

# CS 383

## HW 7

Due in class Wednesday, April 12

.This doesn't need to be typed but it must be legible.

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  $q_0001$

