Homework 5

March 3, 2017

(804501476)

Problem 1.0:

We emulate a TM with FRTM as follows:

1) The start state: We add two ☻ and then copy the input after.

☻	☻	x_1	x_2	x_3	x_4	...	x_n

2) Move left: After moving to the left-end of the tape. Move right until we see second ☻ then move right once.

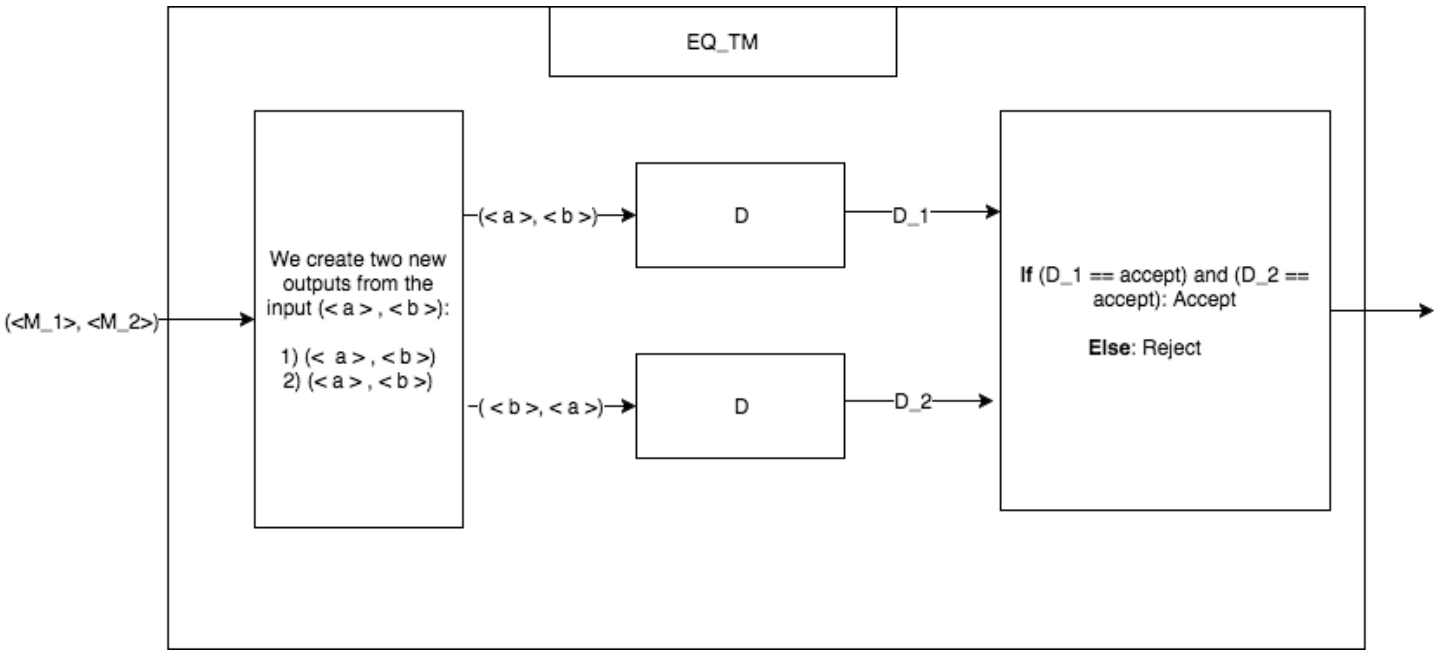
3) Move right: If first time moving right, just move right. Else:

- Move left and then move right until we see ☻ and delete it.
- Move right until we find the next ☻. Then more move right twice.
- Write ☻ and move right twice.

Problem 2.0:

Proof

Suppose $Subset_{TM}$ is decidable $\implies \exists\ D$ decides $Subset_{TM}$. We build a turing machine to decide $EQ_{TM} = \{(< M_1 >, < M_2 >) \mid M_1 \text{ and } M_2 \text{ are } TMs \text{ and } L(M_1) = L(M_2)\}$



Theorem 5.4 states that EQ_{TM} is not decidable $\Rightarrow\Leftarrow$. Therefore $Subset_{TM}$ is not decidable.

Problem 3.0: