

SHRI G.S. INSTITUTE OF TECHNOLOGY & SCIENCE, INDORE

Department of Information Technology

B.Tech III Year

Subject Code: IT38003

Subject Nomenclature: OPERATING SYSTEM

Session: 2022-23

Semester: A

Mid Test-I

Time: 1hr

Marks: 20

Q.no.	Questions	CO	BL	PI	Marks																					
1.	a. Describe requirements for a solution to a critical section problem. b. Explain Process State Diagram.	1	2	1.4.1	4																					
2.	a. Differentiate Process and Threads. b. Describe any two Operating System Services.	2	4,2	1.4.1	4																					
3.	Find Average turn around time and Waiting time using RoundRobin scheduling algorithm. Consider Time Quantum (TQ)= 2. <table border="1"> <thead> <tr> <th>P.No.</th><th>AT</th><th>BT</th></tr> </thead> <tbody> <tr><td>1</td><td>3</td><td>2</td></tr> <tr><td>2</td><td>2</td><td>4</td></tr> <tr><td>3</td><td>6</td><td>3</td></tr> <tr><td>4</td><td>8</td><td>1</td></tr> <tr><td>5</td><td>4</td><td>3</td></tr> <tr><td>6</td><td>5</td><td>4</td></tr> </tbody> </table>	P.No.	AT	BT	1	3	2	2	2	4	3	6	3	4	8	1	5	4	3	6	5	4	3	5	1.4.3	4
P.No.	AT	BT																								
1	3	2																								
2	2	4																								
3	6	3																								
4	8	1																								
5	4	3																								
6	5	4																								
4.	A system shares 9 tape drives. The current allocation and maximum requirement of tape drives for 4 processes are shown below: <table border="1"> <thead> <tr> <th>Process</th><th>Maximum need</th><th>Current allocation</th></tr> </thead> <tbody> <tr><td>P1</td><td>9</td><td>3</td></tr> <tr><td>P2</td><td>6</td><td>1</td></tr> <tr><td>P3</td><td>5</td><td>3</td></tr> <tr><td>P4</td><td>10</td><td>0</td></tr> </tbody> </table> <p>What is the current state of the system?</p>	Process	Maximum need	Current allocation	P1	9	3	P2	6	1	P3	5	3	P4	10	0	2	5	1.4.3	4						
Process	Maximum need	Current allocation																								
P1	9	3																								
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P3	5	3																								
P4	10	0																								
5.	a. Explain about various fields of Process Control Block b. Describe the differences among short-term, medium-term, and long-term scheduling.	1	2	1.4.2	4																					

P
P₁
P₂
P₃
P₄

Department of Information Technology

Mid Term Test -I

July- Nov. 2022

IT-38007 Design & Analysis of Algorithms

B.Tech III Year

Time: 1 Hr.

Max. Marks: 20

		Marks	CO	BL	PI
Q.1	Find tight asymptotic bounds for the following recurrences using recursion tree method i) $T(n) = T(2n/3) + T(n/3) + cn$ ii) $T(n) = 4T(n/2) + cn$	06	CO1	BL3	1.4.1
Q.2	Write the recurrence equation for i) Merge Sort Algorithm ii) Quick Sort Algorithm iii) Finding Fibonacci number	03	CO1	BL1	1.4.1
Q.3	Analyze the following code and find the time complexity 1) <pre>for (int i = 1; i <= n; i *= c) { // some O(1) expressions }</pre> 2) <pre>// function taking input "n" int findSum(int n) { int sum = 0; // -----> constant time for(int i = 1; i <= n; ++i) for(int j = 1; j <= i; ++j) sum++; // -----> return sum; // -----> constant time }</pre>	06	CO1	BL4	1.4.1
Q.4	Design an $O(n \lg k)$ algorithm using divide and conquer technique to find k^{th} largest element from a list of numbers arranged randomly.	04	CO4	BL6	1.4.1
Q.5	Write an $O(\lg n)$ algorithm to find a number from the given sorted list.	01	CO3	BL1	1.4.1

Shri Govindram Seksaria Institute of Technology and Science, Indore

Examination Course: Artificial Intelligence (IT38005)

Date: 21st September 2022

Time: 11:00 AM to 12:00 Noon

Maximum Marks: 20

Instructions:

- There are total of 7 questions over 2 pages. All questions are compulsory.
 - Be brief and precise while writing your answers.
 - Please do not write any extra or unnecessary statements in your answers.
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I. Very Short Answer Type Questions. Write your answers in maximum 1-2 sentence(s).

Q1. What specific goal does the machine have to achieve in order to pass the Turing test?

Q2. Write a formal definition of the search problem. Also, provide the four-element tuple, which can be used to represent a search problem.

[Total marks = 1+3 = 4]

II. Short Answer Type Questions.

Q4. Write pseudo code for DFS. [*You are suggested to write a compact pseudo-code similar to one taught in the class, not the one given in the book by Cormen*]

Q5. The Time Complexity of performing a BFS on a k -ary tree, in the worst case is $O(k^d)$, where d is the depth of the tree. Justify. What will the space complexity for performing a BFS on a k -ary tree?

Q6. State the major difference between state-based and goal-based agents. Give an example of a goal-based agent with brief information regarding its all relevant faculties such as its environment type, sensors, actuators, actions, action mapping, and goals.

[Total marks = 2.5+ 3.5+4= 10]

III. Long Answer Type Questions. Write your answers briefly and precisely.

Q7. What are the different types of environments in which agents operate? Discuss in detail with examples. Also, point out these environments that would be the most challenging ones.

[Total marks = 6]

Department of Information Technology
Mid Sem. Test - I (Jul-Dec 2022)
Theory of Computation (IT 38002)

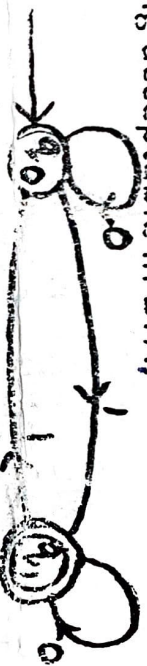
Time: 1 Hour

Note: All questions are compulsory.

Max Marks: 20

	Marks	CO	BL	PI
Q1 Formally define Non-Deterministic Finite Automata (NFA) without ϵ -moves.	03	CO1	1	1.3.1

Q2 Identify entire sequence of states for the input string 0110110 in given DFA. Whether the string acceptable in DFA?	02	CO1	2	1.3.1
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Q3 Using mathematical induction show that for any strings u and v : $ uv = u + v $	05	CO4	3	1.1.1
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Q4 Consider the languages $L_1 = \{w: w \bmod 3 = 0\}$ and $L_2 = \{w: n_a(w) = n_b(w)\}$. The corresponding grammars for languages L_1 and L_2 are respectively denoted by $G_1 = (V_1, T_1, S_1, P_1 = \{S_1 \rightarrow aaS_1/\epsilon\})$ and $G_2 = (V_2, T_2, S_2, P_2 = \{S_2 \rightarrow aS_2b/bS_2a/S_2S_2/\epsilon\})$. Construct the grammar G for language $L_1 L_2$.	03	CO5	3	1.3.1
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Q5 Define the following: 1. Derivation of a string, 2. Sentential form of derivation.	02	CO1	1	1.4.1
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Q6 Construct DFA that accepts all strings consists of number of $a \bmod 3 = 2$ and number of $b \bmod 3 = 1$ or 2 over $\Sigma = \{a, b\}$.	05	CO2	6	2.3.1
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DEPARTMENT OF INFORMATION TECHNOLOGY
BE IT III YEAR MIDTERM-1 2022
COMPUTER NETWORKS (IT38001)

Time: 1:00 Hours

Max Marks: 20

- | | Marks | CO |
|--|-------|-----|
| Q1 Explain the responsibilities of Data Link layer. | 4 | CO2 |
| Q2 Compare different network topology. | 4 | CO1 |
| Q3 If a class B network on the Internet has subnet mask of 255.255.248.0, what is the maximum number of hosts per subnet and the subnet address, first host ID, last host ID and broadcast address. | 4 | CO3 |
| Q4 A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is (x^3+1) . Show the actual bit string transmitted. Suppose that the third bit from the left is inverted during transmission. Show that this error is detected at the receiver's end. | 4 | CO3 |
| Q5 Explain TCP/IP reference model. | 4 | CO1 |