CS 1511 Homework 4

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Assume the definition in (b) is true. Then for a recursively enumerable language L, there exists a Turing machine M with a read/write tape that is initially empty and a write-nly output tape, such that only elements of L are written to the output tape, and every element of L is eventually written to the output tape.

Now construct a turing machine M'.

$M' = $ "On input w:

1. Run M until it produces a new output on its output tape.

2. Check if w was the item written onto the output tape. If yes, accept.

3. Otherwise, go to step 1. If M is halted, loop indefinitely.

Machine M' is the same machine defined in part (a). If $x \in L$, then x will show up on the output tape of machine M and will accept. If $x \notin L$, M will loop indefinitely on x.