

**COP 1334C Homework 5**  
**25 points**

**Submission instructions:**

**For the following programs, include:**

- a. Algorithm
- b. Program code

**Save your work in your homework/homework4 folder.**

**1. Geometry Calculator (9 points)**

**Filenames: *geometryalg.txt*, *geometry.cpp***

Write a program that displays the following menu:

Geometry Calculator

1. Calculate the Area of a Circle
2. Calculate the Area of a Rectangle
3. Calculate the Area of a Triangle
4. Exit

Enter your choice (1 - 4):

If the user enters 1, the program should ask for the radius of the circle and then display its area. Use the following formula:

$$A = \pi r^2$$

Use 3.14 for pi and the radius of the circle for  $r$ .

If the user enters 2, the program should prompt the user for the length and width of the rectangle and then display the rectangle's area. Use the following formula:

$$A = \text{length} * \text{width}$$

If the user enters 3, the program should prompt the user for the base and height of the triangle and then display the triangle's area. Use the following formula:

$$A = .5 * \text{base} * \text{height}$$

If the user enters 4, the program should end.

*Input validation: Display an error message if the user does not select 1 - 4 from the menu. Do not accept negative numbers for any input values.*

**Grading Rubric:**

Algorithm(3)

Conditional statements and Input Validation (3)

Loops (3)

- Allow user to continue to choose until (4) is chosen from menu.

## 2. Average Rainfall (16 points)

**Filename:** *rainfallalg.txt, rainfall.cpp*

Write a program that uses nested loops to collect data and calculate the average rainfall over a period of years. The program should first ask for the number of years. The outer loop will iterate once for each year. The inner loop will iterate twelve times, once for each month. Each iteration of the inner loop will ask the user for the inches of rainfall for that month. After all iterations, the program should display the number of months, the total inches of rainfall, and the average rainfall per month for the entire period.

*Input validation: Do not accept a number of less than 1 for the number of years. Do not accept negative numbers for the monthly rainfall.*

### Grading Rubric:

Algorithm(4)

Conditional statements and Input Validation (4)

Loops (4)

Overall Accuracy (4)

- organization
- use of variables
- input statements
- output statements
- calculations/counters