King Fahd University of Petroleum & Minerals
Information and Computer Science Department

SWE 316: Software Design and Construction (Term 251)

Homework # 2 Weight 8%

12	16 ٢٦	17 ٢٧	18 ٢٨	19 HW # 2 ٢٩	20 ٣٠	21 ١	22 ٢
13	23 ٣	24 ٤	25 ٥	26 ٦	27 ٧	28 ٨	29 ٩
14	30 ١٠	1-Dec ١١	2 ١٢	3 ١٣	4 Last day for dropping ALL courses with W ١٤	5 ١٥	6 Due Date ١٦

Instructions

1. Answers have to be typed; **handwritten solutions will not be accepted**.
2. Submission:
   a. through BlackBoard
   b. **Softcopy** - report in PDF format (**WORD format is NOT acceptable**).
   c. **Source code** should be submitted as a single compressed file
3. The report should include a **cover page** showing: course name, assignment number, date of submission, your names and ID's
4. Include the following table in your cover page

Task	Grade	Your Grade	Comments
Task # 1: Class Diagram	20		
Task # 2: Implementation	60		
Check list and penalties No Cover page with grade table -10 ☐ File name (report) -5 ☐ Not in PDF format -10 ☐			
Total	80		

5. Include the question text and then put your answer
6. The file (report) name should be in the following format: **HW<#> - <YOUR ID> - <YOUR NAME>**
7. Your report **MUST** include your code and it should be formatted properly
   a. Copy the code in Notepad++
   b. Code should be in "`Courier New`" font
   c. To format the code choose Menu → Language →<your selected language>
   d. Click Plugins → NppExport →Copy RTF to clipboard
   e. Paste it in Word
   f. NOTE: You don't have to copy ALL your code. Just copy the parts that need to be illustrated. e.g, GUI code is not needed

Try to use some callouts (like this one) to illustrate the code

8. Correct solutions earn full mark. However, ***not following the previous points will reduce your mark.***

Task # 1: Composite Design Pattern

File/Folder combination is a typical example of the composite design pattern. A file has a name, size, extension. A folder has similar attribute (without an extension) plus a list of files or other folders. You are required to write a demonstration application that traverses files and folders in a selected directory. The application should facilitate visualizing the folder structure in two different ways.

1. Class diagram [20 marks]

Design a class diagram showing the above-mentioned structure using the **composite design pattern**. You have to show all components **including the Application class**. Drawing the folders in two different ways represents a good case for the **Strategy Design Pattern**.

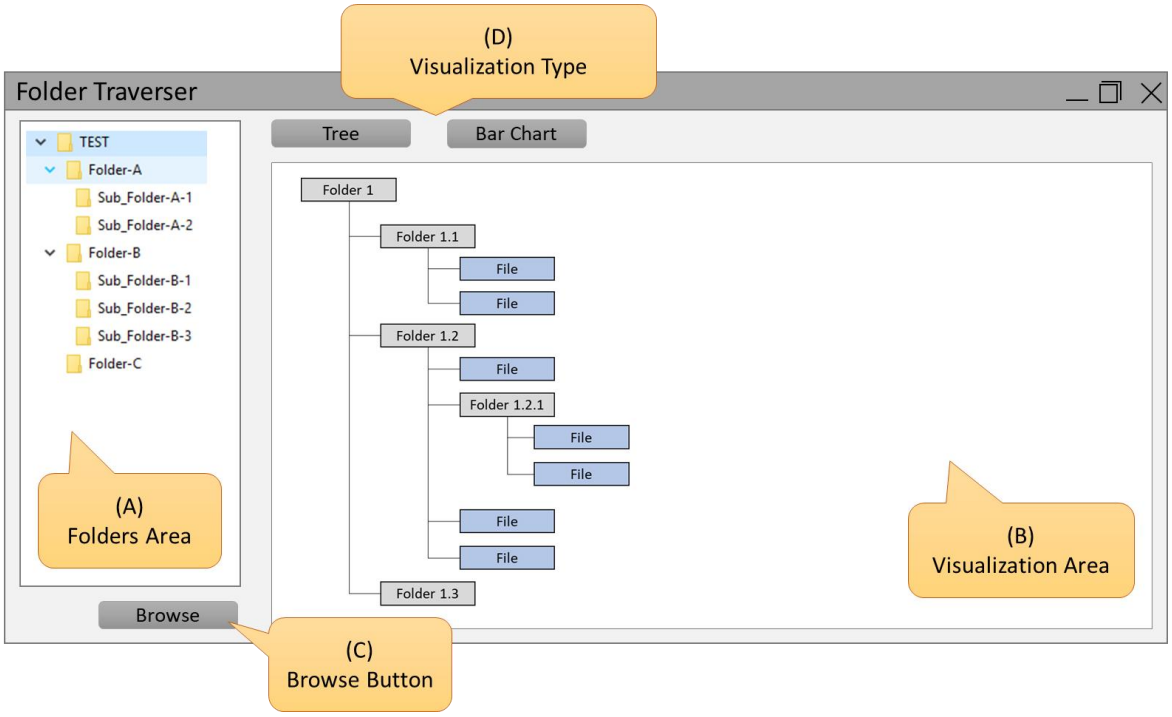
2. Application [60 marks]

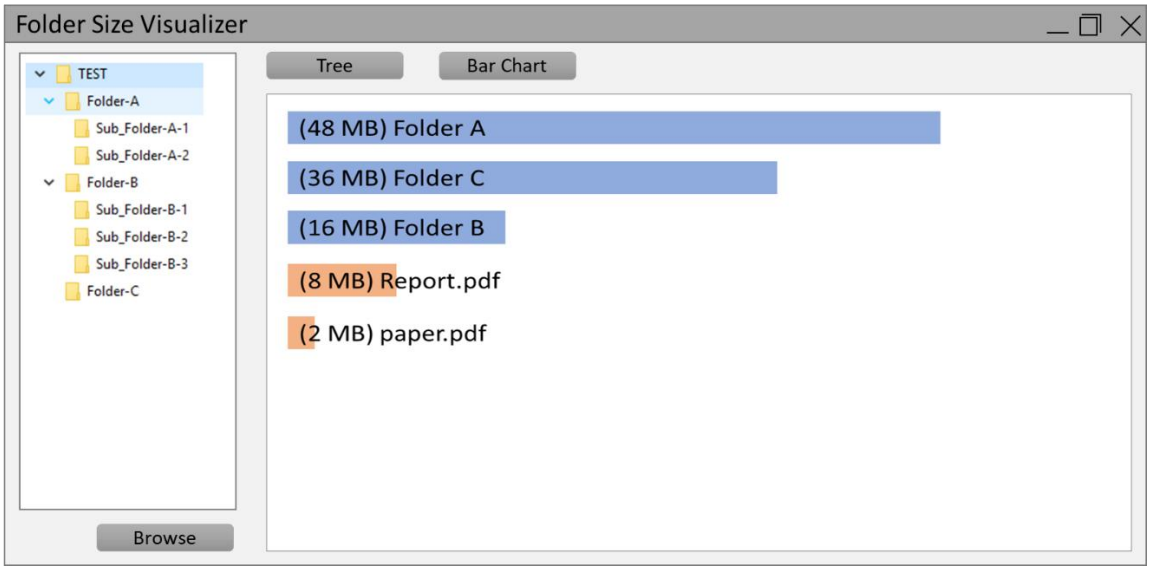
Implement a desktop application (Java, C#, or VB.NET) by which you can choose a certain folder when the program starts. Once you select a folder, you should *recursively* traverse all of its contents (files and folders) and **fill the required information as follows**:

- Folder : only name
- File : name, size, extension

After traversing, your application should traverse the created structure (your structure) again and calculate the size of all **folders by single line call (x.CalculateSize())** where x represent the top most folder.

After calculating the sizes of all folders and subfolders, you should **visualize** the folder and its contents as shown in the sample below. You should show the file or folder size besides its name. This should be accomplished using a single line (**x.visualize()**) where x represent the top most folder. You should support visualizing the folder either vertically or horizontally as shown in the samples below.





For testing purposes, use a reasonable sized folder (small but contains sub folders)

Requirements:

Develop your program to fulfill the following requirements:

1- When executed, it should display a button and give the user the freedom of choosing the folder to visualize.
   a. For your testing purposes, you can hardcode the folder while you are testing.
2- Once the user select a folder, you should display the visualization on a panel inside your main form.
   a. The visualization should be done by code (You can't use any ready components such as Treeview)
   b. The panel should be able to respond to the changes in the size of the form (i.e, bigger or smaller)
3- If the visualization is getting bigger than the panel, you should display scrollbars.
4- You should allow the user to change visualization from Tree to Bar Chart and vice versa.

NOTE: Your program should reflect your class diagram

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