

CSE 121: Section 7 - Methods and More Day 1

1. Getting Loopy

Consider the code below:

```
public class Loopy {  
  
    public static final double MULTIPLIER = 3.0;  
  
    public static void main(String[] args) {  
        int courseCode = 121;  
        for (int i = 0; i < 4; i += 1) {  
            mystery1(courseCode, i);  
        }  
        System.out.println("courseCode = " + courseCode);  
    }  
  
    public static void mystery1(int mysteryVar1, int mysteryVar2) {  
        mysteryVar1++;  
        System.out.println(mysteryVar1 + mysteryVar2 * MULTIPLIER);  
        mysteryVar2++;  
    }  
  
}
```

- A. Trace through the code to determine the output printed to the console. Pay attention to the number of times we will loop and the scope of each variable.

- B. We update `mysteryVar1` and `mysteryVar2` in the method (and we pass in `courseCode` and `i`). Why are these changes not reflected in `main`?

2. Machine Learning?!?

A very popular topic in Computer Science at the moment is Machine Learning, which uses large amounts of data to make predictions about other data. We are going to simulate some example output of a machine learning model's evaluation data. Don't worry; you do not need to know anything about ML to do this; it just serves as a background!

Your job is to write two methods, `printLoss` and `printTrainingProgress`. You are given the scaffolds below.

`printLoss` should calculate and print the loss of a machine learning function, given two parameters, `double prediction` and `double target`, in that order. The loss is defined as the absolute value of the parameters' difference.

For example, `printLoss(0.4, 1.0)` will print:

```
Loss: 0.6
```

`printTrainingProgress` should print out information about a machine learning iteration. You are given a `modelName`, `epoch`, `prediction`, and `target` as parameters. The model name and epoch will be directly printed, while the prediction and target will be used to calculate the loss. For example, `printTrainingProgress("Linear Regression", 2, 0.6, 1.0)` will print:

```
Model: Linear Regression
Epoch: 2
Loss: 0.4
-----
```

You must call `printLoss` inside of `printTrainingProgress`. You may assume that all provided inputs are valid.

- A. Before you begin, write some brief pseudocode for the `printLoss` function. This should not be complete code, but rather a simple overview of the task. What calculations are you going to make? What will you need to print?

B. Now, write out your method code below! Referring to your pseudocode (or writing even more) could be helpful.

```
public class MachineLearning {

    public static void main(String[] args) {
        // Here are some example method calls. You do not need to
        // change the main method.
        printTrainingProgress("Linear Regression", 1, 0.8, 1.0);
        printTrainingProgress("Linear Regression", 2, 0.6, 1.0);
        printTrainingProgress("Linear Regression", 3, 0.4, 1.0);
    }

    public static void printTrainingProgress(String modelName,
        int epoch, double prediction, double target) {

    }

    public static void printLoss(double prediction, double target)
    {

    }

}
```

3. Methodical

Answer the multiple-choice questions below.

1. Which of the following naming conventions should we use for class constants?

snake_case

camelCase

SCREAMING_CASE

UpperCamelCase

2. What determines the scope of a variable?

- Its return type
- Whether it's in a method or not
- How we name it
- Where in the code it is declared

3. Which of these are a good use of class constants?

- To store an unchanging value used throughout the code
- To store a loop variable
- To store an intermediate calculation value
- To store a variable that we intend to pass to a method

4. Why might we use methods when programming? (SELECT MULTIPLE)

- To make our code more readable
- To make our code faster
- To make our code more reusable