GALGOTIAS UNIVERSITY

ADMISSION NUMBER

School of Computing Science and Engineering

Bachelor of Technology in Computer Science and Engineering
Semester End Examination - Jun 2024

Duration : 180 Minutes
Max Marks : 100

Sem VI - R1UC601B - Advanced Algorithmic Problem Solving

General Instructions
Answer to the specific question asked
Draw neat, labelled diagrams wherever necessary
Approved data hand books are allowed subject to verification by the Invigilator

1)	Differentiate between static array and dynamic array.	K1(2)
2)	What is hashing? Why is it used?	K2(4)
3)	Suppose we are comparing implementations of insertion sort and merge sort on the same machine. For inputs of size n, insertion sort runs in 8n^2 (8 n square) steps, while merge sort runs in 64n lg n steps. Forwhich values of n does insertion sort beat merge sort?	K2(6)
4)	Write a recursive function to generate all possible subsets of a given set.	K3(9)
5)	Write a recursive function to solve the subset sum problem?	K3(9)
6)	Assess the impact of using bit manipulation techniques in cryptographic algorithms for data security.	K5(10)
7)	Analyze the impact of stack overflow and underflow conditions in real-world applications. How can these conditions be mitigated or prevented?	K4(12)
8)	Given a Binary Search Tree (BST) and a key K. If K is not present in the BST, Insert a new Node with a value equal to K into the BST. If K is already present in the BST, don't modify the BST. Write a function to insert value K, if K is present or not.	K5(15)
9)	Given a number n, find sum of first n natural numbers. To calculate the sum, we will use a recursive function recur_sum(). Write the function recur_sum() in C/C++/Java/Python.	K5(15)
10)	Write a program to implement a stack using queues.	K6(18)