ASSIGNMENT #1: C++ BASICS/FUNCTIONS

DUE DATE WITH D2L: WEDNESDAY, SEPTEMBER 16, 2015 AT 11:30PM
THE PRINTED COPY DUE AT THE BEGINNING OF THE FRIDAY LAB AT 8:30AM, SEPT. 18

THE PURPOSE OF THIS ASSIGNMENT IS

- to write a complete C++ program and to learn to compile, link, and run the program in C++11
- to write a functions and modularize even small programs: function abstraction and stepwise refinement
- to come up with a test plan and to use it

READINGS

Read the Lab Guide documents found in D2L under 'Useful Information' and become familiar with the other resources found there and in the companion web site of the textbook. Simply follow the link
http://www.cs.armstrong.edu/liang/cpp3e

Read chapters 1-6 of the textbook (for now you can skip §2.8.2, §3.9, §4.4, §4.5, §4.7, §5.8, §5.9, §6.14).

CHECK POINT QUESTIONS (TO BE SUBMITTED)

Do the following Check Point Exercises from the textbook:

1. 1.38 page 23
2. 2.12 page 45
3. 2.14 page 45
4. 2.18 page 45
5. 2.28 page 54
6. 3.11 page 79
7. 3.12 page 83
8. 3.16 page 84
9. 3.23a page 93
10. 3.25 page 94
11. 3.39 page 103
12. 3.40 page 103
13. 4.2 page 121
14. 5.13 page 174
15. 6.22 page 236 and 237

"Write a program to gauge the rate of inflation for the past year. The program asks for a price (such as the price of a monthly phone charge or of a car) both one year ago and today. It estimates the inflation rate as the difference in price divided by the year-ago price. Your program should allow the user to repeat this calculation as often as the user wishes. Define a function to compute the rate of inflation. The inflation rate should be a value of type `double` giving the rate as a percentage, e.g. 5.3 for 5.3%."[1]

IMPLEMENTATION DETAILS

Modularize your (short) program properly.

Display the inflation rate with at most two significant digits after the decimal point.

TEST PLAN

Come up with a test plan once you have understood the problem but before you even design your program (black-box testing). Write out specific test inputs and expected outputs and the reason why you have chosen such inputs. Consider border line cases and some typical cases. What should the output be if there is no inflation? Can your program handle an inflation rate of 2.2 million per cent? How should your program handle a negative value as the price of an item?

If you are assuming that the input is numeric (which you may assume for this assignment), state so.

A test plan
- lists input values
- has the reasons for choosing these input values
- has expected outputs
- has the actual results of your program.

With a test plan, you can compare and see if the results of your program match the expected outputs that you worked out by hand (or with your calculator). You can use a test plan to debug (i.e. find errors) in your program. After you have programmed the solution, put the actual outputs produced by your program into the test plan. Explain the discrepancies between your original test plan's "expected outputs" and your actual results. Also, as you code, add input cases that you might have forgotten in your original test plan and indicate why you think that they should be included even though you had not put them in originally (white box testing).

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[1] **Programming Project**, number 2 of chapter 3 of Walter Savitch's *Absolute C++*

About your source code:

- o You should have enough comments in the source code so that they suffice as internal documentation. You do not need to submit any external documentation.

- o Your programming style does matter and you will be marked on style as well (e.g. you should have functions, named constants, no global variables, no 'break's, etc.)

- o You should have at least one function (as described above). Document the function properly with precondition, postcondition, etc.

About your output: Submit as output

- o "screen captures" or "print screens". Put them in a document and label the output appropriately. You can use the same document for the Check Point Exercises, the test plan and the output (acceptable formats for this document are listed in the Lab Guide).

TO SUBMIT WITH D2L AS A ZIP FILE CALLED ASSIGNMENT01.ZIP :

1. The Textbook Check Point Questions listed above.
2. The source code to your <u>inflation</u> calculation program.
3. An input file (values corresponding to your test plan) if you used one.
4. The output from your program that uses the inputs from your test plan.
5. Your test plan and an explanation of discrepancies in the output.

TO HAND IN (ON PAPER)

Print an assignment header file and 1., 2., 3. (if you used one), 4., 5.

Please print the source code from the editor, if possible, i.e. do not put the code into a Word document. Also, please make the maximum length of a program line 80 characters – it's difficult to read wrap-around text or chopped code.