

**CSCI 1301 – Programming Principles I**  
**Georgia Southern University**  
**Department of Computer Science**  
**Fall 2024**

**Assignment 1**

**Point Value: 20 points**

**Due: Friday August 30, 2024, start of lab**

**NOTE:** Gradescope will give input test cases for any problems that require it. Use the Scanner's `nextDouble()`, `nextInt()`, etc. methods discussed in class to prompt the user for input and Gradescope will act as the user when your program requests it. In other words, just code user input like normal—as if a human were going to test your program.

**Description**

Write three Java programs to demonstrate user input, arithmetic operators, output, and other basic program functions.

**PAssign01a.java (7 points)**

Write a Java program that reads in a convenience store order from the user and calculates the total cost of the order. Assume the convenience store only sells two items: beverages at \$0.50 each and sandwiches at \$2.75 each.

Prompt the user for the number of beverages and store their entered number. Prompt the user for the number of sandwiches and store their entered number. The prices should be set/stored in variables and those variables should be used for calculations, not hard-coded numbers.

Your output should read: "The total of \_\_ beverages and \_\_ sandwiches is \$\_\_." with all blanks filled in with appropriate values.

**Expected Output (Do NOT hard code your output; use your calculated values):**

Gradescope Input: 5 3

The total of 5.0 beverages and 3.0 sandwiches is \$10.75.

**PAssign01b.java (7 points)**

Write a Java program that calculates the area of a triangle given base and height. Your program should prompt the user for the base value, prompt for the height value, and output the triangle's area: "A triangle with base \_\_ and height \_\_ has an area of \_\_\_\_."

HINT: Be aware of integer vs. double division. In Java  $1/2$  is not the same as  $1.0/2.0$  as 1 is an integer. Java will truncate 0.5 to 0 for int data types.

**Expected Output (Do NOT hard code your output; use your calculated values):**

Gradescope Input: 7 9

A triangle with base 7.0 and height 9.0 has an area of 31.5.

### PAssign01c.java (6 points)

The ideal gas law,  $PV = nRT$ , relates the pressure, volume, and temperature of an ideal gas. In SI units, P is the absolute pressure in pascals, V is the volume in cubic meters, n is the amount of gas in moles, R is the ideal gas constant ( $R = 8.31446 \frac{J}{mol \cdot K}$ ), and T is the absolute temperature in degrees Kelvin (0 degrees Celsius = 273.15 degrees Kelvin).

Write a Java program that will determine the pressure exerted by 1 mole of an ideal gas with volume  $V = 0.25m^3$  and  $T = 313^\circ K$ . **Use a named constant for R.** Except for R, use appropriate variable names, NOT the symbolic math representations in the equation.

This program (part c) will **NOT** use user-input. Simply hard-code your values for volume, temperature, and R. **Pay close attention to data types (from Chapter 2) when viewing how each number prints.** Experiment with the numeric types to ensure that they match the expected output.

### Expected Output (Do NOT hard code your output; use your calculated values):

The pressure of 1 mole(s) of an ideal gas with volume 0.25 m<sup>3</sup> at temperature 313 K is 10409.70392 pascals.

### Code

Use the provided template for this assignment. Make any necessary modifications to classes and class headers to complete this assignment.

```
public class PAssign01 { // add a, b, or c as appropriate
    public static void main(String[] args) {
        // add your code here
    }
}
```

### Deliverables

Name your program PAssign01.java, adding a, b, or c to name. Programming Assignment 1 is to be individual work. Submit the program by the specified due date. Submit each file to its corresponding assignment on Gradescope.

See and follow the Programming Assignment Format document for submission requirements.

Use a utility similar to <https://www.diffchecker.com/> and the Expected Output to compare your program's output with the requested output as well as the unit tests provided within Gradescope. Programming is in the details, so double check punctuation, spacing, and case if your output does not match. When copying and pasting, be aware that Microsoft Word sometimes replaces normal quotes with Smart Quotes, which may need to be edited.

Last modified: August 18, 2024