CPSC 351 — Tutorial Exercise #13

Reductions and Undecidability II

This tutorial exercise will be discussed on Monday, October 30, Tuesday, October 31, and Wednesday, November 1.

The problem to be solved is of the difficulty, and length, that would be appropriate for an **assignment** in CPSC 351.

Problem To Be Solved

1. Let $\text{Reject}_{\text{TM}} \subseteq \text{TM+I} \subseteq \Sigma^\star_{\text{TM}}$ be the the set of encodings of Turing machines

$$M = (Q, \Sigma, \Gamma, \delta, q_0, q_{\text{accept}}, q_{\text{reject}})$$

and strings $\omega \in \Sigma^\star$ such that M **rejects** ω.

Use a **many-one reduction** to prove that the language $\text{Reject}_{\text{TM}}$ is undecidable.

A **hint** for this problem is available in a separate file — but you should spend at least a little bit of time trying to solve this problem, without looking at it, before you use this hint.