

Department of Artificial Intelligence and Machine Learning

Course Code: A1233AI
Sem: IIIDate: 09-Jan-2024
Duration: 90 Minutes

CIE-I

Fundamentals of Data Structures and Data Analysis (DSDA)

Answer all the Questions

SL. No	Questions	M	BT	CO
1	a) Define a data structure. Discuss the classification of data structures.	05	02	01
	b) Which type of data structure will be used in the following scenarios, justify i. Storing records of students in a given section of a given branch ii. You are asked to share a single printing service among 40 machines in a laboratory.	05	03	01
2	a) Give the tracing using a stack to convert the given infix expression to postfix form by highlighting the value of TOP and Stack Contents (Do not write C program). $((A + B) / (C - D)) - (E * F) + G$	04	02	01
	b) Write a C program to reverse the given string content using Stacks while reversing to remove the occurrences of special characters, including spaces. Your program should have PUSH and POP functions. Example: Input: R V College!! Output: egelloCVR	06	03	01
3	Consider the following scenario; A theatre has 100 seats, and you get a series of N requests to book them. Write a C program to process these requests using a FIFO manner using a static linear queue of size 1000. Your program should take care of the following: 1. Queue Overflow and Queue Underflow conditions 2. Each request indicates the number of seats 3. Allot the seats, if available, based on the requested number 4. Display whether the allotment is successful or not for every request	10	03	03
4	a) Give the results of the following code snippets; i. <pre>{ int i, *j, *k=NULL; if (j == k) printf("YES"); else printf("NO"); }</pre> ii. <pre>{ int num[]={10,20,30,40,50} int i; for (i=0;i<5;i++) { printf("%d-----%d\n", *(i+num), i[num]); } }</pre>	04	02	01
	b) Assume you have a single linked list created with the following node structure; struct node { char word[80];	06	03	03

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		<pre>struct node *link; };</pre> <p>Complete the following C function, which counts the number of occurrences of words starting with characters 'S' and 'D.' Consider the starting node address as First (Do not write complete C program).</p> <pre>void count(struct node *First) {-----}</pre> <p>Example:</p>			
5	a)	<p>Write a C program to perform the following operation on a given square matrix of size $M \times M$.</p> <p>Input:</p> <pre>1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6</pre> <p>Output:</p> <pre>2 1 4 3 6 5 2 1 4 3 6 5 2 1 4 3 6 5 2 1 4 3 6 5 2 1 4 3 6 5</pre>	05	03	01
	b)	<p>How can the following situations be handled?</p> <ol style="list-style-type: none"> Deciding the OVERFLOW condition of a Circular Static Queue Exchanging the values of any two identical types of variables using only two pointers. 	05	02	03

Course Outcome	
CO1	Apply the knowledge of data structures in providing solutions to some software development requirements.
CO2	Perform data analysis of some real-world scientific/business use cases and present the analysis results.
CO3	Investigate appropriate data structures and understand requirements in solving some problems of industry and society.
CO4	Use data analysis tools to illustrate the principles of data interpretation, statistical analysis, and graphical visualizations of the datasets.
CO5	Appraise data structures and analysis knowledge to build a successful career as an AIML engineer, work in teams, and communicate their ideas effectively.

M-Marks, BT-Blooms Taxonomy Levels, CO-Course Outcomes

Marks Distribution	Particulars	CO1	CO2	CO3	CO4	CO5	L1	L2	L3	L4	L5
	Max Marks	29	--	21	--	--	--	18	32	--	--