Errata et Addenda for
Theory of Computing: An Open Introduction
(α pre-publication edition)

Taylor J. Smith

September 10, 2025

This document contains all known errors and amendments for the book *Theory of Computing: An Open Introduction* (α pre-publication edition) as of the listed date. In each entry, page and line numbers correspond to the PDF version of the book; positive line numbers indicate that lines should be counted downward from the top of the page, while negative line numbers indicate that lines should be counted upward from the bottom of the page. The date indicates when I became aware of the error or amendment.

Entries are formatted as follows:

▸ **Page 123** line 45 ———————————————— Jun. 23, 1912

An error is indicated by a small triangle in the left margin and the correction is written thus:

erroneous text $\rightsquigarrow$ corrected text

Page 567 line 89 ———————————————— Jun. 7, 1954

An amendment is indicated by the lack of a small triangle in the left margin, and the amended text is simply listed in the entry. Amendments are less serious than errors, but are still valuable improvements to the book.

Theory of Computing: An Open Introduction remains a work in progress. Try as I might, I'm sure that there are mistakes lurking in the book that snuck past me, even after hundreds of read-throughs and revisions. I welcome comments from you, the reader, if you notice any errors, omissions, typos, or even if you have a suggestion on how to make the text better. I can be reached via email at `tjsmith@stfx.ca`.

▸ **Page viii** line 20 ───────────────────────── Sep. 16, 2024

AIII ⤳ AAAI

Page 2 line −3 ───────────────────────── Sep. 5, 2024

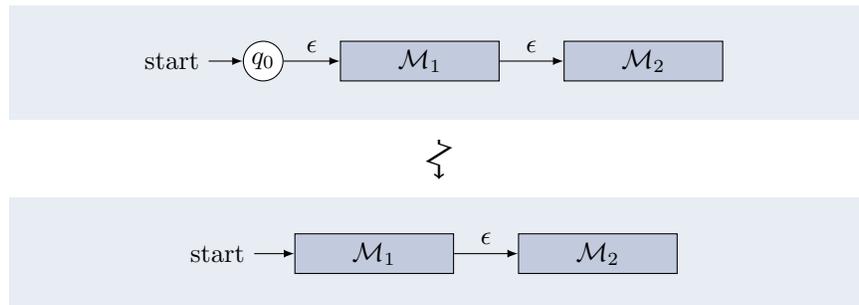
Definition 1.1 (Regular expressions)

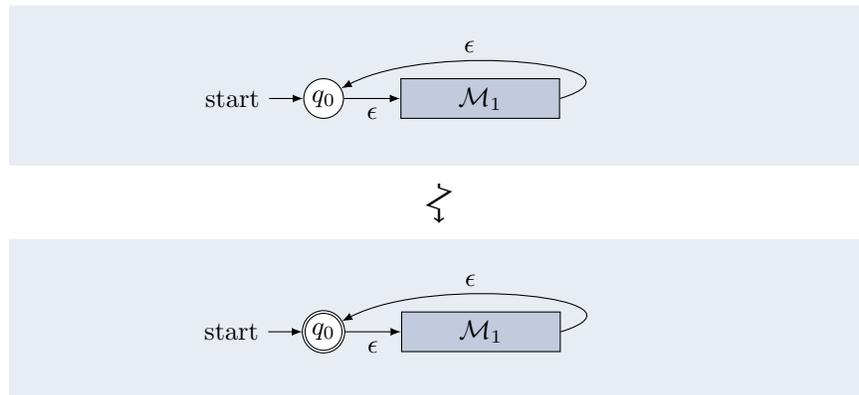The class of regular expressions is defined inductively as follows:

1. $r = \emptyset$ is a regular expression;

2. $r = \epsilon$ is a regular expression;

3. For each symbol a, $r = a$ is a regular expression;

4. For regular expressions r_1 and r_2, $r_1 + r_2$ is a regular expression;

5. For regular expressions r_1 and r_2, $r_1 r_2$ is a regular expression; and

6. For a regular expression r, r^* is a regular expression.

▸ **Page 3** line 18 ───────────────────────── Sep. 6, 2024

In the context of this lecture ⤳ In the context of this book

▸ **Page 10** line 9 ───────────────────────── Sep. 10, 2025

occasions in these notes ⤳ occasions in this book

▸ **Page 31** line 13 ───────────────────────── Sep. 23, 2024

start → q_0 —ϵ→ $\mathcal{M}_1$ —ϵ→ $\mathcal{M}_2$

⤇

start → $\mathcal{M}_1$ —ϵ→ $\mathcal{M}_2$

▶ **Page 31** line 18 ──────────────────────────── Sep. 23, 2024

▶ **Page 40** lines $-6 - -5$ ──────────────────────── Sep. 22, 2024

(Otherwise, this would be a rather short course!) ⤳ (Otherwise, this would be a rather short book!)

Page 66 lines 11–13 ──────────────────────── Oct. 11, 2024

For each rule of the form $A \to \alpha_1 \dots a \dots \alpha_n$, where $A \in V$, $\alpha_1, \dots, \alpha_n \in V \cup \Sigma$, and $a \in \Sigma$, add a new rule $T_a \to a$ and replace the existing rule with one of the form $A \to \alpha_1 \dots T_a \dots \alpha_n$.

Page 67 lines 2–4 ──────────────────────── Oct. 11, 2024

For each pair of rules of the form $A \to B$ and $B \to \alpha$, where $A, B \in V$ and either $\alpha = a$ for some $a \in \Sigma$ or $\alpha = CD$ for some $C, D \in V$, replace the existing rule $A \to B$ with one of the form $A \to \alpha$

▶ **Page 71** line 8 ──────────────────────── Sep. 6, 2024

At the end of the previous lecture ⤳ At the end of the previous chapter

Page 85 lines $-5 - -4$ ──────────────────────── Nov. 4, 2024

Theorem 2.23

Every regular language is also a context-free language.

Proof. Every regular language is recognized by some finite automaton. Since a finite automaton is a pushdown automaton that does not use the stack, every regular language is also recognized by some pushdown automaton. By Theorem 2.22, every pushdown automaton has an equivalent context-free grammar, and by Definition 2.4, a language is context-free if it is generated by some context-free grammar. Therefore, every regular language is context-free. ∎

▸ **Page 94** line −2 ————————————————————

and $B \neq C$, but also if the grammar $\rightsquigarrow$ and $B, C \neq S$, but also $B \neq C$ and, if the grammar

▸ **Page 108** line −7 ————————————————————

In the next lecture $\rightsquigarrow$ In the next chapter

▸ **Page 111** line 2 ————————————————————

earlier in this lecture $\rightsquigarrow$ earlier in this chapter

▸ **Page 111** lines 6–7 ————————————————————

in this lecture $\rightsquigarrow$ in this chapter

▸ **Page 118** line −14 ————————————————————

for *every* language we wished to recognize in this course $\rightsquigarrow$ for *every* language we wished to recognize throughout this book

Page 189 line −9 ————————————————————

Definition A.1 (Set)

A set is a collection of unique elements.

▸ **Page 190** lines 7–9 ————————————————————

- The set of all years in the 20th century in which the summer Olympics were held is

$$O_{20\text{th}} = \{1904, 1908, 1912, 1920, 1924, 1928,$$
$$1932, 1936, 1948, 1952, 1956, 1960,$$
$$1964, 1968, 1972, 1976, 1980, 1984,$$
$$1988, 1992, 1996, 2000\}.$$