1 Project Definition

This is the programming project that will count as 3 written assignments. You need to submit the code and the 2-page report (as a pdf file, not doc, not docx) to Yuksel on Zoom as a direct message (not to the class channel). Ensure you get a 'thumbs up' response after submitting the files.

The project is the implementation of all the sorting algorithms we learned in class. You can pick any programming language to implement the sorting algorithms.

For the sorting algorithms, you need to create the inputs randomly. First, pick a size of the array (start with $N = 10$), then randomly distribute some integer values between $[0, k]$ where k is a value you can decide (preferably > 1000). After generating the array, use the sorting algorithm functions you created, to sort the array. First Insertion Sort, then Merge Sort, then Heap Sort then Quick Sort, then Randomized Quick Sort, and finally Radix Sort. Use time units (time stamps) in your code to measure how much time the computer spends to sort the array and write it to the chart you need to create (see the lecture video of Radix Sort for the format of the chart). After $N = 10$, move to $N = 100$ and repeat the process. Do the same procedure for $N = 1000, 10000, 100000, 1000000$.

The sorted array may be the output of the smaller array sizes, but after reaching bigger array sizes, it becomes irrelevant to print it as the output. So we are concerned with how much time the computer spends, rather than the sorted array.

For some cases, the compiler might give you 0 as the result. And it is incorrect to write 0 as the time the computer spends to do the sorting. To fix that you might want to use nanoseconds instead of seconds. And for some cases, the compiler might not complete the task in a reasonable amount of time. In that case, you can put N/A to the regarding cell of the chart. For some algorithms you can get 'maximum recursion depth error', to do so you might want to set the recursion limit of the OS depending on the IDE you are using.

You need to design every sorting algorithm from scratch. You are allowed to use a builtin sorting function to do the sorting task. Internet copy/paste codes, any assignment that is a product of collaboration will result in 0 score.

The deadline: 07/22/2022 (Friday) by the end of the day.