

CS 383
HW 7

Due in class Wednesday, November 22 (right before thanksgiving)

.This doesn't need to be typed but it must be legible. If you have an elaborate automaton it is okay to divide it into steps and just give the portion of the automaton for each step.

1. Design a TM to accept $\{ww^{\text{rev}} \mid w \in (0+1)^*\}$ (i.e., even-length palindromes)
2. Design a Turing Machine to accept the strings that have the same number of 0's and 1's, such as 000111 and 010101.
3. Design a TM to accept $\{ww \mid w \in (0+1)^*\}$ You might find non-determinism helpful. It is sufficient to break this into steps that can clearly be handled by a TM; you don't need to write out all of the states and transitions unless you want to.
4. Design a TM that starts with the binary code for a number N on its tape and ends with the code for N+1. So if it starts with 10011 it ends with 10100 and if it starts with 1111 it ends with 10000.
5. Here is a non-deterministic TM. Find all configurations that can be derived from q_0001

