CS21004 - Tutorial 12

April 15th, 2019

1. Are the following problem decidable/undecidable?
   (a) $\{\langle B\rangle | B$ is a DFA that accepts a palindrome$\}$
   (b) $LM_{TM} = \{\langle M, x\rangle | M$ ever moves left while computing on the input $x\}$
2. Identify which of the following languages are decidable / undecidable.
   (a) $L_1 = \{M | M$ is a Turing machine that halts on exactly 481 strings$\}$
   (b) $L_2 = \{M | M$ is a Turing machine and $|L(M)|$ is prime$\}$
   (c) $L_3 = \{\langle M_1, M_2\rangle\} | M_1$ and M_2 are two TMs, and $\epsilon \in L(M_1) \cup L(M_2)\}$
   (d) $L_4 = \{\langle k, x, M_1, M_2, \ldots, M_k\rangle | k$ is a natural number, x is a string, M_i is a TM for all $1 \leq i \leq k$, and at least $k/2$ TM's of $M_1, M_2, \ldots, M_k$ halt on $x\}$