Assignment 1

Due Date: Friday, 1 February 2019, 11:59 PM

Instructions Follow instructions carefully, failure to do so may result in points being deducted. Submit your code on ZyBooks.

Partner policy: You are not allowed to work with a partner for this assignment.

Programs

1. Write a program that prompts the user for an integer number. Then determine whether the number is

   - Positive and even
   - Positive and odd
   - Negative and even
   - Negative and odd

   Sample Output:
   ```
   Enter an integer:  4
   4 is positive and even
   ```

2. The equation of a straight line is given by the following formula: $y = mx + b$, where m is the slope and b is the intercept. Write a program to compute the equation of a straight line given two points (x_1, y_1) and (x_2, y_2). The equation for the slope m of a line is: $m = \frac{y_2 - y_1}{x_2 - x_1}$. The intercept can be found by using one of the following formulas: $b = y_1 - mx_1$ or $b = y_2 - mx_2$.

   Your program will prompt the user for two points (x_1, y_1) and (x_2, y_2). Then compute the slope and the equation of the line; and determine whether the slope is positive or negative. If the two points are the same, print an error message.

   Sample Output 1:
   ```
   Enter the first point:1 4
   Enter the second point:5 7
   Slope:0.75
   Equation:y = 0.75x + 3.25
   Slope is positive
   ```

   Sample Output 2:
   ```
   Enter the first point:1 4
   Enter the second point:1 4
   I'm sorry, but these two points are the same
   ```

3. Ohm's law states that the current through a conductor between two points is directly proportional to the voltage across the two points. Introducing the constant of proportionality, the resistance, one arrives at the usual mathematical equation that describes this relationship:
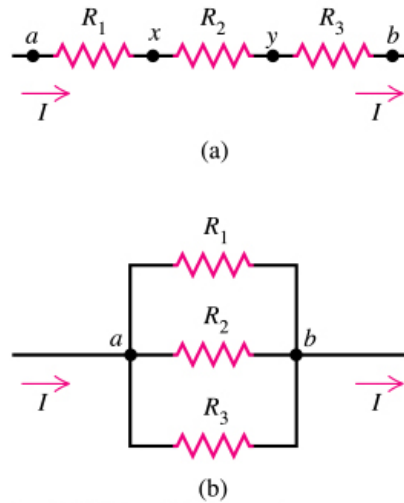
Figure 1: Resistors in (a) in series (b) in parallel

$$V = IR$$

The formula for calculating equivalent resistance of three resistors is given below (see Figure 1 for series and parallel connections):

`Series:` R_s `=` R_1 `+` R_2 `+` R_3

`Parallel:` $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$ `i.e.` $R_p = \left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}\right)^{-1}$

Write a program that prompts the user to enter values of R_1, R_2, R_3 and `V`. Then compute the current through the resistors for both series and parallel connections. The current should be carried out to 2 decimal places.

Sample Output:

```
Enter values of R1, R2, and R3 (in Ohm):  3 4 5
Enter the Voltage:  5
Current through resistors in series:  0.42 A
Current through resistors in parrallel:  3.92 A
```

4. Write a program that prompts user to enter a number and outputs the corresponding month i.e., 1 for January and 5 for May. You need to use <u>switch</u> statement instead of

if-else statement for this program. If user enters a number greater than 12 or less than 1, it should display a message mentioning that "The input is invalid".

Sample Output:

```
Enter the number:  4
The month is April.
```