Week 3 Practice Problems

#1. 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

#2. Combine #1 above with #2 from Week 2: if in #1 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 Week 2 Q#2 to print out the way to make the change.

#3. Your code for #2 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.

#4. Redo Week 2 #5 to use an if-statement. 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.

#5. 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.

#6. 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 (m^2/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.

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 5×10^5, then the flow is laminar. • When the Reynolds number is greater than or equal to 5×10^5, 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"`