

# CS 150 Lab 3

The purpose of today's lab session is to allow you to gain experience reading and writing characters, integers, and doubles. Each activity today will consist of a set of input, a small set of computations, and a set of outputs to be displayed to the user.

- You are to use proper comments for each program.
- Be sure your output looks EXACTLY like the specified output.
- Be sure to submit a folder 03PUNetID, which contains each project, to **CS150-01 Lab** when you are done.
- Show the instructor or TA your solution to each problem before submitting it.

## Lab 3.1

For this lab, you will need to create a new Visual Studio project that will contain your source code. Name this project 05lettersXXXXXXXX, replacing the XXXXXXXXX with your PUNetID.

The goal of this program is to read in 4 characters and display them in different patterns on the screen. Sample input and output follow. Be sure to make your output look exactly like the sample shown below. Pay particular attention to spacing.

What data will you need to store for this program?

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What will the variable declarations look like for the above data?

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### Sample Input/Output

```
*****
Welcome to the Scrambler-O-Rama!
*****

Please enter one character : x
Please enter two characters: a b
Please enter one character : y

Line: x a b y

Column:
  x
  a
  b
  y

Box:
  xa
  by
```

## Lab 3.2

For this lab, you will need to create a new Visual Studio project that will contain your source code. Name this project 06tempXXXXXXXX, replacing the XXXXXXXX with your PUNetID.

The goal of this program is to convert a temperature given in Celsius to a temperature in Kelvin, and vice versa. To convert a temperature in Celsius to Kelvin, add 273.15 to the measure in Celsius. To convert a temperature in Kelvin to Celsius, subtract 273.15 from the measure in Kelvin. **Note:** The temperature given by the user may be a decimal number.

Sample input and output follow. Be sure to make your output looks exactly like the sample shown below. Pay particular attention to spacing.

Before you start writing your program, answer these questions:

What data will you need to store for this program?

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What will the variable declarations look like for the above data?

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### Sample Input/Output

```
*****
Welcome to the Temperature-Convert-O-izer!
*****

Please enter a temperature in Celsius: 90

That is 363.15 K!

Please enter a temperature in Kelvin: 300

That is 26.85 C!

The difference between those two temperatures is 63.15 degrees!
```

When you have finished both projects save a copy to your directory on Turing and submit your folder 03PUNetID containing both project solutions to CS150-01 Lab.

# Challenge!

For this lab, you will need to create a new Visual Studio project that will contain your source code. Name this project 07boxareaXXXXXXXX, replacing the XXXXXXXX with your PUNetID.

The goal of this program is to calculate the total surface area of a box. The total surface area of a box is the sum of the surface area of each side and both ends. The user will input the length, height, and depth of the box. The user may input fractional (42.1) numbers. You need to calculate the total surface area and display it to the user.

Sample input and output follow. Be sure to make your output look exactly like the sample shown below. Pay particular attention to spacing.

Before you start writing your program, answer these questions:

What data will you need to store for this program?

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What will the variable declarations look like for the above data? What calculations will you need?

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## Sample Input/Output

```
*****  
Welcome to the Box-Area-Calculator-gifier!  
*****  
  
Please enter the length and height of the box: 10.9 L 5.1 H  
  
Please enter the depth of the box : 3.9 D  
  
The total surface area of the box is: 262.14
```

The box described by the input above is shown on the back page.

