

CSCI 538 Computability

Assignment 2 (10 marks)

Question 1 (2 marks)

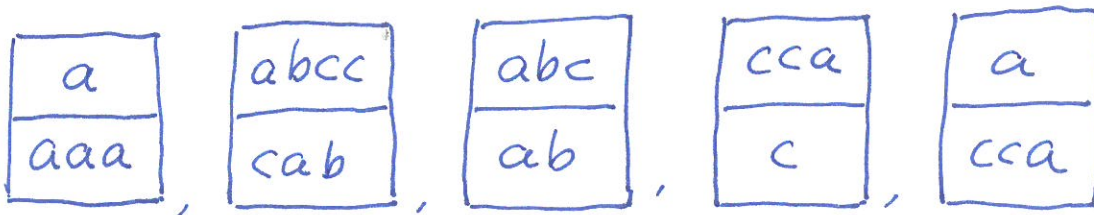
Let $T = \{ \langle M \rangle \mid M \text{ is a TM that accepts } w^R \text{ whenever it accepts } w \}$. Show that T is undecidable. (You cannot use Rice's theorem before proving it first.)

Question 2 (2 marks)

Show that A is Turing-recognizable if and only if $A \leq_m A_{TM}$.

Question 3 (2 marks)

In the following instance of the Post Correspondence Problem, is there a match? Why?



Question 4 (2 marks)

Let $EQ_{DFA} = \{ \langle G, H \rangle \mid G, H \text{ are DFA's and } L(G) = L(H) \}$. Show that EQ_{DFA} is in P .

Question 5 (2 marks)

Define UNARY-SSUM as the problem where you are given a set of positive integers $S = \{a_i \mid a_i \text{ has a single decimal digit for } i = 1, \dots, n\}$ and another positive integer C , and you need to decide whether there exists a subset of integers in S which sum to C . Show that UNARY-SSUM is in P .

Date Due: before the end of class on **Tuesday, Oct 3, 2017**. No late assignment will be accepted.