**Week 2 Practice Problems**

**#1.** Write a function that takes in a three-digit integer and returns the “flipped” version (that is, with its digits reversed). For example:

Enter a positive number less than 1000: **177**

That number flipped is 771

Hint: Represent the user’s input as an integer and use the arithmetic operators // and % to do it.

Make sure it works if the user enters a one or two digit integer. For example, 37 flipped is 730, and 8 flipped is 800.

**#2.** Write a function that asks a user for a positive integer, and then prints the minimum number of quarters, dimes, nickels, and pennies needed to make up that amount. For example:

Enter a number of cents: **67**

2 quarter(s), 1 dime(s), 1 nickel(s), 2 penny(ies)

In case you are not familiar with Canadian currency:

* a quarter is 25 cents
* a dime is 10 cents
* a nickel is 5 cents
* a penny is 1 cent

**#3.** Write a program that asks a user for a floating point number and that then prints two values: the number truncated to the first decimal place and the number rounded to the first decimal place. For example:

Enter a number: **4.158**

Truncated to one decimal place: 4.1

Rounded to one decimal place: 4.2

Hint: Have a look at the math module.

**#4.** Write a little trigonometry program. Ask a user for an angle, specified in degrees. Then print the sine, cosine, and tangent of that angle. For example:

Enter an angle: **60.**

sin(60.00) is 0.866025

cos(60.00) is 0.500000

tan(60.00) is 1.732051

**#5.** Write a program that takes the role of a store clerk. Ask a user to enter two floating point numbers: the cost of an item and the amount of money remitted to pay for the item. Then respond appropriately: calculate the change due to the customer or ask the customer for more money. For example:

Cost of the item: 3.56

Amount tendered: 5.00

Change: 1.44

or

Cost of the item: 3.56

Amount tendered: 3.00

Still due: 0.56

**#6.** Combine #5 with #2: if in #5 you owe the customer some change, calculate the minimum number of $100, $50, $20, $10, $5, toonies, loonies, quarters, dimes, nickels, and pennies needed to make up that amount. Modify the function from #2 to print out the way to make the change.

**#7.** Your code for #6 doesn’t work in Canada since we no longer have pennies. Fix it to work in Canada.

Hint: In stores when the amount isn't a multiple of 5, the store rounds to the nearest 5 cents. E.g., $1.53 is rounded to $1.55, $2.47 is rounded to $2.50, $4.42 is rounded to $4.40.

**#8**. Write a function that takes a positive integer input less than 100000 and returns an integer corresponding to the number of digits in the number. Use this function in a program that prompts the user for an integer and prints the number of digits in the user’s input. [Note: there are a number of ways to solve this problem. It is pretty easy if you do it with a string. You should also try it directly with an integer.]

**#9**. Water exists in three states- solid, liquid, and gas. Write a function that takes in the temperature in Celsius and returns a string “solid”, “liquid”, or “gas” depending on the temperature. Write a program using this function that prompts the user for a temperature and prints out the resulting state of water.

Hint: You are going to need an if-statement to do this: read ahead to the Week 3 content.

**#10**. In fluid mechanics the dimensionless Reynolds Number is defined below, where *v* is the speed of the fluid (m/s), *L* is the characteristic length of the flow situation (m), and *n* is the kinematic viscosity (m2/s).

**Reynolds Number = *vL/n***

The magnitude of the Reynolds Number tells if a flowing fluid is moving in a laminar, transitional, or turbulent mode. Two flow situations are of interest, flow in a pipe and flow on a flat plate.

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| For a pipe: | * When the Reynolds number is less than 2000, then the flow is laminar. * When the Reynolds number is greater than or equal to 2000 and less than or equal to 4000, then the flow is transitional. * When the Reynolds number is greater than 4000, then the flow is turbulent. |
| For a plate: | * When the Reynolds number is less than 5 x 105, then the flow is laminar. * When the Reynolds number is greater than or equal to 5 x 105, then the flow is turbulent. |

Write a function that takes the speed of the fluid, the characteristic length, the kinematic viscosity, and the flow situation as arguments and returns a string indicating if the flow is "laminar", "transitional", or "turbulent".

You may assume that:

* the first three arguments are positive numbers in the correct units.
* the fourth argument is a string equal to "pipe" or "plate"

Hint: As with #9, you are going to need an if-statement to do this problem.