

A dark blue vertical bar on the left side of the page. A blue arrow points to the right from the bar, containing the date.

9/19/2024

Structure & Design Programming Language (CSC 710)

(Assignment 1)

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Submitted to:

Professor Dr Zainab Albujasim

Question 1:

Task: We need to define two array of size 30 and give the input by user. After array gets data, one array is to be sorted using Bubble sort and other is to be sorted using insertion sort. Additionally, those sorted data are to be merged using merge sort without any duplicate values. And finally, binary search operation is applied to search for the targeted element in sorted array of merged sort.

1 (a) - Implementation using Java Programming Language

```
0a356b6\bin Main
Enter integers upto size 30 separated by spaces for list1 :
2 5 1
Enter integers upto size 30 separated by spaces for list2 :
4 2 7
Elements of list1 : [2, 5, 1]
Elements of list2 : [4, 2, 7]
Sorted elements in list1 by Insertion Sort are :[1, 2, 5]
Sorted elements in list1 by Efficient Bubble Sort are :[2, 4, 7]
Sorted elements in list1 and list2 by MERGE Sort are :[1, 2, 4, 5, 7]
Enter to search element in merged array:
6
Target element not found in merged array.
PS E:\ASSIGNMENTS FALL\STRUCTURE AND DESIGN\ASSIGNMENT 1\TASK1>
```

Fig 1.1

Here , target element 6 is not found in array.

```
in\java.exe' '-cp' 'C:\Users\LENOVO\AppData\Roaming\Code\User\workspaceStorage
319154e\redhat.java\jdk_ws\TASK1_7ea356b6\bin' 'Main'
Enter integers upto size 30 separated by spaces for list1 :
2 5 7 1
Enter integers upto size 30 separated by spaces for list2 :
2 5 7 1
2 5 7 1
Enter integers upto size 30 separated by spaces for list2 :
8 5 2 1
Elements of list1 : [2, 5, 7, 1]
Elements of list2 : [8, 5, 2, 1]
Sorted elements in list1 by Insertion Sort are :[1, 2, 5, 7]
Sorted elements in list1 by Efficient Bubble Sort are :[1, 2, 5, 8]
Sorted elements in list1 and list2 by MERGE Sort are :[1, 2, 5, 7, 8]
Enter to search element in merged array:
2
Target element is found at index 1 .
bug > C/C++ Runner: Debug Session (TASK1)
```

Fig 1.2

Here , target element 6 is found in array.

Explanation:

Here two arrays of list are given data by user.

List 1 is sorted using Insertion sort and List 2 is sorted using bubble sort. And list 1 and list 2 are again merged without any duplicate values. Finally binary search operation is performed to search the target element as shown in figure.

How to open file [Main.java] :

Ways to open/run file

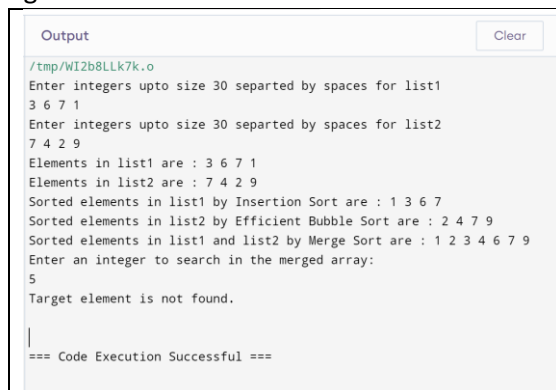
In Terminal : Type "javac Main.java" Type "java Main"	VS Code : Open file in Vs code. Run java file directly (F5)	Online compiler : Copy code and run on Online Java Compiler - Programiz
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1 (b) - Implementation using C++ Programming Language

Explanation:

Here two arrays of list are given data by user.

List 1 is sorted using Insertion sort and List 2 is sorted using bubble sort. And list 1 and list 2 are again merged without any duplicate values. Finally binary search operation is performed to search the target element as shown in figure.

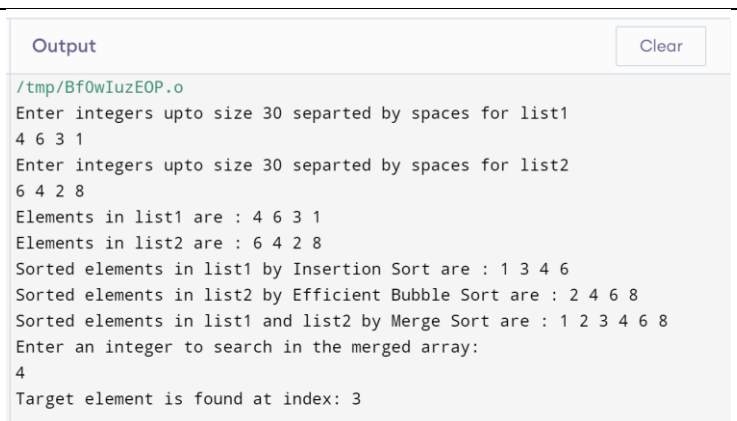


```
Output
/tmp/WI2b8LLk7k.o
Enter integers upto size 30 separated by spaces for list1
3 6 7 1
Enter integers upto size 30 separated by spaces for list2
7 4 2 9
Elements in list1 are : 3 6 7 1
Elements in list2 are : 7 4 2 9
Sorted elements in list1 by Insertion Sort are : 1 3 6 7
Sorted elements in list2 by Efficient Bubble Sort are : 2 4 7 9
Sorted elements in list1 and list2 by Merge Sort are : 1 2 3 4 6 7 9
Enter an integer to search in the merged array:
5
Target element is not found.

=== Code Execution Successful ===
```

Fig 2.1

Here target element is not found.



```
Output
/tmp/Bf0wIuzE0P.o
Enter integers upto size 30 separated by spaces for list1
4 6 3 1
Enter integers upto size 30 separated by spaces for list2
6 4 2 8
Elements in list1 are : 4 6 3 1
Elements in list2 are : 6 4 2 8
Sorted elements in list1 by Insertion Sort are : 1 3 4 6
Sorted elements in list2 by Efficient Bubble Sort are : 2 4 6 8
Sorted elements in list1 and list2 by Merge Sort are : 1 2 3 4 6 8
Enter an integer to search in the merged array:
4
Target element is found at index: 3
```

Fig 2.2

Here, target element is found.

How to open file [Main.cpp]:

Ways to open/run file

To run on command line	To run on code blocks:	Run on Online platform :
1. Install g++ compiler	Copy the code to editor	Copy code to this editor and run.
2. g++ -o Main Main.cpp	Compile and run (F9)	https://www.programiz.com/cpp-programming/online-compiler/
3. ./ Main.cpp		

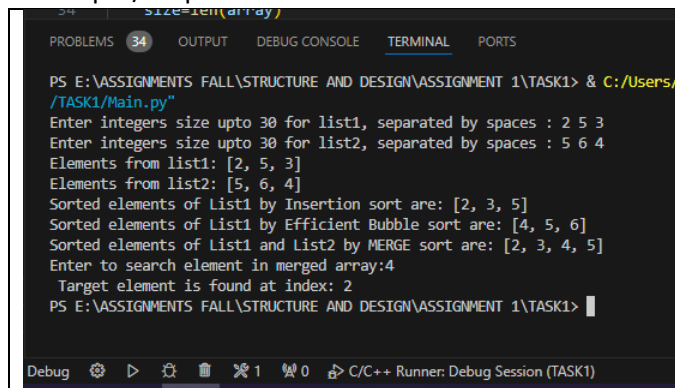
1 (c) - Implementation using Python Programming Language :

Explanation:

Here two arrays of list are given data by user.

List 1 is sorted using Insertion sort and List 2 is sorted using bubble sort. And list 1 and list 2 are again merged without any duplicate values. Finally binary search operation is performed to search the target element as shown in figure.

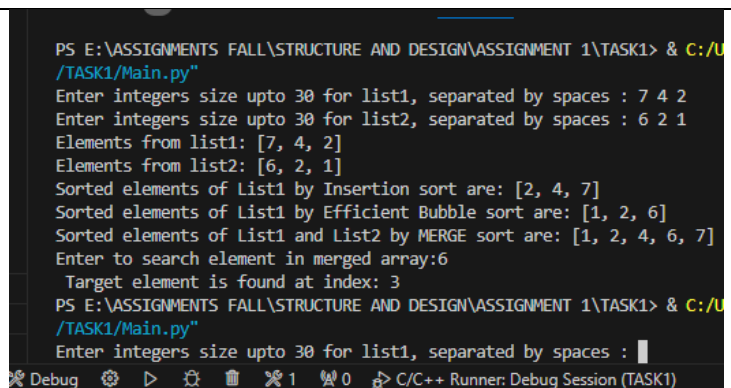
User input/output



```
PS E:\ASSIGNMENTS FALL\STRUCTURE AND DESIGN\ASSIGNMENT 1\TASK1> & C:/Users/.../TASK1/Main.py
Enter integers size upto 30 for list1, separated by spaces : 2 5 3
Enter integers size upto 30 for list2, separated by spaces : 5 6 4
Elements from list1: [2, 5, 3]
Elements from list2: [5, 6, 4]
Sorted elements of List1 by Insertion sort are: [2, 3, 5]
Sorted elements of List1 by Efficient Bubble sort are: [4, 5, 6]
Sorted elements of List1 and List2 by MERGE sort are: [2, 3, 4, 5]
Enter to search element in merged array:4
Target element is found at index: 2
PS E:\ASSIGNMENTS FALL\STRUCTURE AND DESIGN\ASSIGNMENT 1\TASK1>
```

Fig 3.1

Here, target element 4 is not found in array.



```
PS E:\ASSIGNMENTS FALL\STRUCTURE AND DESIGN\ASSIGNMENT 1\TASK1> & C:/Users/.../TASK1/Main.py
Enter integers size upto 30 for list1, separated by spaces : 7 4 2
Enter integers size upto 30 for list2, separated by spaces : 6 2 1
Elements from list1: [7, 4, 2]
Elements from list2: [6, 2, 1]
Sorted elements of List1 by Insertion sort are: [2, 4, 7]
Sorted elements of List1 by Efficient Bubble sort are: [1, 2, 6]
Sorted elements of List1 and List2 by MERGE sort are: [1, 2, 4, 6, 7]
Enter to search element in merged array:6
Target element is found at index: 3
PS E:\ASSIGNMENTS FALL\STRUCTURE AND DESIGN\ASSIGNMENT 1\TASK1> & C:/Users/.../TASK1/Main.py
Enter integers size upto 30 for list1, separated by spaces :
```

Fig 3.2

Here, target element 6 is found in array.

How to open file [main.py]

In Terminal : cd /path/to/your/file Type "python main.py " Or if you have python3: "Python3 main.py"	VS Code : Open file in Vs code. Run python file directly (F5)	Online compiler : Copy code and run on https://www.programiz.com/python-programming/online-compiler/
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Question 2:

Task : here we are required to balance the symbol of opening and corresponding closing braces using stack or LinkedList. If the braces of opening and closing matched it should return "balanced" otherwise "unbalanced".

2(a) - Implementation using linked list using stack in C++

Explanation

This program is written using pascal language. I have written this code using code Blocks using C++. Here we are checking if all the opening braces matches the corresponding closing braces or not. For eg. if user input is () => balance input so it , balanced(output). Similarly, if the user input is { } => unbalance input so it is , unbalanced.

User input/output

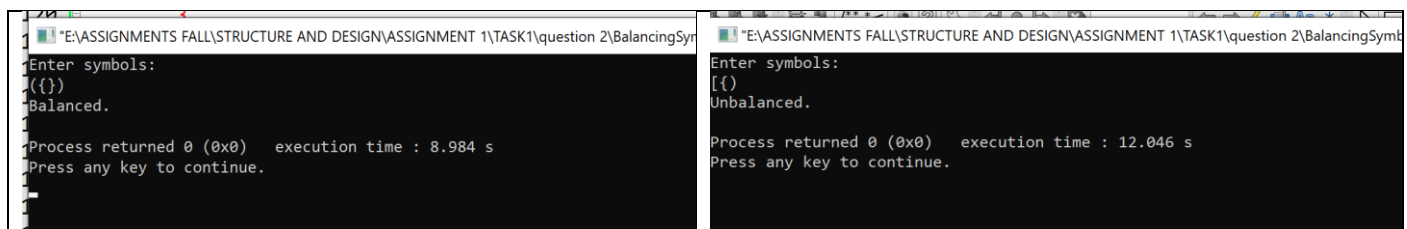


Fig 2.1 : Balanced Symbol

Fig 2.2 : Unbalanced Symbol

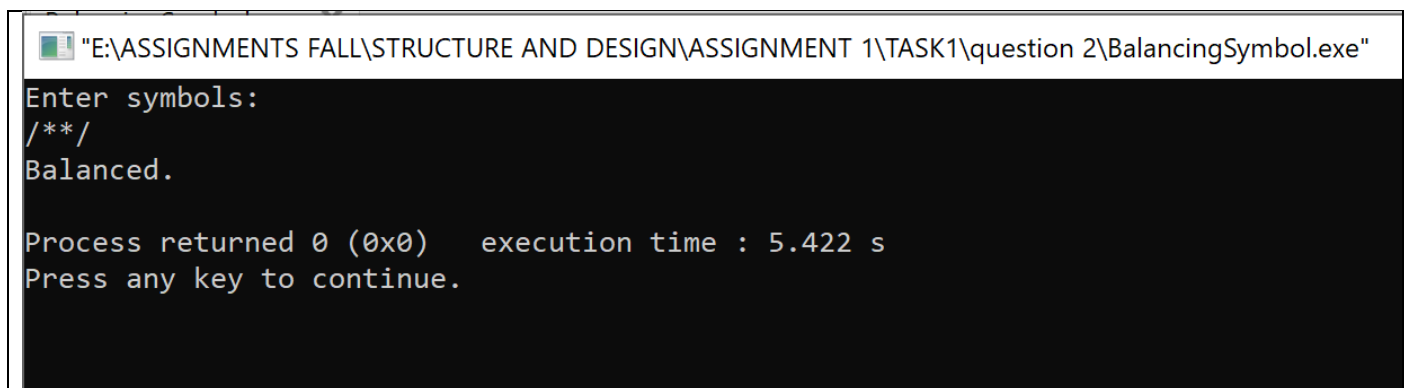


Fig 2.3 Balanced Symbol

How to open file [BalancingSymbol.cpp]

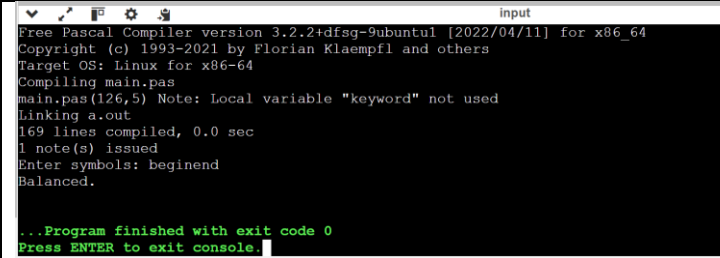
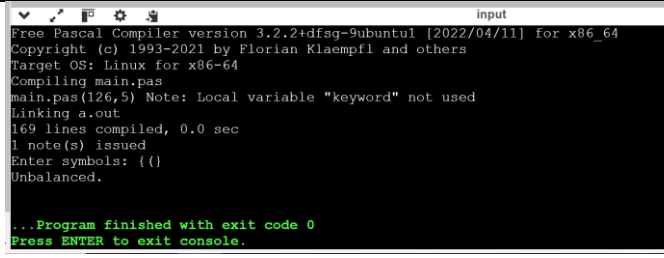
To run on command line 4. Install g++ compiler 5. g++ -o BalancingSymbol BalancingSymbol.cpp 6. ./ BalancingSymbol	To run on code blocks: Copy the code to editor Compile and run (F9)	Run on Online platform : Copy code to this editor and run. https://www.programiz.com/cpp-programming/online-compiler/
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2(b) - Implementing with Pascal using Stack

Explanation

This program is written using pascal language. Here we are checking if all the opening braces matches the corresponding closing braces or not. For eg. if user input is () => balance input so it , balanced(output). Similarly, if the user input is { } => unbalance input so it is, unbalanced.

_User Input/output:

 <pre>Free Pascal Compiler version 3.2.2+dfsg-9ubuntu1 [2022/04/11] for x86_64 Copyright (c) 1993-2021 by Florian Klaempfl and others Target OS: Linux for x86-64 Compiling main.pas main.pas(126,5) Note: Local variable "keyword" not used Linking a.out 169 lines compiled, 0.0 sec 1 note(s) issued Enter symbols: beginend Balanced. ...Program finished with exit code 0 Press ENTER to exit console.</pre>	 <pre>Free Pascal Compiler version 3.2.2+dfsg-9ubuntu1 [2022/04/11] for x86_64 Copyright (c) 1993-2021 by Florian Klaempfl and others Target OS: Linux for x86-64 Compiling main.pas main.pas(126,5) Note: Local variable "keyword" not used Linking a.out 169 lines compiled, 0.0 sec 1 note(s) issued Enter symbols: {() Unbalanced. ...Program finished with exit code 0 Press ENTER to exit console.</pre>
Fig 3.1 - input (beginend) = balanced.	Fig 3.2 – input {() = output (unbalanced)

How to open file [program.pas]

To run, open online compiler : Copy and paste code and run
https://www.onlinegdb.com/online_pascal_compiler

References :

Github : Assignment has been uploaded to github account as well. To view click below:

<https://github.com/praleshraya/FA24ASSIGNMENT>

THANK YOU !!!