



United International University (UIU)

Dept. of Computer Science and Engineering (CSE)

Final Exam Year: 2021

Trimester: Summer

Course: CSE 2215/CSI 217 Data Structure and Algorithms I

Total Marks: 25, Time: 1 hour 15 min, Upload & Download Time: 15 min

(Any examinee found adopting unfair means will be expelled from the trimester / program as per UIU disciplinary rules)

There are FOUR questions. Answer all of them. Figures in the right-hand margin indicate full marks.

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1. a) Draw a binary tree using the data given below, where x, y, z, p, r, t, u and v are nodes of the tree. [1]
y p z x r t u v
Here, x=last two digits of your student id+1, y=x+3, z=x+y, p=y+z, r=x+2, t=700, u=800, v=900
- b) Traverse the binary tree of Ques. 1(a) using the preorder, inorder, postorder and level order techniques. Also find the height of the tree. [3]
- c) Draw a binary tree from the following Preorder and Inorder sequences [2]
Preorder: x y p v r z t u
Inorder: v p y r x t z u
Here, x=last two digits of your student id+1, y=x+3, z=x+y, p=y+z, r=x+2, t=700, u=800, v=900
2. a) Show the status of a QUEUE and a Priority QUEUE (Data in Ascending Order) for the following operations, where both QUEUES are implemented by an array of size, m=3. Here, Enqueue and Dequeue mean insert and delete respectively, and x=last two digits of your student id+1, y=x+3, z=x+y and p=y+z. [3]
Enqueue(z), Enqueue(p), Dequeue(), Enqueue(y), Dequeue()
- b) Draw a complete binary and then build the max-heap tree from the following data, where x=last two digits of your student id+100, y=x+30, z=x+y. [3]
10 x 20 8 y 32 15 z 56
3. a) Draw a directed acyclic graph using the vertices y, p, z, x, r and u, where x=last two digits of your student id+1, y=x+3, z=x+y, p=y+z, r=x+2, u=900 [1]
- b) Construct an Adjacency Matrix and an Adjacency List for the graph in Ques. 3(a). [3]
- c) Find a topological order from the graph in Ques. 3(a). [2]
4. a) Draw an undirected graph using the vertices y, p, z, x and r, where x=last two digits of your student id+1, y=x+3, z=x+y, p=y+z, r=x+2. Also find the Breadth First Search (BFS) sequence from the graph using a QUEUE. [2]
- b) Construct a binary search tree (BST) using the nodes y, p, z, x, r, and t, where, x=last two digits of your student id+1, y=x+3, z=x+y, p=y+z, r=x+2, t=900. Show the insertion and deletion of p+r and z, respectively in/from the BST. [3]
- c) Two disjoint sets {y, p, z, x} and {r, t} are given, where minimum one of a set is the representative of that set. Determine UNION(Find(x), Find(t)). How can you check x and y are in the same set using Find operation? Here, x=last two digits of your student id+1, y=x+3, z=x+y, p=y+z, r=x+2, t=900. [2]