CS 150 Lab 5

If statement, bool data type, type casting.

The main objective of today's lab is to use `if` statements, `bool` data types and type casting to solve a complex problem.
- Be sure your output looks exactly like the specified output.
- Be sure to submit each project to **CS150-01 Lab** when you are done.
- Show the instructor to TA your solution to each problem before submitting it.

Lab 5.1

For this lab you will receive a partially written solution and will need to implement the missing parts of the code as described by the comments. You will need to replace the comments that start with "REPLACE". This program will ask the user for the length and width of a rectangle and also ask the user to input the area of the rectangle. Your code will check if the value of the area input by the user is correct. Display one of the following messages; depending on if the user supplied value of area is correct.

- **Yes! The area of the rectangle was calculated correctly by the user!**

- **Sorry! The correct area of the rectangle is ###.**

In the second message, display the correct area of the rectangle in place of the ###.

To retrieve the partially written solution, do the following:

1. **You will need to copy the projects to your folder before opening them in Visual Studio. Go to the 'CS150-01 Public' folder on Turing. You will find the folder '05UserArea' in the '05Lab' folder. Copy the folder '05UserArea' to the desktop.**
2. **Rename the folder on your Desktop from '05UserArea' to '05UserAreaXXXXXXXX' where the XXXXXXXX is your PUNet ID. Mine would be called '05UserAreakhoj0332'.**
3. **To open your project, start up Visual Studio like you did last week. Click on 'File' from the menu, then 'Open' and 'Project/Solution'.**
4. **Click on the drop down box and select 'Desktop'. Double click on the folder '05UserAreaXXXXXXXX'**
5. **You will see a list of files. Select the Microsoft Visual Studio Solution file called '05UserArea. It's the one with this icon.**

Lab 5.2

For this lab you will create a new Visual Studio Project that will contain your source code. You should save this project as '05SoccerXXXXXXXX', where XXXXXXXX is your PUNet ID. The goal of this program is to solve the following problem:

> We want to calculate the number of goals scored per game by the Pacific University Men's Soccer team. So far they have scored 1, 0, 2, 0, and 0 goals in their first five games. Your program should prompt the user for the five goal totals one at a time. Calculate the average number of goals scored per game and whether or not the team averages more than 2.10 goals a game. Display both of these values to this user. In your C++ code, represent whether or not the average number of goals scored per game is greater than 2.10 as a **bool** variable. A sample input and output is shown below.

Your output should look exactly as follows:

```
************************************************************
*     Pacific University Men's Soccer Goal Tabulator    *
************************************************************
Please enter the first game goal total: 1
Please enter the second game goal total: 0
Please enter the third game goal total: 2
Please enter the fourth game goal total: 0
Please enter the fifth game goal total: 0

The average number of goals scored per game: 1.4
On average, the team does not score more than 2.1 goals a
game.
```

After you run your program with the given data, use the following two data sets:
```
Game one: 5
Game two: 2
Game three: 3
Game four: 1
Game five: 2

Game one: 2
Game two: 0
Game three: 1
Game four: 3
Game five: 1
```

Check the output for each of the above data sets is correct before submitting your assignment.

Challenge!

For this lab you will create a new Visual Studio Project that will contain your source code. You should save this project as '05LeapXXXXXXXX', where XXXXXXXX is your PUNet ID. The goal of this program is to determine if a given year is a leap year or not.

> A year is a leap year if it is divisible by 4. The only exception to this is if it is a century year. Then it is a leap year only if it is divisible by 400. In case you're wondering, these are the rules for the Gregorian calendar, which began to be adopted in 1582 when they realized that having a leap year every 4 years resulted in the days of the year being very off after a several centuries. (The actual length of a year is 365.24219 days, not an even 365.25 days).

You need to determine a single relational expression that represent the above rules and use this in your program.

Once you have completed your program, test it on the following values:

- 1900 – Not a leap year
- 1960 – A leap year
- 1989 – Not a leap year
- 2000 – A leap year