CSE 204 (Data Structures and Algorithms I Sessional)
July 2022 Term
Offline: Binary Heap
Deadline: January 13 (Friday), 11:59 pm

Problem Specification

In this assignment, you have to implement a Min Heap using the array data structure. The min heap will support the following operations.

Operations

1. **`FindMin()`**: Returns the minimum key.
2. **`ExtractMin()`**: Returns the minimum key and deletes it from the heap
3. **`Insert(key)`**: Inserts a new key in the heap.
4. **`DecreaseKey(prevKey,newKey)`**: Decrease the value of the specified key to a new value (i.e., the prevKey will be decreased to newkey). You may safely assume that the input will not contain duplicate keys, and newKey < prevKey
5. **`Print()`**: Prints the level order traversal of the heap.

Input/output

You will take input from a text file where each line will specify one of the aforementioned operations. The operations are denoted by the first three letters, e.g., 'INS' indicates the Insert(key) operation, 'FIN' indiciates the FindMin operation, etc. Then the operands will follow where necessary. You can assume that all the operands will be integers. See the Sample I/O for further clarifications. You have to print the output to a text file.

Submission guidelines and other instructions

You are already aware of the submission guidelines and policies regarding plagiarism from your previous offline assignments. Please strictly follow them.

Sample Input/Output

Input	**Output**
INS 7 INS 10 INS 5 PRI INS 12 INS 15 PRI DEC 15 3 PRI FIN EXT PRI	INSERTED 7 INSERTED 10 INSERTED 5 Printing the binary heap … - Level 0: 5 Level 1: 10 7 - INSERTED 12 INSERTED 15 Printing the binary heap … - Level 0: 5 Level 1: 10 7 Level 2: 12 15 - 15 decreased to 3 Printing the binary heap … - Level 0: 3 Level 1: 5 7 Level 2: 12 10 - FindMin returned 3 ExtractMin returned 3 Printing the binary heap … - Level 0: 5 Level 1: 10 7 Level 2: 12 -