CSE220: Data Structures (Lab)
Fall 2024
Lab Quiz - 06
Duration: 30 Minutes

A

Name:	ID:	Section:

Question 1 [15 Points]

You are given several buckets with water levels represented by a min-heap. In each operation, you choose the smallest non-zero water level, denoted by x, and remove x units of water from all non-empty buckets. Your task is to determine the minimum number of operations required to empty all the buckets. **You need to write the extract_min(), sink(), and the minimum_operation_find() methods /functions.**

Sample Input:	**Sample Output:**
heap = [1, 5, 9, 10, 12]	5

Explanation			
Heap Array	Heap Visual	Heap Array	Heap Visual
Initial Stage: [1, 5, 9, 10, 12]	**1** / \ **5 9** / \ **10 12**	**Step 3:** **Extracted the minimum value 4** [5, 7, 0, 0, 0] **Subtracted the minimum value (4) from each non-zero value** [1, 3, 0, 0, 0]	**1** / \ **3 0** / \ **0 0**
Step 1: **Extracted the minimum value 1** [5, 9, 10, 12, 0] **Subtracted the minimum value (1) from each non-zero value** [4, 8, 9, 11, 0]	**4** / \ **8 9** / \ **11 0**	**Step 4:** **Extracted the minimum value 1** [3, 0, 0, 0, 0] **Subtracted the minimum value (1) from each non-zero value** [2, 0, 0, 0, 0]	**2** / \ **0 0** / \ **0 0**
Step 2: **Extracted the minimum value 4** [8, 9, 11, 0, 0] **Subtracted the minimum value (4) from each non-zero value** [4, 5, 7, 0, 0]	**4** / \ **5 7** / \ / **0 0 0**	**Step 5:** **Extracted the minimum value 2** [0, 0, 0, 0, 0]	**0** / \ **0 0** / \ **0 0**