DSA and Python Questions - GATE DA 2025

DSA (Data Structures & Algorithms)

Q.18: Consider a hash table of size 10 with indices {0, 1, . . . , 9}, with the hash function h(x) = 3x (mod 10), where linear probing is used to handle collisions. The hash table is initially empty and then the following sequence of keys is inserted into the hash table: 1, 4, 5, 6, 14, 15. The indices where the keys 14 and 15 are stored are, respectively:

(A) 2 and 5

(B) 2 and 6

 (C) 4 and 5

(D) 4 and 6

Q.27: For which of the following inputs does binary search take time O(log n) in the worst case?

(A) An array of n integers in any order

(B) A linked list of n integers in any order

 (C) An array of n integers in increasing order

 (D) A linked list of n integers in increasing order

Q.29: Suppose that insertion sort is applied to the array [1, 3, 5, 7, 9, 11, x, 15, 13] and it takes exactly two swaps to sort the array. Select all possible values of x.

 (A) 10

(B) 12

(C) 14

 (D) 16

Q.43: Consider game trees Tree-1 and Tree-2 as shown. The first level is a MAX agent and the second level is a MIN agent. The value in the square node is the output of the utility function. For what ranges of x and y, the right child of node B and the right child of node E will be pruned by alpha-beta pruning algorithm?

(A) $x \in [1,\infty)$ and $y \in (-\infty, 2]$

(B) $x \in (-\infty, 2]$ and $y \in (-\infty, 5]$

(C) $x \in (-\infty, 2]$ and $y \in [2,\infty)$

(D) $x \in [1,\infty)$ and $y \in (-\infty, 5]$

Q.44: Suppose A* algorithm is applied on a given state graph using priority queue to store the frontier. In what sequence are the nodes expanded?

(A) S,A,E,C,B,D,G

(B) S,E,A,C,B,D,G

(C) S,A,E,B,C,D,G

(D) S,A,B,E,C,D,G

Q.58: It is given that a−b−c−d is a shortest path between a and d; e−f−g−h is a shortest path between e and h; a−f−c−h is a shortest path between a and h. Which of the following is/are NOT the edges of G?

(A) (b,d)

(B) (b,g)

(C) (b,h) (

D) (e,g)

Q.64: Consider the following pseudocode. (Stack-based program) Output sum = ? (Answer in integer)

Q.65: Consider a directed graph G = (V,E), where V = {0, 1, 2, . . . , 100} and E = {(i, j) : 0 < j − i ≤ 2, for all i, j ∈ V }. Suppose the adjacency list of each vertex is in decreasing order of vertex number, and depth-first search (DFS) is performed at vertex 0. The number of vertices that will be discovered after vertex 50 is (Answer in integer)

Python Programming

Q.23: Consider the following Python declarations of two lists. A=[1,2,3] B=[4,5,6] Which one of the following statements results in A = [1, 2, 3, 4, 5, 6]?

(A) A.extend(B)

(B) A.append(B)

(C) A.update(B)

(D) A.insert(B)

Q.47: Consider the following Python code snippet: A={'this','that'}; B={'that','other'}; C={'other','this'}; while 'other' in C: if 'this' in A: A,B,C=A-B,B-C,C-A if 'that' in B: A,B,C=C|A,A|B,B|C When the above program is executed, at the end, which of the following sets contains 'this'?

(A) Only A

(B) Only B

(C) Only C

(D) A, C

Q.63: Consider the following Python code snippet: def f(a,b): if (a==0): return b if (a%2==1): return 2*f((a-1)/2,b) return b+f(a-1,b) print(f(15,10)) What value will be printed? (Answer in integer)