	€153.01 → €160.66	+€7.65
Bernard	3	€349.06 → €366.51	+€17.45
Petit	4	€545.10 → €572.36	+€27.26

The draft is fictional. Three stated files are not a budget estimate: that needs representative population data and weights.

Four steps for a draft instruction before it is signed.

7. What this gives the fund

A draft can be tested as a formalised rule before it is signed: is it well-formed, what does it compute, which rules does it touch, and what does it do to family files, one by one. The report also says plainly where the evidence stops: a changed rule it has not observed is flagged, not silently counted as unaffected. Three families are not a budget estimate — that needs representative population data and weights. They show what the draft does to three stated files, with every amount traceable to its rule and article; whether that is what its authors intend is for them to say.

8. Where OpenFisca and Catala stand

France has a rich tradition of reform simulation. OpenFisca has modelled French taxes and benefits since 2011; its reform mechanism changes a

copy of the system and keeps the baseline, and LexImpact uses OpenFisca to help Parliament estimate the household and budget effects of amendments. Catala, a pioneering law-as-code project, keeps executable rules beside the legal text, with tests and execution traces.

What this chapter adds is a check of the draft as a package of rules with its pinned sources; an impact report that names the changed rule and says what it has not observed; and a proof graph with source anchors behind every amount, before and after. That helps reviewers see both the change and the evidence still needed. The Catala book treats a change in the law as a change to the program, verified by tests and continuous integration (ch. 3.3³⁸); it describes no separate draft check or impact report for Catala 1.3.0.

9. Explore the recorded scene

The scene [Before a benefit instruction is signed](#)³⁹ shows the recorded draft check, the draft BMAF and the three families before and after. The same steps are available to an analyst or an AI assistant through Arxo's tools for drafts — check, evaluate and impact; the family amounts come from ordinary questions to the cohort's case files.

Exercise

1. What exactly does the draft change in the revaluation rules?
2. The impact report finds no changed outcome. Why does that not mean the draft has no effect?
3. By how much does the draft raise the Petit family's allowance, and why is the increase larger than the Martins'?

³⁸<https://book.catala-lang.org/en/3-3-0-test-ci.html>

³⁹<https://french-benefits.law.arxo.io/benefit-instruction-check/>

Finding Families Who Do Not Claim

By the end you can distinguish a queue for assistance from a legal determination of entitlement.

Lawyer: necessary conditions and complete grounds.

Analyst: screening with incomplete data.

Developer: preserve the original facts for the full question.

The family's question

The Garniers ask: “Could you help a family that has never applied?” Predict whether passing a children-count screen establishes its entitlement. We switch to four fictional metropolitan households, with no age supplements or forfait: Martin, Bernard, Petit and Durand.

Non-recours → failure to claim a potential entitlement; *enfant à charge* → dependent child → `nb_enfants_charge`. Helping a household verify its position is a task; this demonstration does not measure a reduction in non-claiming.

The text and the full rule

L. 521-1 CSS, pinned wording applied in April 2026, says:

Les allocations familiales sont dues à partir du deuxième enfant à charge.

English gloss: family allowances are due from the second dependent child. The sentence supports a necessary condition for this metropolitan screen. Other facts remain necessary for a complete answer.

The actual amount rule has further premises; labels and source anchors are left out:

```
rule MontantDu(p: fr.pf.core::Personne, m: Money, c: Money,
  f: Money) strict {
  effective [2015-07-01, infinity);
  when montant_mensuel_af(p, m) and complement_
    degressif(p, c)
    and forfait_total_menage(p, f);
  then af_montant_du(p, round(m + c + f, 2, "HALF_UP"));
}
```

A screen derived from necessary conditions is deliberately broader than the complete question. Unknown data must pass to further examination rather than silently excluding a possible recipient.

Four recorded rows

Household	Children	Annual resources	Screen	Full monthly AF, before CRDS
Martin	2	€30,000	Pass	€153.01
Bernard	3	€40,000	Pass	€349.06
Petit	4	€50,000	Pass	€545.10
Durand	1	€30,000	Does not pass	Not evaluated

- Recorded on 9 October 2026 through the local MCP recording server 0.1.0.

The [family-allowance scene](https://french-benefits.law.arxo.io/family-allowances/)⁴⁰ retains the source rows, selection and three full answers with their proof graphs. They use the supplied April BMAF and the selected ArrondiLignesDss reading. No complete entitlement decision was made for Durand.

⁴⁰<https://french-benefits.law.arxo.io/family-allowances/>

SOURCE ROW	SCREEN	FULL QUESTION, WITH PROOF
Martin 2 children · €30,000	→ passes	→ €153.01 a month
Bernard 3 children · €40,000	→ passes	→ €349.06 a month
Petit 4 children · €50,000	→ passes	→ €545.10 a month
Durand 1 child · €30,000	→ does not pass	→ not evaluated

Exercise, not a recorded run — a row whose child count is unknown:

Unknown count missing	→ passes	→ retained for further examination — the missing fact first
------------------------------	-----------------	---

Screen: at least two dependent children (L. 521-1 CSS) — necessary, not sufficient. Full amounts: family allowances before the CRDS deduction, reading *ArrondilignesDss with proof* — each answer keeps its saved proof graph. Durand was not evaluated: no entitlement decision was made.

A screen built from a necessary condition, then the full question for the rows that pass.

Change one thing

Remove a child’s count from a source row. The safe screening method passes that unknown row for further examination; it does not infer zero children. A specialist must obtain the missing information before the full question can establish an amount. This change is an exercise in the screening method, not an additional recorded run in the table.

What this gives the fund

The team can form an assistance queue with a stated selection condition, then examine complete cases without replacing their original facts. Contacting households, establishing missing facts and deciding whether they qualify remain separate steps. Four fictional rows are not evidence of programme effectiveness.

Where OpenFisca and Catala stand on this

Population simulation is a strength of [OpenFisca](https://openfisca.org/)⁴¹. Catala supports executable benefit rules with tests ([Catala book](https://book.catala-lang.org/en/3-3-0-test-ci.html), [ch. 3.3](#)⁴²). Arxo builds

⁴¹<https://openfisca.org/>
⁴²<https://book.catala-lang.org/en/3-3-0-test-ci.html>

proof-bearing questions and necessary-condition screening into the model; the Catala 1.3.0 book does not describe a built-in screening tool derived from a query's grounds. Teams can build population workflows around their calculations. Here selection and a full answer are recorded separately, allowing the fund to explain why a row entered the queue without confusing that with entitlement.

Exercise

1. Does passing the screen establish a right?
2. Should missing children-count data exclude the row?
3. What does the Durand row establish about a benefit payment?

An Assistant That Answers With Proof

By the end you can distinguish an assistant's source discovery from a computed answer and its grounds.

Lawyer: inspect the rule and its premises.

Analyst: check supplied facts before repeating an amount.

Developer: preserve requests, replies and proof in a compatible integration.

The family's question

"Can an assistant tell us the amount and show its grounds?" Predict whether finding the relevant article is enough. The recorded client asks about fictional Martin: two dependent children, €30,000 resources, April 2026 inputs, no age supplements or forfait. This is not the Garniers' file.

The legal fragment

The search finds the pinned L. 521-1 CSS wording applied in April 2026:

Les allocations familiales sont dues à partir du deuxième enfant à charge.

English gloss: allowances are due from the second dependent child. The amount also needs parameters, resource conditions and case facts. *Preuve* → proof → the saved proof graph; MCP is the protocol used by this compatible integration.

The recorded sequence

Step	What the client obtains
law_search	Candidate source text
law_rules	Rules producing af_montant_du and required premises
law_ask	Computed collection with one amount, €153.01, and its proof

- Recorded on 9 October 2026 through local MCP recording server 0.1.0.

The server version describes this recording, not the CLI. The [assistant scene](#)⁴³ preserves the full requests and replies. Albert, the French administration’s AI assistant, was not involved. This demonstrates a compatible client integration, not a claim about every assistant.

The final amount is supported by the same actual rule used in the preceding chapter:

```
rule MontantDu(p: fr.pf.core::Personne, m: Money, c: Money,
  f: Money) strict {
  effective [@2015-07-01, infinity);
  when montant_mensuel_af(p, m) and complement_
    degressif(p, c)
    and forfait_total_menage(p, f);
  then af_montant_du(p, round(m + c + f, 2, "HALF_UP"));
}
```

Labels and source anchors are left out. The recorded €153.01 is gross monthly family allowance, before CRDS. The request uses a legal date of 15 April 2026, supplies BMAF of €478.16 and selects the named reading `fr.pf.af::ArrondiLignesDss`. The assistant must inspect these settings and the household facts before presenting the amount. A search excerpt cannot establish those premises.

Change one thing

If resources are missing, obtain clarification before presenting an established amount. Chapter 2 separates a truth question from the `why_not` question that identifies a missing premise. If the issue is an authority’s

⁴³<https://french-benefits.law.arxo.io/evidence-linked-assistant/>

judgment, use the request-and-decision path of Chapter 9. Neither gap is resolved by a fluent explanation.

These two branches describe the integration method. The recorded Martin dialogue establishes the stated amount with its supplied facts; it does not execute those additional branches.

What this gives the fund

A caseworker can inspect the exact question and the engine's reply before adopting an assistant's explanation. The saved proof offers a check on the answer's grounds and an identified point for asking for data or human determination. Publication or communication to a recipient is a further action.

Where Catala and L4 stand on this

Catala keeps executable law and tests together ([Catala book, ch. 3.3](https://book.catala-lang.org/en/3-3-0-test-ci.html)⁴⁴). [L4 also supports MCP integration](https://github.com/legalese/l4-ide)⁴⁵. Arxo's compatible integration adds a saved proof graph to the computed answer. Catala 1.3.0's book does not describe a built-in MCP protocol interface; an application can provide one. For the fund, the useful artefact here is the preserved question, answer and grounds, rather than the assistant's wording alone.

Exercise

1. Which step establishes the amount?
2. What should the assistant do with a missing resource premise?
3. Was this an Albert integration test?

⁴⁴<https://book.catala-lang.org/en/3-3-0-test-ci.html>

⁴⁵<https://github.com/legalese/l4-ide>

Audit and Reproduction

By the end you can state what replay establishes and what still requires separate review.

Lawyer: distinguish reproducibility from correct interpretation.

Analyst: preserve the question and inputs.

Developer: compare programme, case and result fingerprints.

The family's question

“Can someone repeat your answer next year?” Predict whether repeating the same answer proves its legal correctness. We return to the fictional Moreau teaching case from Chapter 2: synthetic BMAF €400, base ceiling €30,000, resources at the modelled ceiling €35,841. These are not the published 2025 scale.

The pinned rule

L. 531-2 CSS, in the wording in force since 16 December 2020 and used for this teaching case dated 15 July 2025, includes the condition:

dont les ressources ne dépassent pas un plafond

English gloss: whose resources do not exceed a ceiling. The condition concerns the household or person receiving the birth or adoption grant. Equality is included. Replay repeats the formalisation of that question; a legal reviewer must still assess the chosen text, facts and construction.

The saved fingerprints

This excerpt copies the actual saved answer’s fingerprints; other fields are omitted:

```
{
  "programHash": "sha256:d7740308956c4a9b279537698f7af3d4
    48a2abb9b54e2f676fc16eacfaaf29aa",
  "caseHash": "sha256:8134b82a55a7e45ccce7732f00c1659c
    5b1ff91e98abc16a25590339591a9f92",
  "resultHash": "sha256:3b041b7e8d987baafb0425b9fb2c0286
    f11c4d79c8eaa5519db62a2051e64ac2"
}
```

The programme fingerprint identifies the executable model; the case fingerprint identifies the presented case; the result fingerprint identifies the evaluated answer. Preserve the request and bundle, not the fingerprints alone. These fields do not replace a separate archive of legal publications: the Moreau answer’s resolved-edition field is empty. The edition is nonetheless identified: each applied rule carries the anchors of the pinned editions of its sources (Chapter 3 shows one, `CSS_D531_2_ED2021_04`); the resolved-edition field is a separate summary that this version of the tool does not fill.

Check	Recorded result
Original amount question	€919 established
Replayed amount question	€919 established
Programme, case and result fingerprints	All three unchanged

- Original and replay recorded on 12 October 2026 with `law` 0.2.1, from the book’s reproduction kit (Appendix D).

This is one replayed answer, not a certification of the corpus.

REPLAY

law eval of the saved answer: €919 established again; programHash, caseHash, resultHash unchanged

shows: the same model gave the same answer to the same case

does not show: that the answer is legally right

DECLARED EXPECTATIONS
the package's scenarios pass

shows: those scenarios give the answers their authors declared

does not show: the legal review

LEGAL REVIEW

a reviewer assesses the chosen text, the facts and the construction

shows: whether the formalisation and decisions are justified

does not show: anything a fingerprint carries — it is a human judgment

Change one thing: resources €35,841 → €35,841.01 make a **new case** with a different answer — not a failed replay.

Moreau teaching case of Chapter 2, synthetic figures; original and replay recorded on 12 October 2026.

Three different checks: a replay, the declared expectations and a legal review answer different questions.

Repeat the answer

From a local checkout with law installed, save a new answer directory and replay it:

```
cd \
  corpus/laws/fr/pf-paje/examples/prime-naissance-moreau
answer_dir="$(mktemp -d)"
law ask . --case PlafondEgal --query-json \
  queries/montant.json --out "$answer_dir"
law eval "$answer_dir"
```

Compare manifest.programHash, manifest.caseHash and resultHash in the original and replayed JSON. If any differ, inspect inputs, execution and versions before treating the replay as identical.

Change one thing

Changing Moreau's resources from €35,841 to €35,841.01 changes the case and makes the grant not established in Chapter 2's neighbouring file. That is a new question with different evidence, not a failed repro-

duction of the equality case. A changed programme similarly needs a new recorded result.

What this gives the fund

An auditor can repeat a preserved computation and tell whether it used the same model and case. Passing declared expectations checks those scenarios. Legal qualification checks whether the formalisation and decisions are justified. These are three distinct forms of review.

Where Catala stands on this

Catala 1.3.0 provides computation traces for inspecting intermediate steps ([Catala book, ch. 2.4⁴⁶](https://book.catala-lang.org/en/2-4-states-dynamic.html)), alongside scenario tests and continuous integration ([ch. 3.3⁴⁷](https://book.catala-lang.org/en/3-3-0-test-ci.html)). Arxo builds saved query bundles and programme/case/result fingerprints into replay; the Catala 1.3.0 book does not describe this built-in query-bundle form. An application can preserve its inputs and outputs. Here the fund can check a specific computation's identity while leaving legal interpretation open to independent review.

Exercise

1. Does identical replay prove the law was correctly interpreted?
2. Are fingerprints alone sufficient to rerun a case?
3. Is a question after changing resources a replay of the same case?

⁴⁶<https://book.catala-lang.org/en/2-4-states-dynamic.html>

⁴⁷<https://book.catala-lang.org/en/3-3-0-test-ci.html>

Migrating a Rulebook: Other Tools' Tests as Acceptance

By the end you can prepare a migration register without claiming an unexecuted comparison.

Lawyer: qualify the legal grounds of a difference.

Analyst: map inputs and result components.

Developer: preserve external expectations and record both executions.

The family's question

“Another calculator has a test for our benefit. Can you use it to check this model?” Predict whether a matching rate is enough to make two scenarios comparable. We keep the separate Moreau teaching card from Chapter 2; its synthetic amounts are useful for learning the mapping method.

This chapter covers the method. No Catala or OpenFisca numerical comparison is accepted here, and no foreign code is presented as executed.

Start with the legal premise

L. 531-2 CSS, in the pinned wording used in the Moreau case, says:

dont les ressources ne dépassent pas un plafond

English gloss: whose resources do not exceed a ceiling. The equality boundary suggests a scenario worth preserving. *Correspondance des entrées*

→ input mapping; *attendu* → expectation → the original external test’s declared answer.

An actual local equality test ends with these statements; the preceding given facts are omitted:

```
evaluate truth(fr.pf.paje::droit_prime_naissance(entity_ref("urn:law:examples:fr:moreau:menage"), entity_ref("urn:law:examples:fr:moreau:enfant")));
expect truth_status == TRUE_ONLY;
expect evaluation_status == COMPUTED;
```

Those expectations belong to Moreau. Do not rename them as a foreign test or use its synthetic BMAF as a published scale.

A migration register

Field	Preserve before execution
Original identifier	System, test ID and source reference
Version and date	Model release, legal date and retrieval date
Inputs	Household, units, period, resources, geography and provenance
Construction	Parameter edition, rounding, selected reading and defaults
Original expectation	Unchanged value, component and meaning of status
Local execution	Mapped case, question, answer and saved grounds
Difference	Input mismatch, scope, arithmetic, reading or legal-basis question
Acceptance	Named reviewer, evidence and unresolved question

No new numerical comparison is claimed by this register. Moreau’s local equality and missing-input questions were run on 11 October 2026 with law 0.1.12, as recorded in Chapters 2 and 5. This chapter demonstrates the migration method using a local teaching case. It does not establish acceptance of a Catala or OpenFisca comparison. Before publishing a match count, preserve the external source, input mapping, both execution records and the review of each difference.

Change one thing

Replace an annual resource field with a monthly one. Before comparing results, record the conversion and the reference period; twelve times a monthly amount is not automatically the legal annual resource base. Likewise, a formula component cannot be compared with a net transfer merely because both are money.

Keep the original expectation when a difference appears. First compare facts, effective editions, defaults and rounding. For a difference involving article 31 of the housing-aid order of 27 September 2019, record the applicable edition and an open question about the legal basis. Leave the issue unresolved until reviewed; do not classify it as a confirmed implementation error.

What this gives the fund

A migrated test can retain its origin and meaning rather than becoming a fresh expectation tailored to the new model. The register makes disagreements reviewable and names the evidence still needed for acceptance.

Where Catala stands on this

Catala provides assertion and output tests and `clerk test` (Catala book, ch. 3.3⁴⁸). Arxo adds case/query records with proof-bearing responses. The Catala 1.3.0 book does not describe a built-in register binding a migrated external scenario to these answer records; teams can maintain one around either system. For the fund, the shared discipline is preserving the test's original expectation and investigating differences before accepting a migration.

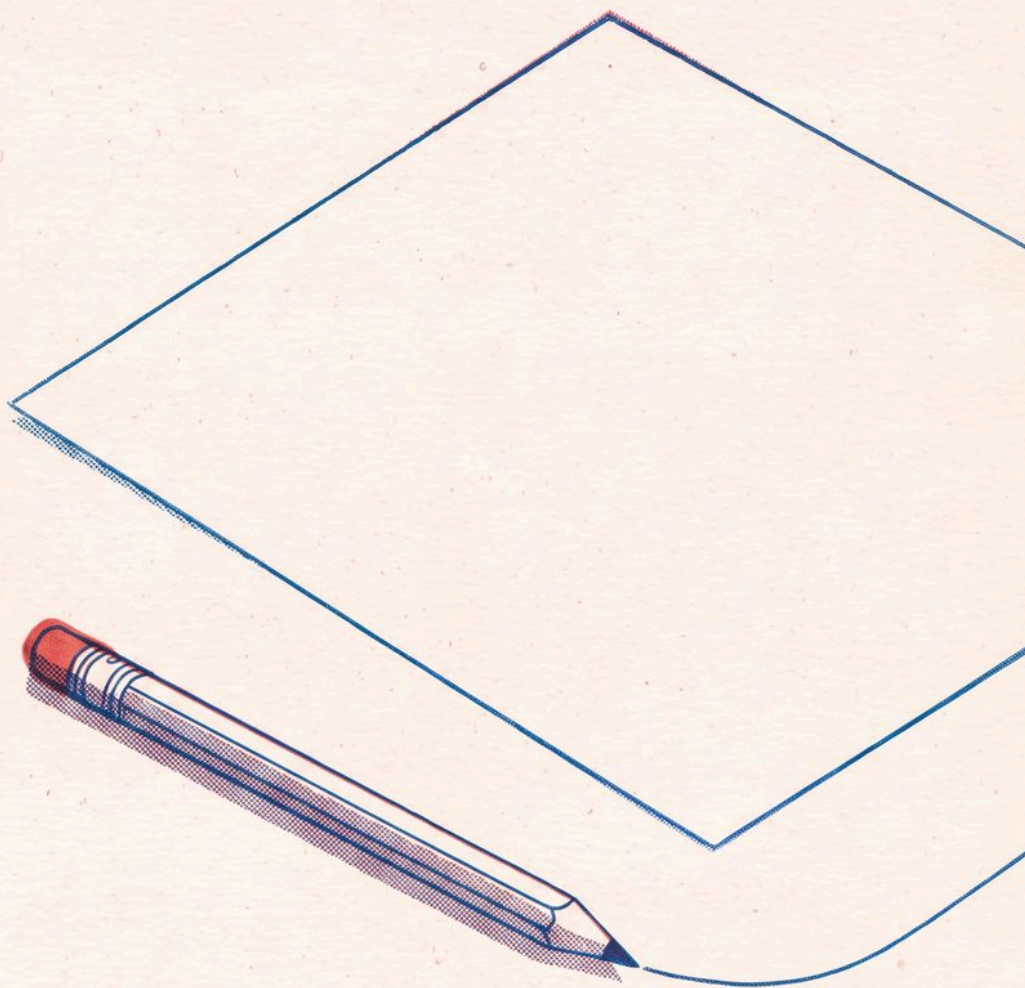
Exercise

1. May you adjust the original expectation to obtain a passing migration?
2. What must be checked before comparing two money values?
3. What would permit publishing a numerical match count?

⁴⁸<https://book.catala-lang.org/en/3-3-0-test-ci.html>

PART VI

Your Turn



FINAL EXERCISE

Amend a Benefit and Build a Country Pilot

By the end you will have a reviewable amendment exercise and a pilot brief for your own country.

Lawyer: amendment authority, readings and unresolved judgment.

Analyst: consequences for three supplied families.

Developer: draft check, execution, impact and preserved case answers.

The question

“How would a proposed revaluation change our allowances, and who must decide whether it may be adopted?” Predict the Bernard household’s increase before opening Chapter 14’s solution.

Use the fictional Martin, Bernard and Petit cohort, without age supplements or forfait, with the April 2026 legal date. This is a policy experiment, not an enacted instruction. The Garniers’ housing file and the Fontaines’ notice file remain separate.

The source and amendment

The pinned DSS/2B/2026/46 instruction states:

le coefficient de revalorisation de la base mensuelle des allocations familiales (BMAF) ... est fixé à 1,008

English gloss: the BMAF revaluation coefficient is set at 1.008. *Projet* → draft; *revalorisation* → revaluation. A departure from the statutory indexation formula requires its own legal basis.

Use the actual fictional amendment from Chapter 14. Labels, dates and source anchors are omitted:

```
rule CoeffNominal(e: Exercice, c: Decimal) strict {
  when coefficient_annee(e, c) and c >= 1.0;
  then coefficient_retenu(e, c * 1.05);
}
```

It replaces the canon's retention of `c` with `c * 1.05`. Keep the baseline separately.

Your submission

1. **Check:** inspect the recorded draft-check request and response. Explain what *EXPRESSIBLE* establishes.
2. **Evaluate:** inspect the draft execution from BMAF €474.37 and coefficient 1.008. Identify the retained coefficient and new BMAF.
3. **Impact:** inspect which rule changes and what the report observed. Do not use its absence of scenario observations as evidence of no effect.
4. **Three families:** compare their baseline and draft answers, preserving the selected `ArroundiLignesDss` reading and all other facts.
5. **Notice:** draft an English demonstration explanation under Chapter 13's four headings. Identify information the computation cannot supply.
6. **Human question:** name the competent decision-maker and one unresolved question, such as authority for the departure from indexation. If using the decency example, address the judgment request to the body identified in Chapter 9.
7. **Reading:** explain why the cent rounding is a named reading rather than a claim about the Cnaf's operational practice.

The [recorded draft scene](#)⁴⁹ preserves calls to `law_draft_check`, `law_draft_eval` and `law_draft_impact`, followed by separate questions for

⁴⁹<https://french-benefits.law.arxo.io/benefit-instruction-check/>

the three families. The results below come from the pilot recorded on 9 October 2026 through the local MCP recording server, version 0.1.0. This identifies the recording server, not the CLI. This exercise examines those saved results; it does not report a new run.

Worked solution

The draft is accepted as a formalisation, without establishing legal validity. It retains 1.0584 and produces BMAF €502.07. Impact identifies the semantic change to `CoeffNominal`; its recorded invocation evaluated no scenarios. The family questions supply the observations:

Family	Baseline monthly AF	Draft monthly AF	Change
Martin	€153.01	€160.66	+€7.65
Bernard	€349.06	€366.51	+€17.45
Petit	€545.10	€572.36	+€27.26

These are gross AF amounts under the named line-rounding reading, not net transfers or a population budget estimate. The draft first changes the retained coefficient and computes a BMAF of €502.07. Each family is then evaluated for 15 April 2026 with its BMAF input changed from €478.16 to €502.07. All other facts and the selected `ArrondiLignesDss` reading stay the same. The impact report does not perform these family calculations.

Demonstration explanation — Bernard household

Degree and manner of the algorithm’s contribution. The model calculates an illustrative allowance from supplied facts. The recording establishes no administrative decision or human approval.

Data processed and their sources. The fictional Bernard case supplies three dependent children, metropolitan residence, resources and published ceilings, with no age supplements or forfait.

Parameters and any weights applied. The calculation uses the supplied BMAF and the named `ArrondiLignesDss` reading, which rounds each allowance line to the nearest cent using `HALF_UP`. No population weights are used. This named reading does not establish the Cnaf’s operational practice.

Operations performed. Separate saved calculations give gross monthly AF of €349.06 before the change and €366.51 after it; a saved subtraction gives €17.45.

Question for the policy team's legal reviewer: what legal basis would authorise this departure from statutory indexation, and which authority could adopt it?

This is an English teaching example. It has not undergone legal and editorial review by a native French legal reviewer and is not ready to send.

What this gives the fund

The submission brings the amendment, case consequences and explanation into a reviewable file. It distinguishes a well-formed draft, observed effects and administrative approval. Three families provide concrete checks; representative data and further review are needed for a policy assessment.

Where Catala stands on this

OpenFisca provides a reform mechanism⁵⁰, and Catala supports assertion tests, output tests and continuous integration (Catala book, chapter 3.3⁵¹). Arxo provides built-in draft checks, draft execution and impact reports alongside case answers with recorded grounds. Chapter 3.3 of the Catala 1.3.0 book does not describe dedicated draft-check or impact-report forms. For the fund, this brings together the proposed rule change, its computed effects and the questions still requiring review.

Country-pilot brief

Complete this template for a programme in your own country:

⁵⁰<https://openfisca.org/doc/coding-the-legislation/reforms.html>

⁵¹<https://book.catala-lang.org/en/3-3-0-test-ci.html>

Field	Your evidence and next action
Agency and tasks	Benefit owner, paying body, calculation and review responsibilities
Explanation basis	Applicable law on reasons, access to data and algorithmic contribution
Indexation	Legal formula, authority, parameter publications and effective dates
Appeal	Remission, administrative review, court route and suspension rules
Other calculators	Maintainer, model/test version, legal date and proposed input mapping
Model status	Independent demonstration or commissioned implementation; executed scope and legal review still needed

Acceptance checklist

Your draft is separate from the baseline; each amount has a preserved question and grounds; each family card is identified; readings are explicit; the notice follows the four headings; and the unresolved human question is named. Reproduction, scenario expectations and legal approval remain separate checks.

APPENDIX A

The Answer Card and Its Statuses

Every answer in this book comes from one question asked of the model about one file on one date. The chapters show it as a table row or a short excerpt; behind it is a saved answer document. This appendix lists what that answer carries and the statuses the book uses.

QUESTION	Are Nadia Garnier’s family allowances for April 2026 €425.57 a month? File Garnier2026Avril · legal date 15 April 2026
STATUS	established truth TRUE_ONLY · evaluation COMPUTED
WHY	MontantMensuelLignes, ArrondiLignesMetropole — D. 521-1 CSS; MontantDu — L. 521-1 CSS each rule with its article and the pinned editions of its sources
READING	ArrondiLignesDss — each row of the scale rounded to the cent chosen by name in the file; asked about €425.56, the answer is <i>not established</i>
REQUESTS	none for this question — Chapter 9 shows one, addressed to the paying body
POSITIONS	household attaches supporting documents · fund pays the net allowances · fund informs the recipient
FINGERPRINTS	programHash · caseHash · resultHash replay the saved answer and compare (Chapter 17)

Selected parts of one answer, on the Garniers’ April family allowances (Chapter 4).

The answer card

Every volume of this series shows a decision on the same card: the question, the legal date, the answer with its status, the claim or right where there is one, the decisive provisions, the sources, the readings applied, the open questions and the fingerprints. The figure above picks out parts of one answer as the model returns it. The card below gives the same answer — the Garniers’ family allowances for April 2026, as Chapter 4 shows it — in the series’ common form:

Question	Are Nadia Garnier’s family allowances for April 2026 €425.57 a month? File Garnier2026Avril
Legal date	15 April 2026 — the editions in force that day
Answer	€425.57 a month — established; asked about €425.56 under the same reading, not established
Claim	the amount due, €425.57 a month — established (MontantDu); the fund’s duty to pay the allowances net of CRDS, €423.44215, is active (PayerAfNet)
Decisive provisions	D. 521-1 CSS — the rates for three children and one age supplement, line by line (MontantMensuelLignes, ArrondiLignesMetropole); L. 521-1 CSS — the amount due
Sources	D. 521-1 and L. 521-1 CSS in their pinned editions; the BMAF of €478.16, entered from the yearly instruction DSS/2B/2026/46
Readings applied	ArrondiLignesDss — each row of the yearly instruction’s scale rounded to the cent (Chapter 4)
Open questions	no request to an authority in this answer; the rounding reading is declared disputed, and the number of age supplements — one, for Inès — is a fact of the file
Fingerprints	not saved for this card; the scenario famille-trois-enfants-loyer.lawtest in the Garnier case package reproduces it with law_test; Chapter 17 shows a saved answer with its fingerprints

The card is a summary for a reader. The table below lists the parts of the saved answer it is drawn from, and the chapter where each is first shown.

What an answer carries

Part	What it says	First shown
The question	the statement or amount asked about, the file and its legal date	Chapter 2
Truth status	whether the facts and rules support the statement, its opposite, both or neither	Chapter 2
Evaluation status	whether the model could answer, and if not, why	Chapter 5
Rules and articles	each rule applied, with the article behind it and the pinned editions of its sources	Chapter 4
Reading	the reading the file chose by name where a text can be read more than one way	Chapter 4
Requests	a question the rules reserve for an authority, with its addressee	Chapter 9
Positions	duties, powers and freedoms in force, with who holds them, towards whom, and their state	Chapter 4
Fingerprints	the programme, case and result hashes that let the answer be replayed	Chapter 17

Truth status

Status	In this book	Meaning
TRUE_ONLY	<i>established</i>	The facts and rules support the statement and do not support its opposite.
FALSE_ONLY	<i>refuted</i>	They support the opposite and do not support the statement. Not met in this book.
NEITHER	<i>not established</i>	They support neither. This is not zero and not a refusal: often a fact is missing, and the model names the open premise.
BOTH	<i>contradiction</i>	They support both. The answer keeps both, with their sources, for review instead of choosing silently. Not met in this book; Volume 2 shows one (Chapter 8).

Evaluation status

The truth status says what follows; the evaluation status says whether the model could answer at all. The book meets four.

Status	In this book	Meaning	Chapter
COMPUTED	<i>computed</i>	The answer was computed; read its truth status.	5
REQUIRES_JUDGMENT	<i>requires judgment</i>	The rules reserve a question for an authority. The answer carries a request naming the question and the authority — for decent housing, the paying body.	9
INTERPRETATION_REQUIRED	<i>a reading must be chosen</i>	The answer depends on a group of readings, and the file has not chosen one. A question that does not depend on the group is answered as usual.	8
RUNTIME_ERROR, cause INEXACT_DIVISION	<i>refused</i>	A division has no finite decimal result and no reading says how to round it. The model stops instead of choosing a rounding for you.	4, 7

Other statuses exist for situations this book does not meet, such as a missing rounding policy or a source that cannot be resolved.

States of a position

A duty, a prohibition, a power or a freedom is a *position*: it has a holder, a counterparty and a state. The book uses four states.

State	Meaning	Chapter
active	The rule's conditions hold: the position exists. An active duty is neither fulfilled nor breached yet.	4, 9, 10
satisfied	Evidence establishes that the duty was performed.	10
violated	Evidence establishes a breach.	10
undetermined	Evidence establishes neither performance nor breach.	10

Glossary: French → English → Name in the Model

French terms as the chapters gloss them where they first appear. The column “In the model” names the element of the model that carries the term, where there is one.

French	English	In the model	Chapter
<i>allocataire</i>	benefit recipient	—	0
<i>allocation conservée</i>	the fund keeps the allowance	<code>conservation_en_cours</code>	9
APL, ALF, ALS	housing aid	—	0
<i>attendu</i>	expectation	the original external test’s declared answer	18
<i>Base mensuelle de calcul des allocations familiales</i>	monthly base for family allowances (BMAF)	—	3
BMAF	monthly base for family allowances	—	0
<i>Coefficient de prise en charge</i>	share covered by aid	<code>coefficient_prise_en_charge</code>	6
<i>commission de recours amiable</i>	amicable review commission (CRA)	—	12
<i>Correspondance des entrées</i>	input mapping	—	18

French	English	In the model	Chapter
CRDS	social debt repayment contribution	—	0
<i>décence</i>	decency	logement_decent	9
<i>Douzième</i>	one twelfth	the division in the E0 construction	7
<i>enfant à charge</i>	dependent child	nb_enfants_charge	15
<i>Équivalence de loyer et de charges locatives minimale</i>	minimum rent-and-charges equivalent	equivalence_loyer_minimale	6
<i>foyer, ménage</i>	household	—	0
<i>indu</i>	overpayment	indu	0
<i>Lecture nommée</i>	named reading	ArrondiCentimeHalfUp	7
<i>Non-recours</i>	failure to claim a potential entitlement	—	15
<i>notification</i>	notice	the attached Notification document	13
<i>Obligation</i>	duty	a declared duty position	10
<i>organisme payeur</i>	paying body	OrganismePayeur	9
<i>Participation personnelle</i>	personal contribution	participation_personnelle	8
<i>plafond</i>	ceiling	plafond_prime	2
<i>prescription</i>	limitation of recovery	the dated conditions in the payment model	11
<i>Preuve</i>	proof	the saved proof graph	16
<i>Prime à la naissance</i>	birth grant	droit_prime_naissance	2
<i>Projet</i>	draft	—	final
<i>recours administratif préalable obligatoire</i>	mandatory prior administrative review (RAPO)	—	12
<i>remise</i>	remission	—	0
<i>Remise gracieuse</i>	discretionary remission	demande_remise_gracieuse	12
<i>ressources</i>	resources	—	0
<i>ressources annuelles</i>	annual resources	ressources_annuelles	2
<i>Ressources retenues</i>	resources counted	ressources_retenues	1

French	English	In the model	Chapter
<i>retenue</i>	deduction	the recovery step	11
<i>revalorisation</i>	revaluation	—	final
<i>Scénario</i>	worked test situation	a .lawtest file	5
<i>Traitement algorithmique</i>	algorithmic processing	—	13

Index of Articles and Instruments

Articles and instruments cited in the chapters, with the chapters that cite them. Quotations of French codes, decrees and ordinances come from the consolidated legislation published by Légifrance (DILA) as open data under the Licence Ouverte / Open Licence 2.0; each chapter names the edition it quotes and the date it applies. The yearly instructions of the Direction de la sécurité sociale are quoted from their text published in the Bulletin officiel Santé – Protection sociale – Solidarité (bulletins-officiels.social.gouv.fr), whose content is offered under the same Licence Ouverte / Open Licence 2.0.

Code de la sécurité sociale — social security code (CSS)

Article	Chapters
L. 161-25	3, 14
L. 521-1	0, 4, 15–16
R. 521-1	0
D. 521-1	0, 4
L. 531-2	2, 5, 17–18
D. 531-2	2–3
L. 551-1	3
L. 553-1	11
L. 581-1	4
L. 583-1	0, 4, 10
L. 845-2	12

Code de la construction et de l’habitation — construction and housing code (CCH)

Article	Chapters
R. 351-61	6
R. 351-61-1	6
R. 821-1	9
L. 822-2	9
R. 822-3	1
L. 822-9	9
R. 822-14	0, 4
R. 823-2	0, 4, 9
R. 823-3	0, 4
R. 823-10	0, 4
R. 823-11	4
R. 823-13	0, 4
D. 823-16	0, 4, 8
D. 823-17	4, 8
R. 825-1	12
R. 825-2	12

Article	Chapters
R. 825-3	12–13
D. 832-24	6
D. 832-25	6
D. 832-26	7
L. 843-1	9
R. 843-3	9
R. 843-4	9

Code des relations entre le public et l'administration — code on relations between the public and the administration (CRPA)

Article	Chapters
L. 311-3-1	13
R. 311-3-1-1	13
R. 311-3-1-2	0, 13

Decrees, ordinances and instructions

Instrument	Chapters
Decree 2022-1694	8
Decree 2026-138	0
Instruction DSS/2B/2026/46	3, 14, final exercise
Ordinance 96-50	4

Reproducing the Examples

The answers in this book come by three routes. Each chapter says which one it used and when the answer was recorded.

1. **Case packages and the `law` command-line tool** — Chapters 0 to 2, 4 to 7, 9, 11, 12, 17 and 18, and the cohort files of Chapters 3 and 14. A *case package* is a small package that holds one fictional file — the facts, the legal date, the readings it selects — and imports the canons whose rules apply. The rules are never copied into the case.
2. **Scenarios declared in a canon itself**, run with `law test` — Chapters 3, 8 and 10, in the canons `corpus/laws/fr/revalorisation`, `corpus/laws/fr/apl` and `corpus/laws/fr/pf-paje`; the maintenance example of Chapter 10 comes from `corpus/laws/fr/pf-maintenance`.
3. **Recordings through MCP**, the protocol through which an assistant calls the model (Chapter 16) — Chapters 13, 15 and 16 show questions recorded on 9 October 2026 through the local MCP recording server 0.1.0; Chapter 14 and the final exercise show its draft tools — `check`, `evaluate` and `impact`. Where a chapter ran such an answer again with the command-line tool, it says so.

Chapters 0, 1, 3, 4, 7, 12 to 16 and the final exercise also link to scenes recorded in the French Benefits Lab, a demonstration workbench at french-benefits.law.arxo.io.

What you need

- The law command-line tool, version 0.2.2 or later (`npm i -g @arxo/cli`), executing `law.core/0.2.11`. The chapters say which version recorded each table; most were recorded on 11 October 2026 with `law` 0.1.11 or 0.1.12 in a checkout of the Arxo repository. The reproduction kit below was checked on 12 October 2026 with `law` 0.2.2.
- The reproduction kit of this book: two public repositories.
 - the `canons`, `github.com/arxohq/arxo-cnaf`: the twenty-one French canons, each with its sources, pinned legal texts and scenarios, and a registry from which the case packages install them. Two circulars of the Cnaf are not redistributed there; `tools/fetch_withheld.py` downloads them from `caf.fr` and checks their fingerprints before you build the two canons that pin them;
 - the `examples`, `github.com/arxohq/law-as-code-france-examples`: the ten case packages and the saved answer of Chapter 17.

Getting the kit

```
r=https://github.com/arxohq
git clone $r/arxo-cnaf.git
git clone $r/law-as-code-france-examples.git examples
```

In the kit each case package is a folder of `examples/` under the last part of its path below — `corpus/laws/fr/pf-paje/examples/prime-naissance-moreau` is `examples/prime-naissance-moreau`. Install it from the registry before the first question:

```
cd examples/prime-naissance-moreau
law install --registry arxo=../../arxo-cnaf/registry
```

`law install` never picks versions: it restores exactly what `law.lock` pins and checks every hash.

The case packages

Chapter	Case package	Files
0, 4	corpus/laws/fr/prestations-versement/exemples/famille-trois-enfants-loyer	Garnier2026Avril, Garnier2026AvrilTexteSeul, Garnier2026Mai
1	corpus/laws/fr/apl/exemples/editions-2021	TenantDecembre, TenantJanvier
2, 5, 17, 18	corpus/laws/fr/pf-paje/exemples/prime-naissance-moreau	PlafondEgal, PlafondDepasse, RessourcesAbsentes
3, 14	corpus/laws/fr/pf-af/exemples/cohorte-revalorisation	Martin, Bernard, Petit
6	corpus/laws/fr/apl/exemples/foyer-coefficient-k	CoupleResidenceAutonomie
7	corpus/laws/fr/apl/exemples/douzieme-sans-arrondi	ResidentSansLecture, ResidentLectureD82
9	corpus/laws/fr/apl/exemples/logement-decent-garnier	DecenceEnAttente, DecenceReconnue, NonDecenceConstatee
11	corpus/laws/fr/prestations-versement/exemples/famille-dans-le-temps	one file per month, such as Famille2025_12
12, 13	corpus/laws/fr/apl/exemples/recours-remise-fontaine	FontaineRemise
12	corpus/laws/fr/prime-activite/exemples/recours-indu-cra	AppelPendant, SansAppel

Running a scenario of a canon

A canon declares scenarios: a file, a question and the expected answer. Chapters 3, 8 and 10 run them in the canons `fr.css.revalorisation`, `fr.apl` and `fr.pf.paje`. In the kit each canon is a folder of `arxo-cnaf/packages/` with its dependencies pinned inside it, so there is nothing to install. From the folder where you cloned the kit, run the file — the folder plays the part of `corpus/laws/fr/<canon>` in the chapters' commands:

```
cd arxo-cnaf/packages/fr.apl
law test . --file tests/finish-lecture-pp.lawtest --json
```

On 12 October 2026 the four scenario files of these chapters passed in the kit. The maintenance example of Chapter 10 runs only from a checkout of the Arxo repository.

Asking a question

Each case package keeps its questions as JSON files in `queries/`. In the package directory, ask a question and save the answer:

```
answer_dir="$(mktemp -d)"
law ask . --case PlafondEgal --query-json \
    queries/montant.json --out "$answer_dir"
```

`--case` names the file, `--query-json` the question; `--out` saves the full answer — status, proof, positions and fingerprints — in the directory `$answer_dir`.

A case package declares scenarios too. To run them all, from the same directory:

```
law test . --json
```

Replaying a saved answer

In the same shell, replay the answer saved above:

```
law eval "$answer_dir"
```

`law eval` evaluates the saved answer again — without the source files or a rebuild — and must give the same bytes. Compare `manifest.programHash`, `manifest.caseHash` and `resultHash` in the original and the replay: if all three match, the same programme gave the same answer to the same case. That shows repeatability, not legal correctness — Chapter 17 explains the difference.

The kit keeps the answer of Chapter 17 in `prime-naissance-moreau/runs/plafond-egal` — PlafondEgal asked `montant`, €919 established.

Its fingerprints, recorded on 12 October 2026; the replay was byte for byte identical:

Fingerprint	Value
manifest.programHash	sha256:d7740308956c4a9b279537698f7af3d448a2abb9b54e2f676fc16eacfaaf29aa
manifest.caseHash	sha256:8134b82a55a7e45ccce7732f00c1659c5b1ff91e98abc16a25590339591a9f92
resultHash	sha256:3b041b7e8d987baafb0425b9fb2c0286f11c4d79c8eaa5519db62a2051e64ac2
semantics	law.core/0.2.11

If your answer differs

Check, in this order: the version of law; the legal date and the facts of the file; the readings it selects; the editions the canon pins. A later edition of a text, or a corrected fact, gives a new answer to a new question — not a failed reproduction of the old one.

Solutions to the Exercises

Chapter 0 — What CNAF Pays, and Why It Is a Law-as-Code Problem

1. Article R. 823-10 of the construction and housing code: the right starts on 1 April 2026, the first day of the month after the conditions were met (the lease began on 14 March; the application followed on 20 March). So the answer to the prediction is April, not March.
2. The household must attach supporting documents (R. 823-2 CCH). The fund must pay the net family allowances (L. 521-1 CSS) and inform the recipient (L. 583-1 CSS).
3. Article D. 521-1 gives percentages of the BMAF: computed exactly they give €425.5624 a month. Rounding that total to the cent gives €425.56. The yearly instruction prints each line rounded first (349.06 + 76.51), giving €425.57. The model reports both, and marks 425.57 as the result of a named reading.

Model counted on 11 October 2026: 27 packages, 2,662 rules, 1,945 scenario files.

Chapter 1 — Sources and Editions: Which French Text Applies on Which Date

1. No: it is the resource base counted by the model.
2. The legal date of the question.
3. The inputs that the new edition requires, here the monthly resource records and relevant household facts.

Chapter 2 — The Birth Grant: First Rule, First Answer

1. Yes: `ressources <= plafond`.
2. No. There is no annual-resource fact from which to make that comparison.
3. The annual resources under the applicable resource rules, represented here by `ressources_annuelles`.

Chapter 3 — Parameters and Revaluation: The BMAF and the Yearly Instruction

1. 2.2975: 229.75% of the base.
2. No. The base is a supplied input in each cohort file.
3. The source anchors, together with the row's validity window and pinned publication records.

Chapter 4 — One Family, One Decision: The Garnier Household in April 2026

1. The conditions were met in March, before the month of the application (May). The second sentence of R. 823-10 — rule `Ouverture MoisDemande` — applies: the aid is due from the first day of the month of the application, **1 May 2026**. The rule `OuvertureApres Conditions` does not apply, because its condition “conditions month $\geq$ application month” is false.
2. The housing allowance: the model refuses with `INEXACT_DIVISION`, because D. 823-16 makes the aid decrease in proportion without saying how to round, and the quotient has no finite decimal value.
3. The duty to justify the change with the request for review (`Justifier Changements`), created by R. 823-3 of the construction and housing code.

Chapter 5 — How a Scenario Is Written

1. `given`.
2. The annual-resource input equals the constructed ceiling, and the test expects `TRUE_ONLY` for the right.
3. The same status could be reached on unintended grounds; the proof identifies the rule and facts used.

Chapter 6 — Housing Aid: The APL Formula and the K Coefficient

1. Downward to two decimal places.
2. No. Af is the formula component; subsequent adjustments are separate steps.
3. They contain the text used for the working reading of the image-published formula.

Chapter 7 — When the Text Does Not Specify Rounding

1. €164.76 under the selected reading.
2. No. It reports a calculation that requires a rounding choice.
3. Both return `RUNTIME_ERROR` with `INEXACT_DIVISION`. The unchanged `PpPlancherFinal` belongs to a separate reading group; this refusal does not decide entitlement.

Chapter 8 — One Text, Two Readings

1. `INTERPRETATION_REQUIRED`.
2. No. The above-threshold file does not exercise the floor's effect.
3. No: they are the personal contribution and formula aid component in an isolated test.

Chapter 9 — A Human Must Decide: Decent Housing

1. *Not established*, with the status *requires judgment*. The request concerns `logement_decent` for the Garnier household and is addressed to the paying body (`OrganismePayeur`).
2. The end of the third sentence: the rent reduction gives the owner no ground to seek termination of the lease. The household holds the immunity (`NonResiliationBailNonDecence`), against the landlord.
3. The calculated amount, €189.95295 a month, is established. Whether it is paid waits for the decency assessment.

Chapter 10 — Duties of the Fund and the Household

1. No: existence and performance are distinct.
2. No: its recorded expectation is *undetermined*.

3. The fund's duty to inform recipients about the nature and extent of their rights.

Chapter 11 — A Family Over Time: Overpayments, Deductions, Prescription

1. No: the gross grant is a supplied input.
2. March 2026: €318.40, because recovery of the AF overpayment is supplied as time-barred and both carry-over amounts are zero.
3. No: the served PA amount is supplied; that entitlement calculation belongs to a separate scenario.

Chapter 12 — Remission of a Debt, Prior Review and Deadlines

1. No: the debt's grounds are not contested in this remission procedure.
2. No: it is a notification deadline; the text also provides an implied rejection for silence.
3. No: it demonstrates grounds affecting recovery during challenge.

Chapter 13 — Explaining a Decision to the Recipient

1. This is a different file, without the age supplement and with different resources.
2. The degree and manner of the algorithm's contribution, including the human role.
3. No. It still needs native French legal and editorial qualification.

Chapter 14 — Testing a Reform Before It Is Signed

1. One expression in one rule: `CoeffNominal` retains `c * 1.05` instead of `c`, so the 2026 coefficient becomes 1.008×1.05 and the BMAF €502.07 instead of €478.16.
2. The recorded impact run compared the two versions of the package and evaluated no scenarios, so an unchanged outcome there is an absence of observation, not a conclusion — which is why the draft is executed in Step 2 and the family files are run in Step 4.
3. By €27.26 (from €545.10 to €572.36). The allowance is a percentage of the BMAF that grows with the number of children — 114% for

four children against 32% for two — so the same 5% on the BMAF moves a larger amount.

Chapter 15 — Finding Families Who Do Not Claim

1. No. It identifies a row for a complete question and review.
2. No. It should pass for further examination.
3. Nothing: its full entitlement was not evaluated in this scene.

Chapter 16 — An Assistant That Answers With Proof

1. `law_ask`; search and rules prepare the question.
2. Ask for the information and inspect the missing-premise response.
3. No. It was the recorded compatible MCP client.

Chapter 17 — Audit and Reproduction

1. No. It establishes repeatability of this saved computation.
2. No. Preserve the request, executable bundle and supporting materials.
3. No. It is a new case question.

Chapter 18 — Migrating a Rulebook: Other Tools' Tests as Acceptance

1. Preserve it. A justified correction needs its own evidence and review.
2. Inputs, date, units, components, parameters, defaults and readings.
3. Sourced external tests, explicit mappings, execution of both sides and qualified differences. This chapter has not completed that work.

Where Catala and OpenFisca Stand

Most chapters close with a short section on how Catala — and, in some chapters, OpenFisca or L4 — meets the same need. Those sections describe the other tools as their own documentation presents them. They were checked against Catala 1.3.0 (released 1 October 2026) and the Catala book on 11 October 2026; the date is printed here once instead of under every section. The Catala book is published by its authors under the Creative Commons Attribution 4.0 licence; these sections link to it and summarise it in their own words, without reproducing its text.

Tools change. If something has changed, tell us at hi@arxo.io. Corrections are published with the next edition and listed under Corrections.

Chapter	What the chapter compares
0	the distinctions the book adds: missing facts, contradictions, judgments, readings, rounding, duties and pinned sources
1	source anchors and pinned publications behind a dated answer
2	a missing fact: optional values against a truth status and a <code>why_not</code> question
3	parameter rows with validity windows and source anchors
4	the decision around the amount: duties and the chosen rounding reading
5	scenario tests, and a check that names the missing premise
6	a statutory formula and the pinned publication behind it
7	a division the text does not round: cent conversion against a named reading

Chapter	What the chapter compares
8	competing constructions: inputs or scopes against named readings with a required choice
9	a judgment reserved for a named authority, and the duties and immunity that follow
10	duties and their assessment states, with L4's obligations and outcomes
11	dated payment checkpoints with their duties and recovery grounds
12	procedural positions and an argument graph for a contested recovery
13	computation traces against a fingerprinted document attached to the case
14	reform simulation in OpenFisca against a draft check and an impact report
15	population simulation against screening on a necessary condition
16	an assistant's answer with its saved proof graph, and MCP in L4
17	computation traces against replay by programme, case and result fingerprints
18	migrating external tests with their original expectations
Final exercise	a draft amendment: OpenFisca's reform mechanism against draft check, evaluation and impact

Acknowledgements

This book stands on work done in France over more than a decade.

Catala. Catala, from Inria, was designed by Denis Merigoux, Nicolas Chataing and Jonathan Protzenko, working with the legal scholars Sarah Lawsky and Liane Huttner; the language grew out of Lawsky’s insight into the logical structure of statutes. Their 2021 paper showed that a statute can be written as code beside its own text, with a mechanised proof of the core compilation — and that doing so finds real discrepancies: their formalisation of French family benefits surfaced an overseas-territories income-cap case (article L. 755-12 of the social security code) in OpenFisca, which was fixed after they reported it. The same research tradition produced Mlang, a modern compiler for the French income-tax code. In June 2026 the Cnaf and Inria announced a partnership to develop Catala for the computation of social benefits.

Open law. None of this would be possible without France’s open legislation and open public code: the consolidated legislation of Légifrance published as open data under the Open Licence; OpenFisca, which has modelled French taxes and benefits since 2011; the income-tax calculation code published by the tax administration; Etalab’s work on opening public data and algorithms; LexImpact, which helps Parliament simulate reforms; and the 2016 Digital Republic Act, which requires an administration to tell people when an individual decision about them relies on an algorithm, and to explain its rules on request.

This book follows an independent Arxo model built from published French law. Where it compares tools, it names the version and the date of the check (Appendix F). Where a result differs from another tool’s, the book shows the case and the text behind it.

Sources

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- Denis Merigoux, Raphaël Monat, Jonathan Protzenko, *A Modern Compiler for the French Tax Code*, CC 2021 — [arXiv 2011.07966](https://arxiv.org/abs/2011.07966)⁵³.
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- Etalab — practical guides on open data, source code and algorithms — etalab.gouv.fr⁵⁸.
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Corrections

Corrections to this edition are listed here, with the chapter, the change and the date, and published with each new version of the book at books.arxo.io.

None yet.

To report an error — in the law, the numbers, the French or the English — write to hi@arxo.io. Please name the chapter and, if you can, the article or the table.