

(Math 170) Homework 10:

Due April 6, 2007

Definition 0.0.1. Let T be the Turing machine given by the following state table.

Configuration Starting State	Configuration Tape symbol	Behavior Tape operations	Behavior Final State
Start	1	>>	Start
Start	0	W1	s_1
s_1	1	>>	s_1
s_1	0	<<	s_2
s_2	1	W0	s_3
s_2	0	<<	s_2
s_3	1	<<	s_3
s_3	0	>>	Halt

Exercise 1: Draw a state diagram for machine T .

Exercise 2: Does T halt on the following input? If yes, what is the final state of the machine? (The \uparrow indicates the starting position of the head)

... |0 |1 |1 |1 |0 |1 |1 |1 |1 |0 |...

\uparrow

Exercise 3: Does T halt on the following input? If yes, what is the final state of the machine? (The \uparrow indicates the starting position of the head)

... |0 |1 |1 |0 |1 |1 |1 |0 |...

\uparrow

Exercise 4: Does T halt on the following input? If yes, what is the final state of the machine? (The \uparrow indicates the starting position of the head)

... |0 |1 |1 |1 |1 |0 |0 |...

\uparrow

Exercise 5: Is the Turing machine T well-formed? If yes, how many arguments can it take? Describe what the function T represents does.

Exercise 6: Draw a state diagram of a Turing machine which takes one argument n and returns $n + 4$.