Assignment #1

Make Turing machine for.

1. XOR operation between two binary numbers.

$$\Sigma = \{1, 0\} \qquad \gamma = \{1, 0, X, \overline{X}, Y, \overline{Y}\}$$

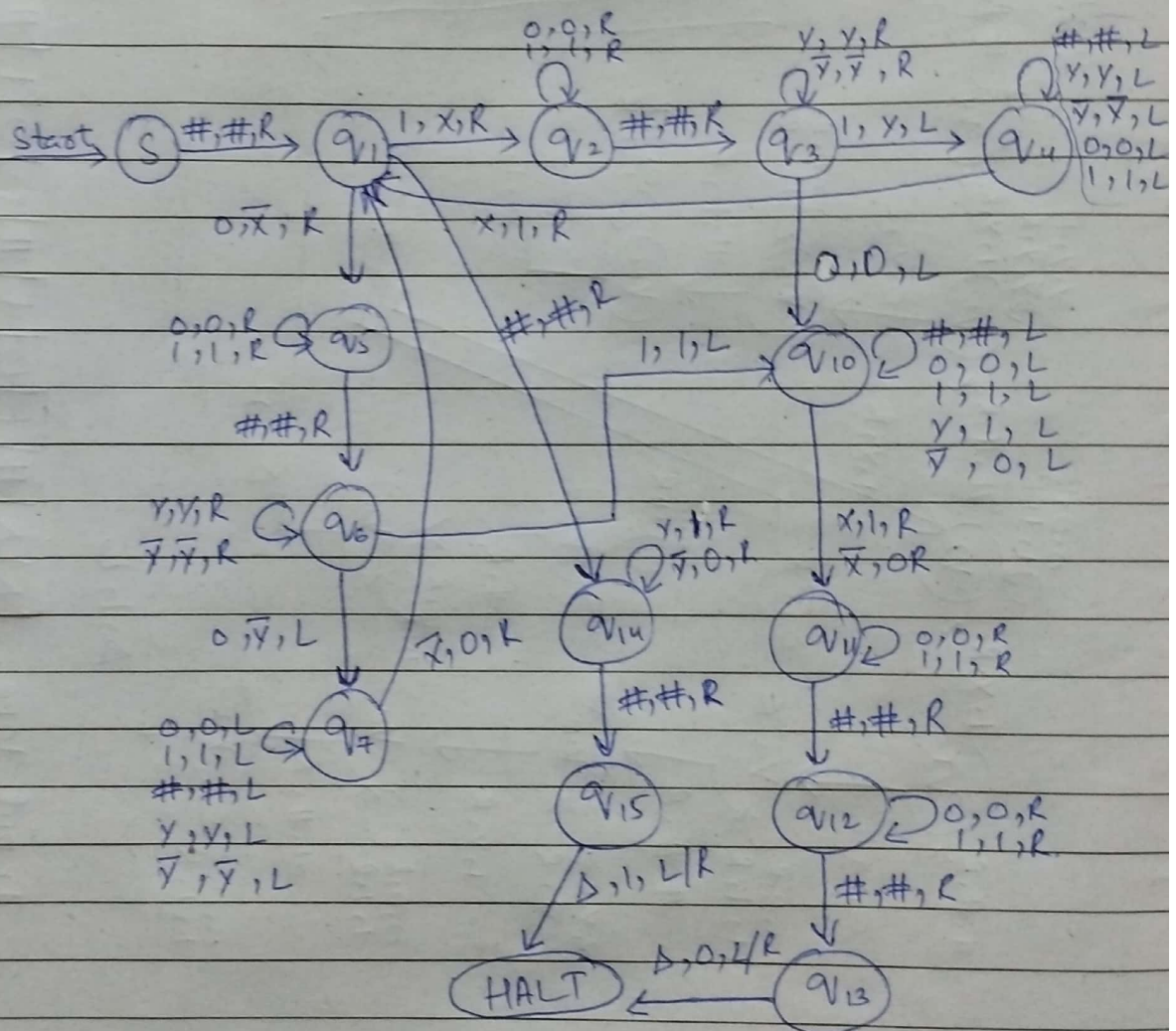Input Tape: | Δ | Δ | # | 1 | 0 | 1 | # | 0 | 1 | 0 | 1 | # | 1 | 0 | 0 | 1 | # | Δ | Δ |

Make Turing Machine for

2. Compare two strings as to whether they are equal or not.
$\Sigma = \{0, 1\}$, $\gamma = \{0, 1, x, \bar{x}, y, \bar{y}\}$.

Input Tape:

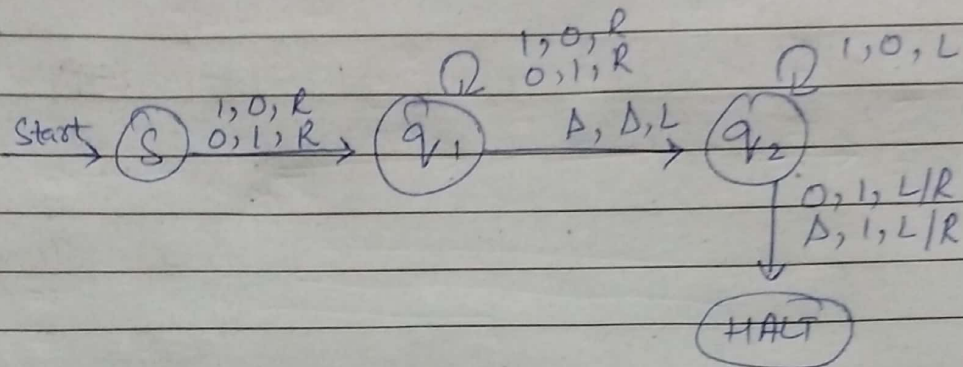| Δ	Δ	#	1	0	1	0	#	1	0	1	0	#	Δ	#	Δ	Δ	Δ

first Input   second input   output 1/0
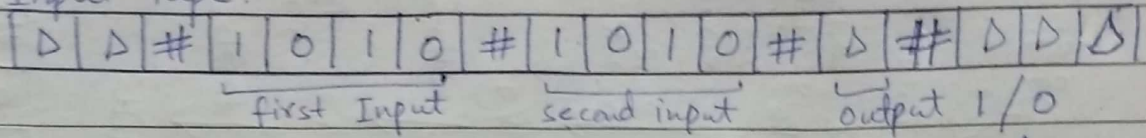
1 = equal
0 = not equal

Make Turing machine for

3. Two's complement of a binary number.

$$\Sigma = \{0, 1\}$$

Start $\rightarrow$ (S) $\xrightarrow[\text{0,1,R}]{\text{1,0,R}}$ (q$_1$) $\xrightarrow[\text{1,0,R}]{\text{1,0,R} \atop \text{0,1,R}}$ $\xrightarrow{\Delta, \Delta, L}$ (q$_2$) 1,0,L

$\downarrow$ $\begin{matrix} \text{0,1,L/R} \\ \Delta, 1, L/R \end{matrix}$

(HALT)

Input Tape :

Δ	Δ	1	0	1	0	Δ	Δ