

Problem 1: Doubly Linked List

Write a C++ code that implements a doubly linked list structure that contains float elements, and then do the following:

1. Implement the necessary member functions.
 2. Implement a function DisplayPop(...) that displays the inserted elements in a way like the pop function in the stack, Example: input= 1.5 , 3.5, 10, 0.5
output= 0.5, 10, 3.5, 1.5
 3. Implement a function DisplayDequeue(...) that displays the inserted elements in a way like the dequeue function in the queue, Example: input= 1.5 , 3.5, 10, 0.5
output= 1.5, 3.5, 10, 0.5
 4. Implement a function DisplayEven(...) that displays only the even elements inserted by the user. i.e.: element number 0, element number 2, etc.
 5. Implement a function DisplayOdd(...) that displays only the odd elements inserted by the user. i.e.: element number 1, element number 3, etc.
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Problem 2:

Write a C++ code that implements two linked lists (L1, L2) that contain double elements, and then do the following:

1. Implement the necessary member functions.
 2. Implement a function Intersection(...) that displays the intersection of the two lists.
Input: L1= 1, 2, 3, 4, 5 L2= 2, 10, 5
Output: Intersection= 2, 5
 3. Implement a function Union(...) that displays the union of the two lists.
Input: L1= 1, 2, 3, 4, 5 L2= 2, 10, 5
Output: Union= 1,2,3,4,5,10
 4. Implement a function Difference(...) that displays the difference between the two lists.
Input: L1= 1, 2, 3, 4, 5 L2= 2, 10, 5
Output: L1-L2= 1, 3, 4
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Problem 3: Fibonacci

Write a C++ code that implements a recursive function that solves the Fibonacci theory. Your program should ask the user to enter a number then you'll show him the Fibonacci of the entered number.

Problem 4:

Write a C++ code that contains a function `List2tree(list)` that converts a list into a binary search tree and returns a pointer to the constructed tree. The nodes of the binary search tree should be allocated dynamically (not a fixed. Write a small program that takes elements from a user, inserts them into a list, and then when the user is done inputting elements, calls the `List2tree(list)` function to create the binary tree, and displays the pre-order. Your code should ask the use to enter his digits (undefined number of digits i.e.: don't ask the user to enter how many digits would he enters).

Here are the assignment rules for this assignment, please read them CAREFULLY

- This assignment is individually no team work is allowed in either solving or submitting the assignment.
 - No late submissions are allowed.
 - The assignment would be submitted via elearning ONLY.
 - You should submit a zipped file containing the .cpp files and your report.
 - Attending the discussion is obligatory if you submitted your assignment and didn't attend your discussion your submission will be discarded.
 - You should come to your discussion with a printed copy of your report else you'll lose marks.
 - The discussion would be done ONLY through the file you've uploaded the elearning if you came to the discussion with flash memory with a modified would be considered as late submission and would be discarded.
 - Any similar or copied codes will be considered plagiarism and will take zero.
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Deliverables:

You should submit a zipped file that contains:

1. Source Code of your running program giving the required output (the .cpp file).
2. Report; this report should document each code of the 4 required problems above consisting of these components:
 - Sample results for each code.
 - Full documentation of your code with a clear explanation for how you implemented your program and the steps you followed to get your code done (what does each line in your code do).

Grading:

This assignment carries 20% of the total mark; 15 marks for your four running codes and 5 marks for the report. The assignment will be graded from 100 and then scaled to 20.

Discussion

The discussion schedule will be announced after the submission of the assignment. You should attend your discussion so that you can take your grade other than that your submission will be discarded, also you **should** bring a printed copy of your report with you.