

CSC341 HW7

March 12, 2024

Havin Lim

Academic Honesty

Written Sources Used:

Michael Sipser - Introduction to the Theory of Computation

Help Obtained:

None

Question 1

1)

Since M is only capable of moving right we can create a DFA that acts in the same behavior, which accepts only when it reads the entire input and otherwise reject.

2)

B is not regular. When it has the capabilities to move left, right, and write on the input tape this does not match the finite-state of a DFA, which makes B not necessarily regular in this case.

Question 2

Yes, we can create such M_\cap that recognizes the intersection of L_1 and L_2 by making allowing it to only halt and accept when both TM1 and TM2 accepts.

M_\cap will have the same M_1 at the beginning and M_2 after that followed by a \square showing the end (accept state) of the TM.

1. The input will go through M_1 , in this case the beginning, if it does not accept reject, otherwise continue.
2. The next part will consist of the original M_2 .
3. If M_2 also accepts all the input, then this means both M_1 and M_2 are accepting the input language, which shows that M_\cap recognizes $L_1 \cap L_2$.

Question 3

1. Select a single vertex v in G .
2. Mark v as visited and do a DFS, marking all vertexes that are visited.
3. If there is any unvisited vertex reject, otherwise accept.

Question 4

For a high-level description of M ,

1. Enumerate all possible strings of length k .
2. For each string s we have created in step 1, check if D accepts each string by using M_{DFA} .
3. If D accepts one of these strings then accept, otherwise reject.