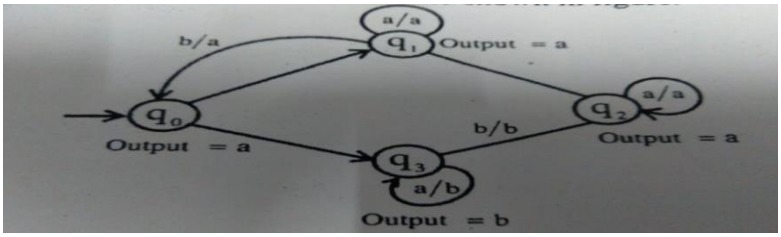
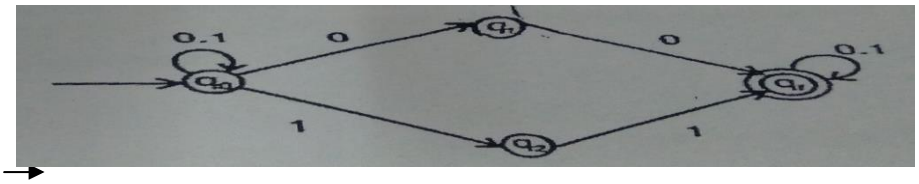
Department of Artificial Intelligence & Data Sciences

II Year IV Semester

4AID4-06: Theory of Computation

Note: Each assignment of Maximum Marks 10.All question carries equal marks.

ASSIGNMENT-I

<table>
<tr><td>Q1. Consider the Moore machine show bellow. What is the output for input “ababa”?
 
</td><td>BLT-5</td><td>CO-1</td></tr>
<tr><td>Q2. Convert the following Moore machine into Mealy Machine.
<table>
<tr><td rowspan="2">State</td><td colspan="2">Input</td><td rowspan="2">output</td></tr>
<tr><td>a</td><td>b</td></tr>
<tr><td>Q_0</td><td>Q_1</td><td>Q_3</td><td>1</td></tr>
<tr><td>Q_1</td><td>Q_3</td><td>Q_1</td><td>0</td></tr>
<tr><td>Q2</td><td>Q0</td><td>Q3</td><td>0</td></tr>
<tr><td>Q3</td><td>Q3</td><td>Q2</td><td>1</td></tr>
</table></td><td>BLT-4</td><td>CO-1</td></tr>
<tr><td>Q3. Explain the process for minimization of finite automata with example.</td><td>BLT-1</td><td>CO-1</td></tr>
<tr><td>Q4. Differentiate between DFA and NDFA. Convert the following NDFA to DFA.
 
</td><td>BLT-2</td><td>CO-1</td></tr>
<tr><td>Q5. Write a regular expression (R) for following (∑=a,b)
a) R that generate all the string where the length of string is at least 3.
b) R that generate all the string where every ‘a’ must followed by ‘b’
c) R that generate all the string containing second symbol from RHS is ‘a’
R that generate all the string where each string contain at most two b’s</td><td>BLT-6</td><td>CO-1</td></tr>
</table>

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ASSIGNMENT-II

Q1. What is ambiguity ?	BLT-1	CO-2
Q2. Differentiate L* and L+	BLT-4	CO-2
Q3. What is context free grammar?	BLT-1	CO-2
Q4. Consider the context free grammarS -> AA A -> AAA | bA | Ab | a find the parse tree for string " bbaaaab "	BLT-4	CO-2
Q5 Construct a r.e for the language which accepts all strings with at least two c' over theset Σ={c,b}	BLT-6	CO-2

ASSIGNMENT-III

Q1. Define Push Down Autometa?	BLT-1	CO-3
Q2. State the equivalence of PDA and CFL.	BLT-3	CO-3
Q3. What are the closure properties of CFL?	BLT-1	CO-3
Q4. Give an example of Deterministic CFL.	BLT-2	CO-3
Q5 What are the properties of CFL?	BLT-1	CO-3

ASSIGNMENT-IV

Q1. What is a Turing machine?	BLT-1	CO-4
Q2. Write short notes on:(i) Context sensitive language(ii)Chomsky hierarchy	BLT-1	CO-4
Q3. Give examples of recursive languages?	BLT-3	CO-4
Q4. Differentiate recursive and recursively enumerable languages.	BLT-4	CO-4
Q5. What are UTMs or Universal Turing machines?	BLT-1	CO-4

ASSIGNMENT-V

Q1. What is vertex cover problem?	BLT-2	CO-5
Q2. Explain Hamiltonian path problem.	BLT-2	CO-5
Q3. Differentiate NP-complete and NP-hard problem.	BLT-4	CO-5
Q4. Explain Traveling salesman problem.	BLT-2	CO-5
Q5. Define the type of complex classes.	BLT-1	CO-5

*__BLT__: BLT shows the **Bloom's taxonomy** levels.