CMPSC 464: Introduction to the Theory of Computation **(Date: 10/05/2022)**

Recitation #6

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Notice: Try to solve these problems before the recitation session by yourself. Sometimes we put more problems than one is able to discuss in 50 minutes. We want to make sure that we do not run out of the problems during each session.

Problem 1

You are given a DFA A and have been asked to design a TM that decides whether A accepts at least one string.

(a.) Formulate this problem as a language. Call this language E_{DFA}, where "E" stands for **E**mptiness.
(b.) Prove that this language is decidable.

Problem 2

Using reduction, prove that the following language is undecidable,

$$L_{PSU} = \{\langle M \rangle \mid M \text{ is a TM and "PSU"} \in L(M)\},$$

where

$$\Sigma = \{A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z\}.$$