1. Rice’s Theorem as in the book states that is incomputable. The halting problem asks whether a Turing machine halts on input . Let then be the input to and on two sets of partial functions and , respectively. only has and only has . is only defined for and . is only defined for and . and are non-trivial because both functions in them are computable (make two Turing machines where they only accept and only accept , respectively), and there are computable functions outside of them (say, whether a string is a palindrome). Assume for the sake of contradiction that the halting problem is computable, so that there exists a Turing machine that takes a Turing machine and its input and decides whether halts on .