AP Computer Science
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Project 3 - Variables
Tuesday, August 30, 2022

Prepare this project to be submitted for grading. You may work together on ideas together, but you MAY NOT share code. Copying code is academic dishonesty, and copied code will receive zero credit, whether it is the source or the target of the copying. Needless to say, this goes for code copied from the internet.

Create one directory called `P3_Variables` to store the `.java` files. Please format the source code using appropriate indentation. Zip this entire directory and submit it on Schoology.

The purpose of this project is to practice the material from Savitch sections 2.1 - 2.3.

Program 1. Type, compile, and run the program `ChangeMaker` which is also listed on page 77 (Savitch 6th edition).

```
import java.util.Scanner;

public class ChangeMaker
{
    public static void main(String[] args)
    {
        int amount, cents, quarters, dimes, nickels, pennies;

        System.out.println("Enter a whole number from 1 to 99");
        System.out.println("I will find a combination of coins");
        System.out.println("that equals that amount of change.");

        Scanner keyboard = new Scanner(System.in);
        amount = keyboard.nextInt();

        cents = amount;
        quarters = cents / 25;
        cents = cents % 25;
        dimes = cents / 10;
        cents = cents % 10;
        nickels = cents / 5;
        cents = cents % 5;
        pennies = cents;

        System.out.println(amount + " cents in coins can be given as: ");
        System.out.println(quarters + " quarters");
        System.out.println(dimes + " dimes");
        System.out.println(nickels + " nickels");
        System.out.println(pennies + " pennies");
    }
}
```

Program 2. Copy the `ChangeMaker.java` file to a new program called `ChangeBreaker`. Make the following modifications to the program.

(a) Change the original amount to be a `float` variable, and modify the program to input a dollar amount such as `268.72` for two hundred sixty two dollar and seventy two cents. Create separate integer dollars and cents variables to hold the dollars (e.g. 268) and cents (e.g. 72). Print the number of dollars with the rest of the output at the end.

(b) When the floating point amount is printed, make sure that it is formatted to display exactly two decimal places. You may use code such as

```
float x = 1.23456;
String s = String.format("%.2f", x);
```

to do this. Use Google to figure it out if you have additional questions.

(c) Modify the program to break down the dollars in a manner analogous to the way it treats cents. Use the following names:

- 1 dollar bill: `Washingtons`
- 2 dollar bill: `Jeffersons`
- 5 dollar bill: `Lincolns`
- 10 dollar bill: `Hamiltons`
- 20 dollar bill: `Jacksons`
- 50 dollar bill: `Grants`
- 100 dollar bill: `Franklins`
- 500 dollar bill: `McKinleys`
- 1000 dollar bill: `Clevelands`
- 5000 dollar bill: `Madisons`

Program 3. Create a program called `DigestString.java` which inputs a string from the keyboard, and analyses it by printing the following information about the string.

(a) The string, converted to uppercase.

(b) The string, converted to lowercase.

(c) The string, with all `t`'s changed to `q`'s.

(d) The number of characters in the string.

(e) What it looks like if you concatenate the string `Fido says ` at the beginning.

(f) Whether or not it equals the string `Hello, World!`

(g) Whether it is alphabetically less than the string `Mama said to eat your greens.`

(h) The index of the first occurrence of the word `easy` in the string.

(i) The end of the string, starting at the fifth character.