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Purdue University Global

IN300 Programming for Data Analysis (Python, Java, R)

Unit 1 Assignment

Dr. Robert Kayle

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# #1 – Java Code and Output

The following is the Java code that I wrote to satisfy the instructions for the first instruction in the assignment. I love adding extra things to my code and have been encouraged by other professors in past programming classes, so I hope that is ok to do? I learned how to set the ANSI codes for specific colors to variables that I could use within the println() statement to change the color of the output, which is what you will see as being added:

//Import the necessary libraries to take user input

import java.util.Scanner;

public class WilliamAlecAkinAssignment {

    public static void main(String[] args) {

        //Create the code that takes in user input and name it "scanner"

        Scanner scanner = new Scanner(System.in);

        //I usually do this in my Python programs so I wanted to learn how to do it here and I hope it's ok!

        //This sets the variable "ANSI\_RESET" to the corresponding ANSI code which resets terminal color to default

        String ANSI\_RESET = "\u001B[0m";

        //This sets the variable "ANSI\_BLUE" to the corresponding ANSI code which prints things as blue

        String ANSI\_BlUE = "\u001B[34m";

        //This sets the variable "ANSI\_GREEN" to the corresponding ANSI code which prints things as green

        String ANSI\_GREEN = "\u001B[32m";

        //Print a message to standard out for the user prompt as blue and then reset terminal color to default

        System.out.println(ANSI\_BlUE + "Please enter three numbers: " + ANSI\_RESET);

        System.out.println("Please input the first number: ");

        //This line reads the first number number entered by the user and stores it in the firstNumber variable

        int firstNumber = scanner.nextInt();

        System.out.println("Please input the second number: ");

        //This line reads in the second number entered by the user and stores it in the secondNumber variable

        int secondNumber = scanner.nextInt();

        System.out.println("Please input the third number: ");

        //This line reads in the third number entered by the user and stores it in the thirdNumber variable

        int thirdNumber = scanner.nextInt();

        //This is left over from utilizing the example code in the assignment instructions

        //Read in the data entered by the user and assign it to a variable

        //String message = scanner.nextLine();

        //This line declares the "sum" variable as an integer and sets it equal to the sum of all three number variables

        int sum = firstNumber + secondNumber + thirdNumber;

        //This line declares the "average" variable as n integer and assigns it equal the the "sum" variable

        //divided by the integer 3 to calculate the average

        int average = sum / 3;

        //This line prints the output of the sum variable combined with a descriptive text message to stdout in green text

        System.out.println(ANSI\_GREEN + "The sum is: " + sum);

        //This line does what the line above does but instead prints the "average" variable and descriptive text

        System.out.println("The average is: " + average);

        //This is left over from utilizing the example code in the assignment instructions

        //Print the message entered to standard out

        //System.out.println(message);

    }

}

## Text Description automatically generatedHere is the output from the terminal pane of the Java code successfully compiling and then running:

# #2 – Python Code and Output

The following code does the assignment action for #2. I also included bonus code that outputs the text to stdout in the same colors as the Java code. This code requires the “Colorama” library from PyPi to do so and can be installed with “pip install colorama.”

'''William Alec Akin

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#Import an extra library to add color like java

from colorama import Fore, Style

#Print a welcome statement to the user in the color blue and reset terminal to default color scheme

print(Fore.BLUE + "\n\nWelcome to Alec's simple sum and average calculator!" + Style.RESET\_ALL)

#Prompt user for input of first number and assign to variable with a floating point data type that allows decimals

firstNumber = input("Please enter the first number: ")

firstNumber = float(firstNumber)

#Prompt user for input of second number and assign to variable with a floating point data type that allows decimals

secondNumber = input("Please enter the second number: ")

secondNumber = float(secondNumber)

#Prompt the user for input of third number and assign to variable with a floating point data type that allows decimals

thirdNumber = input("Please enter the third number: ")

thirdNumber = float(thirdNumber)

#Define the "sum" variable and make it equal to the sum of all three numbers entered by the user

sum = firstNumber + secondNumber + thirdNumber

#Defind the "average" variable and make it equal to the average of all three numbers entered by the user

average = sum / 3

#Print the sum of all three numbers in the color green

print(Fore.GREEN + "The sum of all three numbers is:", sum)

#Print the average of all three numbers in the color green and reset the terminal to default color scheme

print("The average of all three numbers is:", average, Style.RESET\_ALL)

## Text Description automatically generatedHere is the Python output:

# #3 – R Code and Output

I wrote the following code in the “Codio” editor, but I copied and pasted it into VSCode and one of the internal applications for R we have at work since I did this assignment from my work computer. It runs in both, and I took a screen capture of it running in our work environment:

# William "Alec" Akin

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# Purdue University Global

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# Using https://codio.io

# Welcome the user to the R-based sum and average calculator and explain use

print("Welcome to Alec's sum and average calculator!")

print("You will enter three numbers and the calculator will return the sum and average of those numbers.")

# Prompt the user to insert a first, second, and third number

firstNumber <- readline(prompt="Please enter the first number: ")

secondNumber <- readline(prompt="Please enter the second number: ")

thirdNumber <- readline(prompt="Please enter the third number: ")

# Convert the datatypes of the three variables from "char" to "numbers/double"

firstNumber <- as.numeric(firstNumber)

secondNumber <- as.numeric(secondNumber)

thirdNumber <- as.numeric(thirdNumber)

# Sum the three numbers together and assign them to a new variable "sum"

sum <- firstNumber + secondNumber + thirdNumber

# Average the three numbers by dividing "sum" by "3"

average <- sum/3

# Print the sum to stdout with the "cat" function

cat("The sum of all three numbers is: ", sum)

# Print the average of the three numbers to stdout with the "cat" function

cat("\nThe average of all three numbers is: ", average)

## Here is the output from the R program in R environment in the work app we use:

Text

Description automatically generated

# #4 – Discuss Most Liked Language

After doing this assignment in all three languages, I would have to say that I enjoyed and thought Python was the most straightforward and most accessible to write in. Its apparent accessibility is likely because I have the most experience in Python; however, Python was designed with some very helpful features/intentions that make life a lot easier than what I can tell is possible/available in Java or R. The most important one to me, especially as a neurodivergent person, is the readability of Python. Python was written to make the source code as easy as possible, and as someone who has "dabbled" in Python up until a few months ago and then took a deep dive because of school and now work, it executes this mission very well for me (Reitz & Real Python, 2022). The other thing that sets Python apart from Java but not from R is that Python (and R) are both interpreted languages versus compiled languages. Java was difficult for me not just because the syntax felt off but also because it is a compiled language, and the compilation errors were usually less than helpful.

The other thing that threw me for a loop with Java was that it seemed like variables were not typically "global," meaning it matters what the preceding words are before declaring a variable (part of the reason I have so many sources cited around Java). Additionally, everything in Java is a class, both from experience and online resources (Kotamraju, 2019). That seems like a strange design concept to me, and I hope we cover it in the seminar! Additionally, I forgot to take screenshots of the various struggles I had with each, but I hope the number of sources I used (and cited) speak for the struggles!

R was also challenging for me to wrap my head around, just because Python and even Java felt so different. I see R's power, especially in data analysis, data mining, and data science, even with the very little exposure I have now had. The syntax felt weird to me, and the difference between what a function you might expect to do, such as "print()" versus "cat()," did not make much sense to me. As I continue to gain exposure and experience, each language will start to "speak" about what it is very good at and where it should be used, and I am very excited to see where it takes me!

# #5 – “==” and “equals()” in Java

This question was pretty tricky to wrap my head around. However, I think I can describe it relatively succinctly now after finding two substantial resources which explain the concept but differently. According to GeeksforGeeks (2022), the “==” operator (one difference) and the “equals()” method (also different) both compare two separate objects in Java to see if they are equal. However, they do it much differently and have vastly different purposes. The first difference is described in the first sentence – one is an operator (like “+,” “-,” etc.), and the other is a method (just like print() would be in Python) (GeeksforGeeks, 2022). The “==” operator is specifically used to see if two objects occupy the same memory location (RAM), which is something that I am used to from my experience in incident response and malware analysis, whereas the “equals()” method is used to see, for example, if two variables contain the same string value (Parahar, 2019). If you wanted to see if two separate variables contained the same value, such as the number “3,” you would use the equals() method. If you wanted to see if two different variables (such as “firstNumber” and “secondNumber”) occupied the exact location in memory, you would use the “==” operator to do so (Parahar, 2019). Prahar (2019) gives an extremely helpful table which I found incredibly useful for answering this question.

**Note:** On the next few pages are my cited References, including those that I used during the development process. Please let me know if you have any questions about how I went through these or discovered them!

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