

ICS 3U - Assignment 8

Please make sure that proper documentation procedure is followed. Also, it is important to make your program user friendly. For example, if the user enters a wrong number, they will be notified or provide an alternate by creating an overloaded method.

Draw flow charts to describe the entire program.

This assignment will be grouped as one large program. Create all of the following functions in one project. In your main function, you should call these functions in order to test them. It will also have a menu for the user to choose from. The values that will be used to call the functions will come from the user.

For some of these methods, you will need to use built in Math functions.

These are the methods it needs to have:

HINT: type in Math. to find out the built-in math functions

1. A perfect integer is a number which is equal to the sum of all its factors except itself. For example, 6 is a perfect number because $1 + 2 + 3 = 6$. The function returns a boolean value, accepts one integer value as a parameter, and should have the name isPerfect().
2. This method will calculate the outcome of flipping a coin. It will accept an Integer value of the number of times the computer will flip a coin. Then it should return the outcome of heads and the outcome tails.
3. This method will calculate the outcome of rolling a die. It will accept an integer value representing the number of times the computer will role the die. Then it should return the number of times that each side has turned up for each.
4. Write a function that calculates the mid point of two given points on a Cartesian Coordinate System.
5. Calculate the max / min values given the standard form equation of a parabola. The function will accept the three co-efficient values. $y = ax^2 + bx + c$
6. Create a getDollarAmount() function that has four int parameters corresponding to the number of pennies, nickels, dimes, and quarters, and returns a String that corresponds to the dollar value of the coins. Note that the String returned should include the currency sign (\$).

7. Write a function that will draw a rectangle that will take two inputs (width and height).

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8. Write a function that will draw an upside down triangle which will take just a height as input.

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9. Using methods solve the following problem:

A company wants to transmit data over the telephone line, but they are concerned that their lines are tapped. All of their data is transmitted as four-digit integers. They have asked you to write a program that encrypts their data so that it may be transmitted more securely. Your program should read a four-digit integer and encrypt it as follows:

Replace each digit by $((\text{digit} + 7) \% 10)$. Then, swap the first digit with the third, swap the second digit with the fourth and print the encrypted integer.

Example:

Input: 6254
Output: 2139

Submission: