Math 6010 - Assignment 4

Due February 15, 2021

(1) Give many-one reductions from the halting problem HP to the acceptance problem AP and conversely.
(2) For $A \leq_m B$ show:
    If B is computable, c.e., co-c.e., respectively, then so is A.
(3) Show that a language A is c.e. iff $A \leq_m$ AP.
(4) Is the set of Turing machines that accept the empty language
$$\{[M] \mid L(M) = \emptyset\}$$
computably enumerable? What about its complement?
(5) Show that the set of codes for Turing machines that write some nonblank symbol eventually when started with empty input is computable.
    What about machines that write the letter 0 sometime after starting on an empty tape?