

Theory of Computation

CS 378, Fall 2022

Smaller Assignment 7

Due **BY THE BEGINNING OF CLASS** Tuesday, November 15

- Standard file naming and HW submission conventions apply: Please submit your type-written answers in a PDF file named

CS378_SA7_<userid>.pdf

where <userid> is replaced by your Colby userid. Please use your full userid, including your class year. Place the properly named file in your **Private** directory in your CS378 filespace on **filer**.

- *A general note for CS378:* As always, please present answers cleanly and **explain them clearly and thoroughly**, giving all details needed to make your answers easy to understand; typed-up (rather than handwritten) answers are required, and using L^AT_EX to typeset your answers is appreciated. (Feel free to talk with your Prof. about using L^AT_EX!) Graders may not award full credit to incomplete or illegible solutions. Clear communication *is* the point, on every assignment.

In general in CS378, unless explicitly specified otherwise, answers should be accompanied by explanations. Answers without explanations may not receive full credit. Please feel free to ask me any questions about explanations that might come up!

Exercises

1. Draw a transition diagram for a Turing Machine recognizing the following language:

$$L = \{a^i b^j \mid i < j\}$$

Please explain your design, and be sure to label the TM states with descriptive names.