

Assignment 2

Basic C Programming Comprehensive Assignment

Title: Mastering Basic C Syntax and Programming Concepts

Objective: The objective of this assignment is to reinforce your understanding of essential C programming concepts. You will work on a series of tasks that cover topics such as C data types, enums, pointers, arrays, structures, file I/O, functions, macros, and the C standard library.

Assignment Tasks:

Task 1: C Data Types and Enum Types

1. Create a C program that defines and demonstrates the use of custom data types using ``typedef``.
2. Implement an enumeration type (``enum``) to represent the months of the year.

3. Write a function to print the month corresponding to a given enum value.

Task 2: Pointers and Arrays

1. Develop a C program that manipulates arrays using pointers.
2. Implement a function that finds the sum and average of an integer array.
1 function? 2 functions?
type of each function
3. Write a program to test your function with user-defined arrays.
take input?

Task 3: C Structures and File I/O

1. Define a C structure to represent a wash machine with attributes like name, type, date manufactured, and manufacturer.
2. Write a program that creates an array of the product structure.
3. Implement file I/O functions to read and write the product data from/to a binary file.
txt file to binary file?

Task 4: Functions and Function Pointers

Create a program that calculates the factorial of a given integer using a recursive function.

Implement a function pointer to handle mathematical operations (addition, subtraction, multiplication).

Develop a calculator program that allows users to choose and perform arithmetic operations using the function pointer.
only integers is okay?

Task 5: Macros and Preprocessor Directives only integers is okay?

1. Define macros to handle common mathematical operations (e.g., square, cube).
2. Create a header file with include guards to store the macros.
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3. Modify your calculator program to utilize the macros for arithmetic operations.

Task 6: C Standard Library Functions

1. Explore and utilize standard library functions like ``stdio.h``, ``stdlib.h``, and ``string.h``.
2. Create a program that reads a text file, counts the number of words, and displays the most common word. *lower-upper case distinction?*
3. Implement error handling for file I/O operations.

Task 7: Integration and Documentation

1. Combine all the tasks into a single, well-organized C program.
2. Document your code thoroughly with comments explaining each section.
3. Prepare a report summarizing your experience, challenges faced, and what you've learned during this assignment.

Submission Guidelines:

- Submit the consolidated source code (a zip file) for the entire assignment.
- Include a README file with instructions for compiling and running your program.
- Ensure your code is well-documented with comments.
- Submit your report in a separate document.

Assessment Criteria:

Your assignment will be assessed based on the following criteria:

- Submit your own work (80% in points) even though it doesn't execute as expected.
- Proper use of C data types, enums, pointers, arrays, and structures.
- Efficiency and readability of the code.
- Effective use of functions and function pointers.
- Proper error handling and validation.
- Utilization of macros for code optimization.
- Utilization of C standard library functions.
- Quality and completeness of documentation.

Important Note: Plagiarism will not be tolerated, and students are expected to produce their work independently. Please perform this assignment by yourself and don't copy any solutions from any Generative AI applications like ChatGPT, your friends or online. If I find any things that imply plagiarism, you will lose the whole points and be reported.