CS 3800, Spring 2016
Homework 5 (50 points)
Assigned: Sunday, 21 February 2016
Due: Monday, 29 February 2016, 5pm

This is a programming assignment. For each of the problems, you will specify a Turing machine that recognizes a certain language.

Your specifications of the Turing machines must be in the form expected by the instructor's Turing machine interpreter, and you should use the instructor's interpreter to test your machines.

Your specification of the Turing machine for question 1 must be in a file named "tm1", the TM for question 2 must be in a file named "tm2", and so on. If you use other file names, the automated tests we use for grading will not work.

You will submit your Turing machine specifications by following the instructions shown on the course web site.

1. [10 pts] Define a Turing machine that decides $L((0 \ (0 \ \cup \ 1)^* \ 1))$.

2. [10 pts] Define a Turing machine that decides $\{0^i 1^j \mid 0 < j < i\}$.

3. [10 pts] Define a Turing machine that decides

$$\{1^n 01^{3n} \mid n \geq 1\}$$

4. [10 pts] Define a Turing machine that decides

$$\{1^i 01^j 01^k \mid i, j, k > 0 \text{ and } i = jk\}$$

5. [10 pts] Define a Turing machine that decides

$$\{1^m 01^n \mid m > 0 \text{ and } n = 2^m\}$$