Practice 6: Program Control Functions*

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Abstract

Questions, exercises, problems, etc. that support this chapter in the "Programming Fundamentals - A Modular Structured Approach using C++" collection/textbook.

1 Learning Objectives

With 100% accuracy during a: memory building activity, exercises, lab assignment, problems, or timed quiz/exam; the student is expected to:

1. Define the terms on the definitions as listed in the modules associated with this chapter.
2. Given pseudocode, test data and source code of an existing program, modify the pseudocode and source code to create "program control" functions.

2 Memory Building Activities

Link to: MBA 06[1]

3 Exercises

Exercise 1 *(Solution on p. 6.)*

Answer the following statements as either true or false:

1. Pseudocode has a strict set of rules and is the same everywhere in the computer programming industry.
2. Hierarchy Charts and Structure Charts are basically the same thing.
3. Program Control functions are used to simply sub divide and control the program.
4. The void data type is rarely used in C++.
5. Making source code readable is only used by beginning programmers.

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[1]See the file at <http://cnx.org/content/m22458/latest/index.html>

4 Miscellaneous Items

None at this time.

5 Lab Assignment

5.1 Creating a Folder or Sub-Folder for Chapter 06 Files

Depending on your compiler/IDE, you should decide where to download and store source code files for processing. Prudence dictates that you create these folders as needed prior to downloading source code files. A suggested sub-folder for the **Bloodshed Dev-C++ 5 compiler/IDE** might be named:

- Chapter_06 within the folder named: Cpp_Source_Code_Files

If you have not done so, please create the folder(s) and/or sub-folder(s) as appropriate.

5.2 Download the Lab File(s)

Download and store the following file(s) to your storage device in the appropriate folder(s). You may need to right click on the link and select "Save Target As" in order to download the file.
Download from Connexions: Solution_Lab_01.cpp[2]
Download from Connexions: Solution_Lab_01_Pseudocode.txt[3]
Download from Connexions: Solution_Lab_01_Test_Data.txt[4]
Download from Connexions: Solution_Lab_01m_with_Program_Control.cpp[5]
Download from Connexions: Solution_Lab_01m_Pseudocode_with_Program_Control.txt[6]
Download from Connexions: Solution_Lab_01m_Hierarchy_Chart.jpg[7]
Download from Connexions: Solution_Lab_03.cpp[8]
Download from Connexions: Solution_Lab_03_Pseudocode.txt[9]
Download from Connexions: Solution_Lab_03_Test_Data.txt[10]

5.3 Detailed Lab Instructions

Read and follow the directions below carefully, and perform the steps in the order listed.

- Navigate to your sub-folder: Chapter_06. Review the original Lab 01 materials. Compile and run the Lab 01 source code. Then review and compare the original Lab 01 materials to modularized Lab 01 materials taking note of the conversion to "program control" functions. Compile and run the Lab 01m source code. Review as needed the course materials. Email your professor if you have any questions.
- We have supplied the solution to the Lab 03 assignment. Review the Lab 03 assignment by compiling and running the Lab 03 source code.
- You need to copy the Lab 03 source code file and pseudocode file to make the following new files: **Lab_06.cpp** and **Lab_06_Pseudocode.txt**
- Modify the Lab 06 pseudocode file to implement “program control” functions as shown in the demonstration materials.
- Modify the Lab 06 source code file to implement “program control” functions as shown in the demonstration materials.

[2] See the file at <http://cnx.org/content/m22458/latest/Solution_Lab_01.cpp>
[3] See the file at <http://cnx.org/content/m22458/latest/Solution_Lab_01_Pseudocode.txt>
[4] See the file at <http://cnx.org/content/m22458/latest/Solution_Lab_01_Test_Data.txt>
[5] See the file at <http://cnx.org/content/m22458/latest/Solution_Lab_01m_with_Program_Control.cpp>
[6] See the file at <http://cnx.org/content/m22458/latest/Solution_Lab_01m_Pseudocode_with_Program_Control.txt>
[7] See the file at <http://cnx.org/content/m22458/latest/Solution_Lab_01m_Hierarchy_Chart.jpg>
[8] See the file at <http://cnx.org/content/m22458/latest/Solution_Lab_03.cpp>
[9] See the file at <http://cnx.org/content/m22458/latest/Solution_Lab_03_Pseudocode.txt>
[10] See the file at <http://cnx.org/content/m22458/latest/Solution_Lab_03_Test_Data.txt>

- Build (compile and run) your program. You have successfully written this program if when it runs and you use the test data [use the same test data as used in Lab 03] it gives the same results as Lab 03.
- After you have successfully written this program, if you are taking this course for college credit, follow the instructions from your professor/instructor for submitting it for grading.

6 Problems

6.1 Problem 06a – Instructions

Create a hierarchy chart for the following pseudocode example.

Example 1: pseudocode

```
****************************************************
Filename:  Average_IQ.txt
Purpose:   Average the IQs of two people
Author:    Ken Busbee; © Kenneth Leroy Busbee
Date:      Jan 17, 2009
****************************************************

Function main
  Pass In: nothing
  Call: get_iqs
  Call: process_iqs
  Call: show_average
  Pass Out: zero to the OS
Endfunction

********************

Function get_iqs
  Pass In: nothing
  display a message asking user for the IQ of the first person
  get the IQ of the first person from the keyboard
  display a message asking user for the IQ of the second person
  get the IQ of the second person from the keyboard
  Pass Out: nothing
Endfunction

********************

Function process_iqs
  Pass In: nothing
  calculate the answer by adding the two IQs and
  dividing by 2.0
  Pass Out: nothing
Endfunction

********************
```

```
Function show_average
  Pass In: nothing
  display the answer with an appropriate message
  Call: pause
  Pass Out: nothing
Endfunction

********************

Function pause
  Pass In: nothing
  direct the operating system to pause the program
  Pass Out: nothing
Endfunction

*****************************************************

Potential Variables

Data Type Identifier Name
********* ***************
integer iq1
integer iq2
double answer

*****************************************************
End of file
```

6.2 Problem 06b – Instructions

Identify some problems that make this code "undocumented", "unreadable" or wrong in some other way.

Example 2: C++ source code

```
//*****************************************************
// Author:  Ken Busbee; © 2009 Kenneth Leroy Busbee
// Date:    Jan 17, 2009
//*****************************************************

#include <iostream>
using namespace std;

void pause(void);

int  age1, age2;
double  xx;
```

```
//*****************************************************
// main
//*****************************************************

int main(void)
  {
  // Input
cout ≪ "\nEnter the age of the first person --->: ";
  cin ≫ age1;
    cout ≪ "\nEnter the age of the second person -->: ";
  cin ≫ age2;

  // Process
  xx = (age1 + age2) / 2.0;

  // Output
  cout ≪ "\nThe average of their ages is -------->: ";
  cout ≪ xx;

  pause();
  return 0;
  }

void pause(void)
  { cout ≪ "\n\n";
  system("PAUSE");
  cout ≪ "\n\n";
  return; }

//*****************************************************
// End of Program
//*****************************************************
```

Solutions to Exercises in this Module

Solution to Exercise (p. 1)

Answers:

1. false
2. true
3. true
4. false
5. false