Credit Name: CSE 3120 Object-Oriented Programming 1
Assignment Name: Chapter 7 MySavings

How has your program changed from planning to coding to now? Please explain?

I began by creating a class PiggyBank as my object for MySavings. This will be used to store the coin values in the program.

```
//PiggyBank class to manage number of coins and values in MySavings
public class PiggyBank {
```

Initalized private variables in PiggyBank class; to be used only inside class.

```
//Initialize private variables
private int penny, nickel, dime, quarter;
```

Created a constructor to set all default coin amounts as 0.

```
public PiggyBank() { //constructor
    //initialize all coin amounts as 0
    penny = 0;
    nickel = 0;
    dime = 0;
    quarter = 0;

}
```

Created 4 correspondent methods to add a single coin to each coin type. These methods do not return a value.

```
//Modifier methods

public void addPenny() { //adds a penny
    penny = penny + 1;
}

public void addNickel() { //adds a nickel
    nickel = nickel + 1;
}

public void addDime() { //adds a dime
    dime = dime + 1;
}

public void addQuarter() { //adds a quarter
    quarter = quarter + 1;
}
```

Created a method that removes all coins from the bank. Sets all coin values back to 0. Method does not return a value.

```
public void removeCoins() { //removes all coins from bank
    penny = 0;
    nickel = 0;
    dime = 0;
    quarter = 0;
}
```

Created 4 methods to return the number of each correspondent coin back to the main method. Methods return a double value.

```
//Accesser methods
public double getPenny() { //returns number of pennies
    return penny;
}

public double getNickel() { //returns number of nickels
    return nickel;
}

public double getDime() { //returns number of dimes
    return dime;
}

public double getQuarter() { //returns number of quarters
    return quarter;
}
```

Created a method to return the total value of all coins in the bank. I multiplied each amount of coins by their value in cents, and added them together to retrieve the sum value. This method returns a double value.

```
public double total() { //returns total sum of coins in bank

    double total;
    total = (penny * 0.01)+(nickel * 0.05)+(dime * 0.1)+(quarter*0.25);
    return total;

}
```

In the main method, I began my importing scanner to prepare for user input, and creating decimal formating to shorten longer decimals to 2 decimal places,

```
//Preparing for user input + format decimal variables
Scanner input = new Scanner(System.in);
DecimalFormat shorten = new DecimalFormat("#00.00");
```

Created PiggyBank object "spot" to later store coins and determine values from.

```
//create PiggyBank object
PiggyBank spot = new PiggyBank() ;
```

Initialize and set variable cont to true; later used in while statement.

```
//Initialize variable cont to true
boolean cont = true;
```

While the variable cont remains true, reapeat the processes below:

```
//While cont is equal to true:
while (cont == true) {
```

Display menu choices to user, and prompt them for choice; record user input as choice variable int.

```
//Display choices to user
System.out.println("");
System.out.println("1. Show total in bank.");
System.out.println("2. Add a penny.");
System.out.println("3. Add a nickel.");
System.out.println("4. Add a dime.");
System.out.println("5. Add a quarter.");
System.out.println("6. Take money out of the bank.");
System.out.println("Enter 0 to quit application");
System.out.println("");

//Prompt user for choice and record user input
System.out.print("Please enter your choice to continue: ");
int choice = input.nextInt();
```

Using a switch statement, process the correspondent choice choosen by user.

```
//Process choice chosen by user with corresponding case:
switch(choice) {
```

If user choice = 1, display total value of coins in bank. Use object spot's correspondent methods to gather values.
Use decimal format to format dollar amount to 2 decimal places.

```
//Display total value of the coins in the user's currect piggy bank.
case 1: System.out.println("Your total amount in the bank is: $" + shorten.format(spot.total()));
        System.out.println("Pennies: " + spot.getPenny() + " Nickels: " +
        spot.getNickel()+ " Dimes: " + spot.getDime() + " Quarters: " + spot.getQuarter());
        break;
```

If user choice = 2-5, add 1 of correspondent coin to object spot. Inform user of successful addition of coin.

```
//Add a penny to the PiggyBank
case 2: spot.addPenny();
        System.out.println("Successfully added penny"); break;

//Add a nickel to the PiggyBank
case 3: spot.addNickel();
        System.out.println("Successfully added Nickel"); break;

//Add a Dime to the PiggyBank
case 4: spot.addDime();
        System.out.println("Successfully added Dime"); break;

//Add a Quarter to the PiggyBank
case 5: spot.addQuarter();
        System.out.println("Successfully added Quarter"); break;
```

if user choice = 6, remove all coins from object spot using method. inform user of success.

```
//Remove all coins from the PiggyBank
case 6: spot.removeCoins();
        System.out.println("Successfully cleared bank"); break;
```

if user choice = 0, set cont as false to end while loop, effectivly terminating the program.

```
//End program; set cont as false; ending the while loop.
case 0: System.out.println("Thank you for using MySavings application.");
        System.out.println("Have a great day!");
        cont = false; break;
```

(Error handling) if user enters anything other than above choices, inform user of error, and continue loop.

```
//Default case; inform user of error.
default: System.out.println("Invalid. Please enter a choice 1-6."); break;
```