Weeks 10 and 11: Data Structures and Algorithms

Sorting

Q1	Q2	Q3	Total
$(3 \times 9) = 27$	$3 + 20 = 23$	10	60

Do the following reading prior to doing this assignment:

Lecture	Topics	Reading
21 – 26	**Sorting**	https://drive.google.com/file/d/19g07m0WDR3E0XNnPi_ogoXaxr6vKGsgx/view?usp=sharing

Q1) Write a **program** that implements and compares several **Sorting algorithms**

S. No.	Program Details	Marks
1	Functions: [1] Selection_sort ( ). [2] Bubble_sort ( ) [3] insertion_sort ( ) [4] merge_sort ( ) [5] quick_sort ( ) [6] heap_sort ( ) [7] radix_sort ( ) [8] count_sort ( ) [9] bucket_sort ( )	 (3) (3) (3) (3) (3) (3) (3) (3) (3)
2	A main( ) function that [1] Calls upon an external file containing a list of numbers (“input1.txt”). [2] Evaluates the total number of numbers present in the input file. [3] Sorts the list of numbers using all the (9) sorting algorithms enlisted in (Q1). [4] Evaluates the run-time for each sorting algorithm. [5] Prints the time-taken by each sorting algorithm in increasing order of magnitude.	 (3) (5) (5) (5) (5)
3	[1] Repeat Q2 for the five files attached i.e., “input2.txt” to “input5.txt.” [2] Plot the results using a graph, where the Y-axis represents the time taken in seconds, whereas, the x-axis represents the number of entries in each input file (in increasing order). You may use the logarithmic scale $\log_{10}()$ for the x-axis. Make sure you use a different colour for each sorting algorithm.	(5) (5)

Rubrics (Associated Marks)

S. No.	Content	Meets Criteria (1)	Marks	Does not meet expectations (0)	Marks
1	Indentation	Perfect	100%	Code not indented properly	0
2	Code works	Code compiles and executes properly for any variable sized matrices	100%	Code has errors	Based on the code
3	Comments	Code is properly commented	100%	Code is not properly commented.	0