Homework 1

Complete, to run on our UNIX server, the following Programming Challenges from Gaddis:

1. 3.19
2. 3.20
3. 3.21
   * (*This problem modifies Programming Challenge 3.20*)
   * Use the statement {**const double PI = atan(1.0) \* 4.0;**} to compute the value of **π**. (can use **constexpr** rather than **const**)
4. 3.25 (3.24, 8th ed.)
   * Write your input statements so that user responses can include spaces (*multi-word*).
   * This type of problem is an example of a [Mad-Lib](http://en.wikipedia.org/wiki/Mad_Libs).
5. Use the *two* division operators to write a program to calculate the minimum number of U.S. coins necessary to make the input value, in the range $0 - $1, and the *count* of each.

Heuristic steps:

1. Make the input value the current value
2. Compute and print the number of the largest coin value that will be less than or equal to the current value
3. Change the current value to the current value minus the product of the coin value by its count
4. Change the largest coin value to that of the next largest coin value. If there is no next largest coin value, stop.
5. Repeat from step (2) (there are only four coin values, so don’t use a loop, rather *repeat* steps 2 - 4 three times (four total).

For example, given an input of $**0.64**, your program should print:  
  
**2 quarters  
1 dimes  
0 nickels  
4 pennies  
------------  
7 coins total**

For each programming challenge, at least one day prior to submitting your source file (as a syntax-highlighted PDF file) and output (via the Unix script command)to the Homework 1 D2L Assignment dropbox, you will submit a pseudocode (*see the top of* Gaddis p. 136 {p. 134, 8th ed.) text file for that problem to the D2L dropbox. Use that pseudocode as a foundation for the comments you include in your source code (see Prog. 3-28).

Each Programming Challenge problem shall be solved on our UNIX server by a coupled-pair of source and executable files.

Each source file will include the following comments:

* Your Name
* “CSCI 201”
* Your section number
* The current semester
* “Homework 1”
* The name of the program and the Programming Challenge number it is solving
* The full pathname on our UNIX server for each of your source programs’ executable files.
* A brief description of the purpose of the program.

For each source file you will:

* Import the pseudocode statements into your editor and transform the pseudocode statements into internal comments to describe what your code is doing and why. You shall then write your C++ statements below each comment derived from the pseudocode.
* Use descriptive identifiers.
* Use both vertical and horizontal white space consistently to enhance readability.
* Use comments which describe your variables while defining in a style as demonstrated in Program 3-28, lines 15 – 22.

**Testing**: test with several input values. Validate your program, when possible, by repeating the calculations, using the input values, on a scientific calculator.

Use the UNIX **script** command to generate an output file (**.txt**) consisting of several runs of your source file’s executable with different test (input) data. One of those runs should replicate the author’s example if stated.