All solutions should be neatly written or type set. All major steps in proofs and algorithms must be justified.

1. (10 points) Recall the following definition:

\[ A_{TM} = \{(M, w) : M \text{ accepts } w\}. \]

Show that if \( L \) is Turing recognizable then \( L \leq_m A_{TM} \).

2. (10 points) We know (from Theorem 5.23) that if \( A \leq_m B \) and \( A \) is not Turing recognizable then neither is \( B \). Use this and the fact that the complement of \( A_{TM} \) is not Turing recognizable to show that

\[ D_{TM} = \{(M) : L(M) \text{ is decidable}\} \]

is not Turing recognizable.