# Scientific Computing (MATH6183001)

## Problem Set 8 - Turing Machines

July 31, 2024

**Problem 1.** This exercise concerns TM $M_1$, whose description and state diagram appear in Example 3.9 (page 173 of the textbook). Give the sequence of configurations that $M_1$ enters when started on the input string $s = 10\#11$.

**Problem 2.** Give the description of a Turing machine that decides the following language over the alphabet {0,1}: {w | w contains twice as many 0s as 1s}.

**Problem 3.** Show that the collection of decidable languages is closed under the operation of complementation.