

DATA STRUCTURE

Type Building Heap

Deadline **IN CLASS**

Weighting TBA

LAB PERFORMANCE

4

OBJECTIVES

This assessment item is designed to test your skills on constructing Heap and performing basic heap operations.

ASSESSMENT TASK

1. Consider the following array below:

2	7	26	25	19	17	1	90	3	36
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Build a Max-Heap from the above array (Manually)

2. Write a function to insert a new item into the heap

iDEA:

To add an element to a heap we must perform an up-heap operation (*also known as **bubble-up**, **percolate-up**, **sift-up**, **trickle-up**, **heapify-up**, or **cascade-up***).

Algorithm

1. Add the element to the bottom level of the heap.
2. Compare the added element with its parent; if they are in the correct order, stop.
3. If not, swap the element with its parent and return to the previous step.

3. Write another function to extract the maximum value from the heap

iDEA:

The procedure for deleting the root from the heap (effectively extracting the maximum element in a max-heap or the minimum element in a min-heap) and restoring the properties is called down-heap (*also known as **bubble-down**, **percolate-down**, **sift-down**, **trickle down**, **heapify-down**, **cascade-down**, and **extract-min/max***)

Algorithm

1. Replace the root of the heap with the last element on the last level.
2. Compare the new root with its children; if they are in the correct order, stop.
3. If not, swap the element with one of its children and return to the previous step.
(Swap with its smaller child in a min-heap and its larger child in a max-heap)

WHAT & HOW TO SUBMIT

You need to upload through your **VUES** account. You can find the upload link under “*Courses/ DATA STRUCTURE/Lab Performance/*”

SUBMISSION STEPS:

1. Create a Directory/Folder as following format:

<Your ID>_PERFORMANCE-< Performance Number>

Ex: 14-10380-1_PERFORMANCE-1

2. If you update your code then the format should be following:

<Your ID>_PERFORMANCE-< Performance Number>_UPDATE-<Update Number>

Ex: 14-10380-1_PERFORMANCE-1_UPDATE-1

3. Put all the files into that Folder and upload the **zipped** format of that Folder

NOTES

- Your submission will be rejected if uploaded in wrong format
- Only “.zip” file will be accepted.