EAST WEST UNIVERSITY
Department of Computer Science and Engineering
B.Sc. in Computer Science and Engineering Program
Final Examination, Fall 2021 Semester

Course: CSE 207- Data Structures, Section-3
Instructor: Tanni Mittra, Senior Lecturer CSE Department
Full Marks: 40 (20 will be counted for final grading)
Time: 1 Hour and 20 Minutes
Submission Time: 10 Minutes

Note: There are SIX questions, answer ALL of them. Course Outcome (CO), Cognitive Level and Mark of each question are mentioned at the right margin.

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1. An operating system execute process depending on their priority. Where highest number has highest priority. Consider at a particular instance of time, 10 processes arrives with following priority. Now build a Binary Heap using the priority number. [CO3,C3, Mark: 6]

Process	Priority	Process	Priority
P1	3	P6	3
P2	5	P7	4
P3	2	P8	5
P4	4	P9	1
P5	6	P10	6

b. Now delete the top four priority patients from the heap and perform necessary operations to **rebuild** the heap after deletion. [CO3,C3, Mark: 4]

2. **Show** breadth-first traversal of the following graph, where A is the starting node. Visit adjacent nodes in an anticlockwise ordering from a particular node (12 o'clock position). [CO3,C3, Mark: 6]
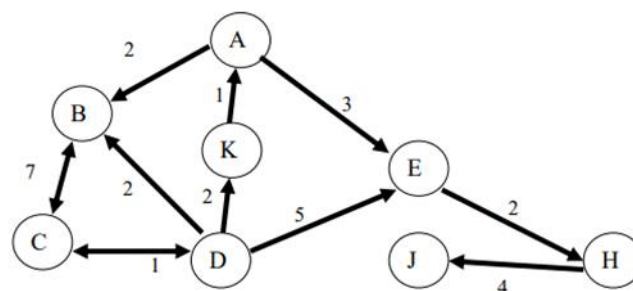
3. Create a hash table of size 11 by inserting the items 74, 924, 83, 113 and 5. To insert the item k, use the hash function k % TableSize and resolve collisions with quadratic probing. [CO3,C3, Mark: 6]
   We now consider looking up for the items 65 and 76 that are not in the table after doing the insertions above. For each, give the list of buckets that are looked at in order before determining that the item is not present. Include all the buckets examined, whether or not they contain an item.

4. Given an array of integers [12, 3, 40, 1, 21, 4, and 1]. Now write a program that will sort the elements in ascending order using Binary Heap. [CO3,C3, Mark: 6]

5. **Write** a program to find the out-degree of a single vertex whose graph is stored in an adjacency list. [CO3,C3, Mark: 6]
   Example:

Input	Output
Number of Vertices, n = 4	Vertex 2 has out degree: 2

6. If we have some elements like {15, 47, 23, 34, 85, 97, 65, 89, 70}. And our hash function is h(x) = x mod 7. If any collision happens then solve it with chaining. [CO3,C3, Mark: 6]