Machine Problem 3

Limitations of Decrease and Conquer

Decrease and conquer is an algorithmic technique that is based on exploiting the relationship between a solution to a given instance of a problem and a solution to its smaller instance. In this strategy, we aim to reduce the size of the problem or breaking it down into subproblems in order for us to easily get the answer that we want.

The decrease and conquer algorithms will allow you to identify some better solutions in different operations such as sorting, searching, graph traversal, and many more. This will also allow us to have a faster and more efficient algorithm.

OBJECTIVE: In this Machine Problem, you were asked to identify the limitations of some algorithms related with Decrease and Conquer. Upon identification, an implementation should be done to prove these limitations. This will allow us to identify the capacity and limitation of the algorithms. This will provide experiences to demonstrate and implement your understanding and skills for real-world applications of Computer Science.

1. Students should analyze and review these algorithms accordingly.
2. The students will be asked to identify the limitations of these algorithms and then implement them.
3. The students should provide a learning outcome and insight while working on this machine problem.

GUIDELINES:

1. Create a document report containing the following sections:
   (a) I. Introduction *Describe Decrease and Conquer strategy and the content of your document report*
   (b) II. Decrease and Conquer *Discuss each Decrease and Conquer algorithms that we discussed in our Synchronous Session (Insertion Sort, Binary Search, Russian Multiplication Method, and Josephus Problem only)*

(c) III. Analysis of Time Complexity *Provide a detailed analysis of the time complexity of each decrease and conquer algorithm stated above. Please show and explain why do you get that time complexity.*

(d) IV. Algorithms Comparison *Compare these algorithms in a tabular form and showing the Strengths, Weaknesses, and Real World Application*

(e) V. Limitations *Identify the limitations of these algorithms. In this section, you to creatively describe the limitations of these algorithm and you need to show it by implementing it through coding.*

(f) VI. Findings and Conclusion *Create a comprehensive conclusion for your implementation and review. Discuss the importance of understanding decrease and conquer algorithms, findings, and learning outcomes.*

(g) VII: References

2. Implement at least two (2) algorithms that will prove the limitations that you stated in the document report. Do it by coding the limitations using **any Programming Language**.

DELIVERABLES:

1. You need to submit the Document Report containing the sections listed above. The Document Report should be done in LaTex and export it into PDF format (both .latex and .pdf files should be submitted).

2. You also need to submit the source of code of your implementation technique located in a repository for better checking of the structure.

3. You are required to record the demo of the implementation explaining the optimization you did for these algorithms.

NOTES:

1. You are allowed to use any programming language only to implement this Machine Problem.

2. In google classroom submission bin, you just need to submit all the requirements above. You can submit a google link containing all the files related with your Machine Problem.

3. Be unique and creative.

4. Submit the folder with filename: COURSEYEARANDSECTION-GROUP-MP2

REMINDERS:

1. This should be done by group.

2. AI Generated work or copied from the internet will be considered as DISHONESTY and CHEATING and should be a sanction for FAILING GRADE with this activity.

3. Similar work with your **classmate or even with other block** should be a sanction as well for FAILING GRADE with this activity.

4. Late submission will not be accepted. Submit your machine problem on the said deadline.

GOOD LUCK AND WORK ON YOUR MACHINE PROBLEM!