CSC341 HW6

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Academic Honesty

Written Sources Used:

Michael Sipser - Introduction to the Theory of Computation

Help Obtained:

None

Question 1

$Q = \{q_0, q_1, q_2, q_3, q_4, q_5\}$

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

$\Gamma = \{0, 1, \square\}$

$\delta(q_i, r) = (q_j, r^\grave{}, D)$

Where q_i, q_j are current and next states, $r, r^\grave{}$ are symbols read and to be written on the tape and D is the direction the head will move.

Start State: q_0

Accept State: q_4

Reject State: q_5

Question 2

For $A = \{0^n 1^n 0^n \mid n \geq 0\}$, we will use two tapes. Tape 1 contains the input string and tape 2 starts as an empty tape.

1. Scan Tape 1, if the scanned input is 0 mark 1 on Tape 2, if the scanned input is 1 mark 0.
2. Repeat stage 1 until we reach $\square$. When $\square$ is detected, move both heads of Tape 1 and Tape 2 back to the front of the tape.
3. Scan both tapes, if they have the same input, reject, else move the head to the right and continue scanning.
4. Continue stage 3 until $\square$ is reached on Tape 1, if $\square$ is reached, accept.

Question 4

The first tape (Tape 1) contains the input string and the second tape (Tape 2) starts emtpy.

1. Both tapes start from the beginning and moves right until Tape 1 reaches a blank symbol, meaning the end of the input.
2. When the end of Tape 1 is reached, Tape 2 has also moved the same amount to the right to that of the length of Tape 1′s input.
3. Move the head of Tape 2 to the left-most, beginning, and write down the computed length in bianry representation.