Assignment 4

CS 581
Due November 1, 2018

Problem 1 [10 point] Consider the problem of determining whether a single-tape Turing Machine ever writes a blank symbol over a nonblank symbol during the course of its computation on any input string. Formulate this problem as a language and show that it is undecidable.

Problem 2 [10 point] Prove that there exists an undecidable subset of $\{1\}^*$.

Problem 3 [10 point] Prove that the following language is recognizable.

$$\{\langle M \rangle \mid M \text{ is a TM that accepts at least on element of } \{1\}^*\}$$