

ASSIGNMENT

**CBDS2103
DATA STRUCTURES
JANUARY 2024**

SPECIFIC INSTRUCTION

1. Answer in **ENGLISH**.
2. Submit your assignment **ONCE** only in **MULTIPLE** files.
3. The program must be written in **C LANGUAGE**.
4. Submit your assignment **ONLINE**.
5. Submission date : **xxx 2024**.
6. This assignment accounts for **60%** of the total marks for the course.

ASSIGNMENT QUESTION

PURPOSE

The purpose of this assignment is to develop data structures using C language to solve a given problem and demonstrate the implementation of appropriate data structure features with suitable test data and output.

REQUIREMENT/ASSIGNMENT QUESTION

Arrays are not practical for modification, inserting or deleting data. This weakness can be overcome by using linked lists. Linked lists are collections of data items in a row – insertions and deletions are made anywhere in a linked list. Linked lists consists of sequential items known as nodes. Each node is made up of two parts: data, the elements in the list, and link, the link to the next node in the list.

In linked lists, there are several basic operations that can be performed:

- a) Create an empty linked list
- b) Insert new nodes
- c) Test whether a linked list is empty or not
- d) Traverse a linked list

You are required to create an employee structure to store five employee records in a linked list. The employee structure is given as:

```
struct employee {  
    int id;  
    char name[25];  
    float salary;  
} records [5];
```

Write a C program that will be able to do the four basic linked list operations for the employee records. The documentation must include a short introduction to the problem given, the program codes, and output screens (screen shots). You must submit the documentation file and the .c program file.

The assessment will be done based on the following criteria:

- i. A proper writing of C codes: structure, efficiency and modular.
- ii. The readability, consistency, naming and user interface
- iii. Robustness and testing
- iv. Complete documentation and correct submission.

Note: You MUST write C programming codes for this assignment. Codes written in C++ will not be accepted.

(60 marks)

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ASSIGNMENT RUBRICS

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CLO	Criteria	Weight	Excellent	Good	Fair	Poor	Unsatisfactory	Max Marks
			4	3	2	1	0	
2	<u>Declaration of employee structure and linked list structure</u> <ul style="list-style-type: none"> Codes are clear, logical, control structure used correctly. Most appropriate programming structures (selection, repetition, files) are used Functions are modular and increases programming clarity 	3.0	Met the requirements of the criteria.	Mostly met the requirements of the criteria but it can be improved further.	Basic/ minimally met the requirements of the criteria.	Poorly met the requirements of the criteria.	Did not meet criteria at all OR wrong answer was given.	12
2	<u>Linked List Manipulation: Create empty list and insert data function</u> <ul style="list-style-type: none"> Linked list is used correctly. Most appropriate programming structures (selection, repetition) are used Functions are modular and increases programming clarity 	3.0	Met the requirements of the criteria.	Mostly met the requirements of the criteria but it can be improved further.	Basic/ minimally met the requirements of the criteria.	Poorly met the requirements of the criteria.	Did not meet criteria at all OR wrong answer was given.	12
2	<u>Linked List Manipulation: Test linked list is not empty and traverse the linked list</u> <ul style="list-style-type: none"> Linked list is used correctly. Most appropriate programming structures (selection, repetition) are used Functions are modular and increases programming clarity 	3.0	Met the requirements of the criteria.	Mostly met the requirements of the criteria but it can be improved further.	Basic/ minimally met the requirements of the criteria.	Poorly met the requirements of the criteria.	Did not meet criteria at all OR wrong answer was given.	12

2	Readability, consistency, naming and user interface: <ul style="list-style-type: none"> • Coding style, easy to read and maintain. • Consistent and proper naming. • Screen based instruction and final output are clear, correct and attractive. 	2.5	Met the requirements of the criteria.	Mostly met the requirements of the criteria but it can be improved further.	Basic/ minimally met the requirements of the criteria.	Poorly met the requirements of the criteria.	Did not meet criteria at all OR wrong answer was given.	10
3	Robustness and Testing <ul style="list-style-type: none"> • Ability of the program to be compiled and executed • The program can handle erroneous or unexpected input • Complete without being redundant, all test cases are considered • Determination process based on the input. Correct technique must be chosen and shown in this part • Displaying all output as required 	2.5	Met the requirements of the criteria.	Mostly met the requirements of the criteria but it can be improved further.	Basic/ minimally met the requirements of the criteria.	Poorly met the requirements of the criteria.	Did not meet criteria at all OR wrong answer was given.	10
3	Complete documentation and correct submission: <ul style="list-style-type: none"> • Cover page of assignment • Introduction, description of problem • Copy of codes • Several screenshots with various input and output • Submission of C source file in extension .c 	1.0	Met the requirements of the criteria.	Mostly met the requirements of the criteria but it can be improved further.	Basic/ minimally met the requirements of the criteria.	Poorly met the requirements of the criteria.	Did not meet criteria at all OR wrong answer was given.	4
Total		15						60