

# Lab Politer Customs

Abhi Thanvi, Paul Holaway

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# Lab Politer Customs

## Welcome

Just like learning a new spoken language, you will not learn the language without practice. Labs are an important part of this course. Collaboration on labs is **extremely encouraged**. If you find yourself stuck for more than a few minutes, ask a neighbor or course staff for help. When you are giving help to your neighbor, explain the **idea and approach** to the problem without sharing the answer itself so they can figure it out on their own. This will be better for them and for you. For them because it will stick more and they will have a better understanding of the concept. For you because if you can explain it to other students, that means you understand it better too.

## The Idea of this Lab

The idea behind this lab is to continue the respect of the customary steps of learning any [computer science](#) language. It is to learn loops, if/else statements, and writing your own functions (some languages call it “methods”). This is crucial to learn to write efficient code as these allow you to write logical, non-repetitive, and clean code for others to understand. Just like sharing your analysis, people read your code! When you write good code, people find it easier to understand what you did and really appreciate it. Consider this lab to be the one that gets your feet wet for the “Pure CS” portion of Data Science.

“I am not a huge fan of Froot Loops, but I do love writing loops” - Honest Abhi

## Problem 1: The Warmup Before Dash!

**Question 1:** We want to calculate the area of a square, given some of the parameter. Create your own perimeter sequence by editing some code in Setup code (YOU DO NOT HAVE TO DELETE ANYTHING). We want all unique numbers in sequence (no repetition) and between the integers 1 and 10. We recommend sampling between 5-7 numbers. Then create your own custom function to calculate the area using the perimeters you sampled. Let’s just dive in.

**Answer:**

```
#SETUP DO NOT DELETE
set.seed(143572)
perimeter_seq = sample(1:10,5, replace=FALSE)
perimeter_seq
```

```
## [1] 4 2 10 7 9
```

```
##Code here
Area = function(perimeter) {
  #Complete The Function to calculate the Area
  side_len = perimeter/4
  Area = (side_len*side_len)
  return(Area)
}
#Use Your Custom Function
Area(perimeter_seq)
```

```
## [1] 1.0000 0.2500 6.2500 3.0625 5.0625
```

## Problem 2: The Final Stretch

**Question 1:** Create function that returns the “greatest” difference between 3 numbers.

Ex: You are given three numbers 4.1, 2.2, 10.8. You should return the greatest difference which would be  $(10.8 - 2.2 = 8.6)$ . Make sure your answer is always a positive difference.

*Hint: There are multiple ways you can solve this problem.* **Answer:**

```
##Code here
Difference = function(num1, num2, num3) {
  #Complete The Function to calculate the Volume
  pos_diff1 = abs(num1 - num2)
  pos_diff2 = abs(num1-num3)
  pos_diff3 = abs(num2-num3)
  if(pos_diff1 > pos_diff2 && pos_diff1 > pos_diff3) {
    return(pos_diff1)
  }
  if(pos_diff2 > pos_diff1 && pos_diff2 > pos_diff3) {
    return(pos_diff2)
  }
  if(pos_diff3 > pos_diff1 && pos_diff3 > pos_diff2) {
    return(pos_diff3)
  }
  #Equal differences, any difference is fine
  return(pos_diff1)
}
#Use Your Custom Function
Difference(4.1, 2.2, 10.8)
```

```
## [1] 8.6
```

**Question 2:** We are given slope and a x-value and y-intercept, and we need to calculate the y-value from the given parameter values. Write a custom function that takes in  $(x_1, slope, y_0)$  as its parameter and calculate its y-value. There are different ways to code this, it's up to you! Make sure to test your function by printing a solution.

**Answer:**

```
##Code here
Value = function(x1, slope,y0) {
  y1 = slope*(x1) + y0
  return(y1)
}
#Use Your Custom Function
Value(2,1,3)
```

```
## [1] 5
```

### Problem 3: Mystery Function 2.0

This question should be filled out, but it is a higher level of thinking question.

Question:

*#QUESTION DO NOT CHANGE THIS*

```
Mystery = function(num1, num2, num3) {  
  temp1 = num3+num2+num1  
  temp2 = num1+num3+num2  
  
  if(temp1 == temp2) {  
    mystery = temp1/3.0  
    return (mystery)  
  }  
}
```

*What is the mystery function doing? What is the purpose of the if statement, is it necessary? Justify your reasoning*

**Answer:** (Student Response Here) The mystery function is returning the average of the three numbers, the if statement is unnecessary as it is checking for equality between `temp1` and `temp2` which is always equal.

### Submission

Once you have finished your lab...

1. Go to the top left and click **File** and **Save**.
2. Click on the **Knit** button to convert this file to a PDF.
3. Submit **BOTH** the `.Rmd` file and `.pdf` file to Blackboard by 11:59 PM tonight.