**ASSIGNMENT 3**

**Due on 24/07/2023 @ 11:59 pm**

1. Choose one searching and sorting algorithm each of your choice and
2. Describe each of the algorithm with examples
3. compare their performance
4. write the advantages and disadvantages of each algorithm
5. You are to sort a list L consisting of a sorted list followed by a few “random” elements. Which of sorting methods would be especially suitable for such a task? Explain your reason.
6. Which searching technique/s takes O (1) time to find a data. Give reasons.
7. Describe with illustrations number of interchanges required to sort 5, 1, 6, 2 4 in ascending order using Bubble Sort.
8. What is the postfix form of the expression (A + B)∗(C∗D − E)∗F / G
9. What is the postfix form of the following prefix expression -A/B\*C$DE
10. Merging 4 sorted files containing 50, 10, 25 and 15 records will take O (100) time. Explain.
11. In worst case Quick Sort has O (n2/2) order. Explain.
12. The quick sort algorithm exploit divide and conquer design technique. Describe how it is done.
13. What is the total number of companions required to merge 4 sorted files containing 15, 3, 9 and 8 records into a single sorted file?
14. Which sorting algorithms does not have a worst-case running time of O(n2)?
15. State and explain the complexity of searching an element from a set of n elements using Binary search algorithm.
16. A dish washer is an automatic washing machine that cleans and rinses dirty dishes. The dishwasher operation follows a sequence as listed below.

• Adds water

• Heats the water to the appropriate temperature

• Opens the detergent dispenser at the right time to mix with the water

• Shoots the mixer through jets to get the dishes clean

• Drains the dirty water

• Sprays more water on the dishes to rinse them

• Drains itself again

• Heats the air to dry the dishes off, if the user has selected that setting

The dishwater also has timer that regulates the length of each cycle. A sensor detects the water and air temperature to prevent the dishwasher from overheating or damaging dishes. Another sensor monitors water level. When the water gets too high it activates the draining function to keep the dishwasher from overflowing. The diagram showing the flow chart of the dishwasher is shown below.

1. Draw a flow chart to illustrate the process
2. Write an algorithm for the process.