

MINI PROJECT**ECE532 – DATA STRUCTURES AND ALGORITHMS**

Total Marks: 50

Date assigned : 19th December 2022Due date for submission : 28th January 2023

Course Outcome:

CO2: Determine appropriate data structures and algorithms to solve engineering problems.

Introduction:

This project requires each group of students to propose a programming solution to solve the given engineering problem. The main task of this project involves developing an information system using a specific tool. The solution for the task needs to be specifically designed to meet its requirements using the concept of Data Structures and Algorithms. This requires each group to understand the basic concept of the algorithms involved and choose the best way to implement them. In planning and designing the proposed solution, each group should have a depth of knowledge of the problem. Besides, various available data structures and algorithms must be considered to choose the best one to tackle the specific requirements for each sub-task.

Objectives:

The objectives of this question are to:

1. Construct a dynamic database using suitable data structures.
2. Apply suitable algorithms to solve the given engineering problem.
3. Design a programming solution to solve the given engineering problem.

Tasks/ Activities

Working in a group of not more than three (3) students, you must plan, design and develop a program to address and solve pre-determined tasks. Each group member must perform an individual task and highlight your main contribution to the project. Each group needs to find a suitable task related to the engineering field.

Questions

Develop an information system for engineering applications. The information system should contain a dynamic database in linear, hierarchical, and graph formats. The information system is required to fulfill the criteria in Task 1, Task 2 and Task 3.

Task 1:

- i. Data Insertion (at least 500 data) – input process
- ii. Store the data in a linked list
- iii. Addition and deletion of nodes (all three scenarios)
- iv. Perform a sorting algorithm

Task 2:

- i. Construct a tree based on the input data
- ii. Perform three traversal algorithms
- iii. Perform searching algorithm

Task 3:

- i. Construct a graph based on the input data
- ii. Perform two search/traversal algorithms
- iii. Perform three Greedy methods

Submission:

Each group must submit a report describing the following elements :

- i. Description of your project (Problem statement, objective & scope)
- ii. Algorithm design and Flowchart
- iii. Methodology
- iv. Conclusion

The report and the program must be submitted on the presentation day (week 14).

Evaluation:

Evaluation will be conducted based on the developed system and submitted report. Marks will be given individually to each group member based on the completed task.

Marking Criteria

Rubric Mini project

No	Item	PO, WP	Criteria	Marks					Score	Weight	Weighted Score	Total Marks
				Very Weak	Weak	Fair	Good	Very Good				
				1 - 2	3-4	5-6	7-8	9-10				
1	Introduction: Problem Statement, Design Objectives, Scope of Project	PO3 WP1,WP2,WP3	Design	Problem Statements, Objectives, Scopes are not given or unacceptable.	Problem Statements, Objectives, Scopes are not clearly stated.	Problem Statements, Objectives, Scopes reasonably stated.	Clearly states the Problem Statements, Objectives, and Scopes	Comprehensively states the Problem Statements, Objectives, and Scopes	10	0.4	4	
2	Algorithm Design System Functions	PO3 WP1,WP2,WP3	Design	System functions involved are not given or unacceptable.	System functions are not described in depth, or lacking in organization.	System functions involved are reasonably stated	System functions involved are clearly stated	System functions involved are comprehensively stated	10	1.2	12	
3	Coding Design Programming Style (based on requirement checklist)	PO3 WP1,WP2,WP3	Design	The programming style does not meet the requirement	Basic programming style is utilized	Standard programming style is utilized	Good programming style is utilized	Excellent programming style is utilized	10	1.2	12	
4	Methodology: Design Constraints , strategy, techniques and resources used, functional block diagram, Flowchart	PO3 WP1,WP2,WP3	Design	The project methodology is not provided or unacceptable.	The project methodology is inadequately defined.	The project methodology is adequately defined.	The project methodology is clearly defined.	The project methodology is comprehensively defined.	10	0.8	8	

5	Conclusion	PO3 WP1,WP2,WP3	Design	Does not summarize important design features and expected results.	Unsatisfactorily summarized important design features and expected results.	Satisfactorily summarized important design features and expected result.	Clearly summarized important design features and expected results.	Comprehensively summarized important design features and expected results.	10	0.4	4	
	Total								50			

Checklist requirement

Criteria		Marks
1	Data Insertion (at least 500 data for Task 2)	/2
2	Task 1 : Construct a linked list	
	a. Data addition (all 3 scenarios)	/3
	b. Data deletion ((all 3 scenarios)	/3
	c. Sorting algorithm	/2
3	Task 2 : Construct a tree	
	a. Traversal algorithms (three traversal algorithms)	/4
	b. Searching algorithm	/4
4	Task 3 : Construct a graph	
	a. Searching algorithms (two search/traversal algorithms)	/4
	b. Perform three Greedy methods	/4
5	Programming codes	
	i. Selection	/1
	ii. Iteration / loop	/1
	iii. Method / function	/1
	iv. List / array	/1
	v. Input file	/1
	vi. Output file	/1
Total (INDIVIDU)		/16