REPUBIC OF TE PHLIPPINES

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Course and Year: BSIS 2A

Subject: Data structure and Algorithm

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Title: The Ultimate Music Fest Lineup: A Heap Challenge

THEME: You're the headliner organizer for a massive music festival! Different bands have popularity ratings (higher number = more popular). Use heaps to create the ultimate festival lineup, ensuring the most popular bands play at the best times.

LEARNING GOAL

- Mastering insertion and deletion in Max-Heaps.

- Implementing the heapify operation on an array.

- Understanding heap properties and their application in real-world scenarios.

TASK

1. Building the Lineup-Insert bands and their popularity ratings into a Max-Heap. After each insertion, display the current lineup (heap). The output should clearly show the band's name and popularity rating at each stage.

2. Last-Minute Cancellation-A band has canceled! Remove the band with the specified name from the Max-Heap and display the updated lineup. Handle the case where the band is not found gracefully.

3. Optimizing the Schedule- You have a list of bands and their popularity ratings. Use the heapify operation to create a Max-Heap from this list, representing an optimized festival

schedule (most popular bands at the top). Display the optimized schedule.

INSTRUCTIONS

Music Festival Lineup Challenge

This challenge uses a max-heap to manage a music festival lineup using the provided C++ code. The code has limited interactive capabilities; it pre-populates some bands and allows for removing bands.

Step 1: Run the Program

- Compile and run the provided C++ code.
- The program will initially display a small pre-populated lineup.

Step 2: Handling Cancellations (Task 2)

The program will prompt you to choose a band to cancel:

- The lineup will be displayed with numbers (starting from 0).
- Enter the number of the band you want to remove and press Enter.
- The program will remove the selected band and display the updated lineup. If you enter an invalid number, it will let you know.

Step 3: Observe the Heapification (Task 3)

The program will then generate a random list of bands.

- Observe the unsorted list of bands and their popularity ratings.
- The program will automatically sort this list using a heap, showing you the optimized schedule (most popular bands first).

Step 4: Program Completion

The program will end after Step 3.

SAMPLE INPUT/OUTPUT

Compile Result

```
HELLO!

This is the MUSIC FESTIVAL ORGANIZATION

This is the band The Rockers with popularity 85 added to
the lineup.
        CURRENT LINEUP (heap)
1) Band: The Rockers
 Popularity:85

This is the band The Melodies with popularity 90 added to
 the lineup.
        CURRENT LINEUP (heap)
1) Band: The Melodies
 Popularity:90
2) Band: The Rockers
 Popularity:85

This is the band The Groovers with popularity 78 added to
 the lineup.
        CURRENT LINEUP (heap)
1) Band: The Melodies
 Popularity:90
2) Band: The Rockers
 Popularity:85
3) Band: The Groovers
 Popularity:78

one band has canceled.
Please choose the band to cancel (0 - 2): 2
 .
The band The Groovers with popularity 78 has canceled.
        CURRENT LINEUP (heap)
1) Band: The Melodies
 Popularity:90
2) Band: The Rockers
 Popularity:85

Random list of bands and their ratings:
Band: Random Band 1, Popularity: 93
Band: Random Band 2, Popularity: 85
Band: Random Band 3, Popularity: 76
Band: Random Band 4, Popularity: 63
Band: Random Band 5, Popularity: 49

Heapified lineup for optimized schedule:
Band: Random Band 1, Popularity: 93
Band: Random Band 2, Popularity: 85
Band: Random Band 3, Popularity: 76
Band: Random Band 4, Popularity: 63
Band: Random Band 5, Popularity: 49


[Process completed - press Enter]
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