The Dragon Academy
Exploring Computer Technology TEJ10 (G9)
Term 3
Assignment 1
Due date: Thu 21 Feb. 2019

February 22, 2019

Submission form: Write your answers in a text document or as a web page and submit your file as an attachment to msantos@dragonacademy.org.

Make sure to write as *subject* of your email "***Assignment 1 ; Term 3***"

For the class slides on these type of problems see here those of Thu 14 Feb and Fri 15 Feb 2019.

1 Problems

1. Write the rules for a Turing Machine (**TM**) that satisfies the following requirements:
   (a) As soon as it sees a 0, it writes 111, i.e., 3 1's in a row, and it stops.
   (b) If initially it sees a 1, it writes a 0 and moves to the left

   Remark: Make sure this **TM** stops if it gets a tape with all just 1's. The second requirement is meant to deal with this. See our discussion of Thu 14 Feb 2019.

2. Write the rules for a Turing Machine (**TM**) that satisfies the following requirements:
   (a) As soon as it sees a 1, it moves 4 steps to the right, followed by 5 steps to the left, and then stops
   (b) As soon as it sees a 0, it stops

3. Write the rules for a Turing Machine (**TM**) that satisfies the following requirements:
   (a) As soon as it sees a 1, it writes 000, i.e., 3 0's in a row, and it stops.
   (b) Stops when it sees a 0.

4. Write the rules for a Turing Machine (**TM**) that satisfies the following requirements:
   (a) As soon as it sees a 0, it writes 11, i.e., 2 1's in a row, and it stops.
   (b) Stops when it sees a 111.

5. Write the rules for a Turing Machine (**TM**) that satisfies the following requirements:
   (a) As soon as it sees a 01, it writes 11, i.e., 3 1's in a row, and it stops.
   (b) Stops when it sees a 00.

6. Write the rules for a Turing Machine (**TM**) that satisfies the following requirements:
   (a) As soon as it sees a 101, it writes 00, i.e., 2 0's in a row, and it stops.
   (b) Stops when it sees a 000.
   (c) Stops when it sees a 111.