

CSCE 551/MATH 562, Homework 3

due Monday 2/26/2024

In Chapter 4, you can ignore everything relating to context-free languages (CFLs) or context-free grammars (CFGs).

1. Let $M := (\{q_0, q_1, q_2, q_{acc}, q_{rej}\}, \Sigma, \Gamma, \delta, q_0, q_{acc}, q_{rej})$ be a TM, and suppose the following three IDs occur consecutively in some computation of M :

accq₀aab

acq₁cbab

acaq₂bab

What are $\delta(q_0, a)$ and $\delta(q_1, c)$? What can you say about Γ ?

2. Exercises 3.2(d,e):

Ex 3.2: The exercise concerns TM M_1 , whose description and state diagram appear in Example 3.9. In each of the parts, give the sequence of configurations that M_1 enters when started on the indicated input string.

d. 10#11.

e. 10#10.

3. Give a formal description of a (standard, 1-tape) TM that decides the language L of all strings of the form $w\#x$ where $w, x \in \{0, 1\}^*$ and x has the same number of 0's as w . Give a transition diagram.