

CS 211 Data Structures and Algorithms Lab
July -- December, 2018
Assignment 4
Total Marks: 10
Due on 11th September

The objective of this assignment is to implement Priority Queue and Heapsort using max-heaps.

Command-line argument:

Your program should receive a file (input file) as a command line argument.

Input file

The input file will be a text file where each line will be of any of the following format:

insert <number>, maximum, extract-max, increase-key <index> <number>, sort, where <number> represents any non-negative integer.

The output must be in a file named 'priority_queue.out'. Every line in the input file must have a corresponding output line in priority_queue.out. The details are given below.

Command	Meaning	Output
insert <number>	Insert <number> to the priority queue	<number> inserted
maximum	Find the maximum in the priority queue	<maximum number> / <empty-line> (if the priority queue is empty)
extract-max	Find and remove the maximum from the priority queue	<maximum number> / <empty-line> (if the priority queue is empty)
increase-key <index> <number>	Make the key at <index> as <number> if <number> is at least the current value at <index>. Note that the index ranges from 0 to heap-size - 1	Key at <index> changed to <number> / <number> is less than the current key at <index>
sort	Do a heapsort on the elements in the priority queue. Note that you don't have to build a max-heap here.	Elements in the priority queue in ascending order. Two values are separated by a single space.

Submission and Evaluation

- The program you submit should output `priority_queue.out` when run.
- The main file of your program should be named as `main.<extension>`, where the extension depends on the language you choose (You can use your favourite language for this assignment, but inform the instructor in advance if it is not C or C++).
- Test well before submission. We have some hidden inputs with us to test your program. The mark you obtain is purely based on whether your program correctly gives outputs for the hidden inputs.
- Submit your code as a zip file (even if there is only one file) where the name of the zip file is your roll number. It is important that you follow the input/output conventions exactly (including the naming scheme) as we may be doing an automated evaluation.
- This assignment is due on 11th September. Penalty for late submission is 5% per week; i.e., if you submit on 13th September, you will get only 95% of the mark you deserve otherwise.
- Follow some coding style uniformly. Provide proper comments in your code.
- Submit only through moodle. Submit well in advance. Any hiccups in the moodle/internet at the last minute is never acceptable as an excuse for late submission.
- Acknowledge the people (other than the instructor and TAs) who helped you to solve this assignment. The details of the help you received and the names of the people who helped you (including internet sources, if applicable) should come in the main file or in a separate file (`acknowledge.txt`). Copying others' programs is a serious offence.
- Honesty policy of the institute will be strictly followed. Note that we have access to a very good software to check plagiarism.