

Homework 1

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

- I. 3.19
- II. 3.20
- III. 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`)
- IV. 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](#).
- V. 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.