1 Turing Machine exercises

1. Provide TMs for the following languages:

   (a) $L = \{w \mid w \in \{0,1\}^*, |w|_0 = |w|_1\}$
   (b) $L = \{a^n b^m c^{nm} \mid n, m \geq 1\}$

2. Design a TM that increments a binary number.

3. Design a TM that decrements a binary number.

4. Provide a 3-tape TM for adding 2 binary number (consider both numbers having the same length, one padded with 0s in the front):

5. Provide a 2-tape TM for the following language:

   (a) $L = \{a^m b^n \mid m, n \geq 1, n\%m = 0\}$