

Lecture 6

Punctuation, Part 1

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Version of October 21, 2025



Generalities

Punctuation Marks

The main punctuation marks are

- ▶ **periods;**
- ▶ **question marks;**
- ▶ **exclamation points;**
- ▶ **colons;**
- ▶ **semicolons;**
- ▶ **commas;**
- ▶ **long dashes;**
- ▶ **short dashes;**
- ▶ **hyphens;**
- ▶ **slashes;**
- ▶ **apostrophes;**
- ▶ **quotation marks;**
- ▶ **parentheses;**
- ▶ **ellipses.**

Commas and hyphens are more difficult and kept for the next lecture.

The Role of Punctuation

The main goals of punctuation are **clarity** and **comprehensibility**.

Many punctuation rules directly serve these goals, but some can also seem arbitrary. Even following the arbitrary rules ultimately serves clarity, because readers will parse your sentences faster and more reliably if you follow the **established conventions**.

Easy Punctuation Marks

Periods

Periods (.) (also called “full stops” in British English) appear

- ▶ at the **end of sentences**;
- ▶ in some **abbreviations** (e.g., *e.g.*, *Dr.*, *U.S.*);
- ▶ in **decimal numbers** (e.g., *2.71*).

Question Marks

Use question marks (?) for **actual questions**.

Questions can liven up your text by engaging the reader.

Beware of indirect speech. The following sentence is a statement, not a question:

I wonder whether there is a more efficient approach?

Avoid multiple question marks in a row—e.g.:

How come there is a memory leak??

Avoid question marks in parentheses—e.g.:

Lisp was invented around 1960 (?) by John McCarthy.

Exclamation Points

Apart from their mathematical uses (e.g., `n!`), exclamation points (!) have virtually **no place** in formal writing. You can be emphatic without using them. Compare:

This is still the case when postprocessing after every step!

The current definition of `fib` does not terminate!

Try to think of this as a stimulus to further investigation!

Frustratingly, this is still the case when postprocessing after every step.

Shockingly, the current definition of `fib` does not terminate.

Try to think of this as a stimulus to further investigation.

Avoid multiple exclamation points in sequence, and avoid exclamation points in parentheses. Compare:

The information is stored in an unordered (!) pair.

Notice that the information is stored in an unordered pair.

Colons

You can use a colon (:) after a complete clause instead of a period (.) if the clause **introduces** what follows—e.g.:

There are three paint primary colors: red, yellow, and blue.

An explanation suggests itself: The training data set is heavily biased in favor of easy problems.

Capitalization of what follows the colon is slightly tricky:

- ▶ Sentence fragments are never capitalized.
- ▶ In American English, some authors capitalize full sentences, whereas others do not. In British English, full sentences are not capitalized.

Some authors use colons extensively. Others never use them.
The “editor” should ensure a uniform style.

Colons

In scientific and technical writing, a colon is frequently used between a sentence and **displayed material** such as a standalone equation or a code fragment—e.g.:

The following code swaps the contents of two variables:

```
temp = a  
a = b  
b = temp
```

When the displayed material is part of the sentence, no colons should be used. Both colons below are wrong:

To achieve thread-safety, we need to replace the line:

```
new MouseDrawApp();
```

with:

```
SwingUtilities.invokeLater(() -> new MouseDrawApp());
```

Finally, a colon is used **between a title** and **a subtitle** in running text or bibliographies—e.g.:

*Lambda, the Ultimate TA: Using a Proof Assistant to Teach Programming Language Foundations*¹

*Guarded Kleene Algebra with Tests: Verification of Uninterpreted Programs in Nearly Linear Time*²

¹Benjamin C. Pierce, *ICFP 2009*, pp. 121–122, ACM, 2009.

²Steffen Smolka, Nate Foster, Justin Hsu, Tobias Kappé, Dexter Kozen, and Alexandra Silva, *Proceedings of the ACM on Programming Languages* 4(POPL), pp. 61:1–61:28, 2020.

Semicolons

Semicolons (;) can be used as “**lightweight periods**” between sentences that belong closely together. Often, the joined sentences exhibit parallelism—e.g.:

Thanks to computer algebra systems, working mathematicians are no longer spending their time performing tedious calculations; simulation tools bring similar benefits to physicists.

Some systems include a postprocessor that simplifies the data set before presenting it to the user; others simply output the data set as is.

Semicolons are more common in English than in most other languages.

Some authors use semicolons extensively. Others never use them.

The “editor” should ensure a uniform style.

Semicolons

Semicolons can also be used as “**heavyweight commas**” for separating items in an enumeration when the items themselves already contain commas—e.g.:

We reserve the letters f, g, h for functions; m, n for natural numbers; and s, t, u for terms.

Long Dashes

Long dashes (—) are very versatile.

They can be used instead of commas or parentheses to indicate a **longer pause**—e.g.:

General relativity is hard to understand—and even harder to explain.

The need for users to perform so many interactions—the lack of automation—is undoubtedly the main obstacle to the technology's adoption.

Especially in British English, long dashes are sometimes shorter and surrounded by spaces—e.g., ... understand – and even

Typesetters call ‘—’ an em dash and ‘–’ an en dash.

Some authors use long dashes extensively. Others never use them. The “editor” should ensure a uniform style.

Short Dashes

Fine typesetting dictates the use of short dashes (–) in the following cases:

- ▶ Short dashes indicate **number ranges**—e.g., *pages 20–35, in 1789–1914*.
- ▶ Especially in American English, short dashes are used to form compound adjectives from two or more nouns that are considered **equals**—e.g., *Church–Turing thesis, Backus–Naur form, Frankfurt–Tokyo flight*.
- ▶ Occasionally, short dashes are used in compound adjectives as in *pre–World War I era*. With a hyphen, *pre-World War I era* could be misparsed as “War I era that is pre-World.”

Especially in British English, short dashes (–) may look identical to long dashes (–), except that they are not surrounded by spaces.

When using short dashes for number ranges, beware of redundant constructions such as *between 1789–1914*. (Change to *between 1789 and 1914* or *1789–1914*.)

Slashes

Slashes (/) often mean “or” but can also mean “and”—e.g., *the pure/applied dichotomy of mathematics*.

Slashes are **clumsy** and generally best avoided in formal writing. Compare:

The support desk should respond to tickets in a rapid/timely manner.

If/when the handle is closed, the resource is returned to the operating system.

The support desk should respond to tickets in a timely manner.

When the handle is closed, the resource is returned to the operating system.

It is almost always best to replace the construction *X and/or Y* by one of

- ▶ *X and Y*;
- ▶ *X or Y*;
- ▶ *X, Y, or both*.

Slashes

Exceptionally, slashes are unobjectionable when used to separate lines of **poetry** or **song lyrics**—e.g.:

*Do I contradict myself? / Very well then I contradict myself, /
(I am large, I contain multitudes.)*¹

¹Walt Whitman, *Leaves of Grass*, 1855.

Apostrophes

Apostrophes (') are used within **abbreviations** as in *it's*, *didn't*, and *rock 'n' roll*. But such forms are usually spelled out in formal English: *it is*, *did not*, *rock and roll*.

Apostrophes are also used to form the **possessive**—e.g., *writer's*, *writers'*.

Beware of the **grocer's apostrophe**. The plural of *tomato* is *tomatoes*, not *tomato's*.

Quotation Marks

Quotation marks ("") are used mainly for **identifying quoted text**—e.g.:

It was Alfred Wainwright who said that “there’s no such thing as bad weather, only unsuitable clothing.”

For longer quotes (above about 30 words), a displayed block is more elegant.

Quotation marks are also used to indicate that a phrase is some **tag** or **someone else’s terminology**—e.g.:

*In Table 7, the “System” column is sorted alphabetically.
She kept reminding us about the “curse of knowledge” in academia.*

In nested quotations, double ("") and single (‘ ’) quotation marks alternate—e.g.:

He said, “She kept reminding us about the ‘curse of knowledge’ in academia.”

In British English, double and single quotation marks are exchanged.

Quotation Marks

Quotation marks are also used with **informal expressions** or **slang**, although this is not recommended—e.g.:

The λ -calculus hits a “sweet spot” on the language design continuum.

Instead, either be brave and omit the quotation marks or use another expression.

Quotation marks are used for phrases that should **not be taken literally**.

In general, it is preferable to use phrases that *can* be taken literally. Compare:

Inconveniently, the “theorem” is not provable.

Inconveniently, the putative theorem is not provable.

Quotation marks surround the **titles of “small works”** such as papers, articles, songs, and poems, in conjunction with headline-style capitalization—e.g.,
“Local Type Inference.”

Finally, do not use quotation marks for emphasis. Use italics or bold.

Parentheses

Parentheses `(( ))` (also called “brackets” in British English) are used to mark off **parenthetical phrases**.

Punctuation should be logical with respect to parentheses. If you remove a pair of parentheses and their content, the text should still be readable, including punctuation—e.g.:

For us (and most Python programmers), operator chaining is enigmatic.

For us, operator chaining is enigmatic.

Entire sentences, including the period, can be in parentheses. This is often less distracting than footnotes—e.g.:

... of the array. (The `[]` operator returns the element at a given index.) This definition ...

Parentheses

Parentheses are also used to introduce **abbreviations**—e.g.:

This pattern is called model–view–controller (MVC).

This project has received funding from the European Research Council (ERC).

In addition, parentheses are used to establish **conventions**.

In a scientific paper or thesis, *a (well-typed) program* means

“a well-typed program, and from now on all programs will be well typed by default.”

Avoid **clumsy devices** such as *file(s)* and *police(wo)man*.

Generally avoid **nested parentheses**. Compare:

The derivation rules are depicted in Figure 2.3 (Hurd (2003)).

The derivation rules are depicted in Figure 2.3 (Hurd 2003).

Ellipses (. . .) can be used to indicate the **omission of material** in quotations.
For example,

“Point-to-point reachability is arguably the simplest model-checking property; it asks whether a program can reach a given target state from a given initial state.”¹

can be shortened to

“Point-to-point reachability . . . asks whether a program can reach a given target state from a given initial state.”

¹Julian Müllner, Marcel Moosbrugger, and Laura Kovács, “Strong Invariants are Hard: On the Hardness of Strongest Polynomial Invariants for (Probabilistic) Programs,” *Proceedings of the ACM on Programming Languages* 8(POPL), pp. 882–910, 2024.

Ellipses

Ellipses are useful when you **omit words** in the middle of a quotation. As a rule, there is no need to put ellipses at the beginning or end of a quotation. This is suboptimal:

*This property "... is arguably the simplest model-checking property ..."
according to Müllner et al.*

In informal writing, ellipses are used to denote **hesitation**, **suspense**, or a **trailing thought**. In formal writing, there is no defense for sentences such as the following:

If only we had ... well, now we have to live with the consequences.

Finally, ellipses are used in mathematics for **finite sequences** (e.g., $x_1, \dots, x_n$) and **infinite sequences** (e.g., $x_1, x_2, \dots$). If the ellipsis coincides with the end of the sentence, the result is four evenly spaced periods—e.g.:

The process gives rise to a sequence of time stamps $t_0, t_1, t_2, \dots$.