Assignment 6

Bridge course: Data Structure and Practices

Indian Institute of Technology, Jodhpur

Topic- Sorting

Note: Write code for all the questions; the output should display the solution.

Instructions:

1. Plagiarism is not allowed. Also copying code from the internet or any other source is not allowed. If found, you will be given zero marks.

2. Submit all code in a single zip file with your roll number as file name.
Example: MP19CS001.zip

3. Inside the zip, every file should be named as illustrated below:

a. <roll_number>_<question_number>.<file_type>

b. Example: If your roll number is MP19CS001 and the solution is for question 1, then file name will be : MP19CS001_Q1.py

4. Include a readme file.

5. You are only allowed to code in C, C++, and python.

1. The pivot used in Quicksort may have a significant impact on its performance. Some popular options include: **(50 points)**
    A. The first component is
    B. The middle component
    C. A component is chosen at random
    D. The array's median element
    E. The median member of the array's first three elements

    Write a code that considers an example for quicksort and Comment on each of the above options by implementing it and analyzing it. What are the advantages and disadvantages of each? In what circumstances are they excellent or terrible ideas?

2. Assume you already have an example code for heapsort (As per your choice). Now perform the following operation on it: **(20 points)**

A. Make use of the current heap code. Create a heap object, then loop over your array of data to sort and add each item to the heap. Then, one at a time, remove items from the heap, filling up the array from left to right (since the heap function we developed is a min-heap).
B. Remove the present heap code and replace it with something comparable that operates directly on the array we have.