CS-581: Theory of Computation
HW #3

Due Date: Feb. 10, 2016.

1. Provide a formal description of Turing Machines.

2. Describe informally (no more than half a page) the operation of a Turing Machine.

3. Design a Turning Machine that takes 3 numbers in unary representation and adds them together, leaving the result on the tape. (Unary representation: 5 in unary is "11111".) Assume the three numbers are separated by the "#" symbol. For example, the problem 3+4+2 would be represented on the tape as: 111#1111#11 the machine should accept with the following string on the tape: 111111111. Give your machine in graph notation, in the style of Figure 3.8.

4. What is a Decidable Language?

5. What is a Turing-Recognizable Language?

6. What is a Recursively Enumerable Language?

7. State the Church-Turing Thesis.

Exercises/Problems (Page 187 in Third Edition)

3.6
3.8 (b)
3.9
3.11
3.15 (b)
3.15 (d)

(Second edition: Problem numbers are the same.)