C240 Computability and Complexity : Tutorial 2

1. Design a TM Z whose output is "hello world" on any input. So
    formally, the input/output function f_Z of Z is
    $f_Z(w)$ = hello world
    for any word w of Z's input alphabet (say, the roman alphabet).

2. (a) Design a Turing machine to solve the following problem:
    The input is a word {1} of length n. So before M starts to run its tape
    contains a 1 in squares 0,1,…,n-1 and blanks (^) in all other squares.
    The problem is to determine whether n is even or odd. When M halts,
    square 0 of the tape should contain a 0 if n is even, and a 1 if n is odd.
    Square 1 should contain a blank.

    (b) write down the input/output function of M in mathematical
    notation.

3. Describe a TM, R, that reverses a word of {0,1}.
    So $f_R(00011) = 11000$, etc. Use 'pseudocode' or English description.