

CSE 1321L: Programming and Problem Solving I Lab

Assignment 2 – 100 points

Type Systems and Expressions

Program 1: Design (pseudocode) and implement (source code) a program (name it `Cylinder`) to compute the volume of a cylinder using the following formulas (PI is 3.14):

```
Area    = radius * radius * PI
Volume  = area * length
```

The program reads the radius and length from the user and then computes the volume. Document your code and properly label the input prompts and the outputs as shown below.

Sample run 1:

```
Enter radius: 5.5
Entered length: 12
The Volume is 1140.4
```

Sample run 2:

```
Enter radius: 1.0
Entered length: 1.0
The Volume is 6.28
```

Sample run 3:

```
Enter radius: 6.5
Entered length: 10.0
The Volume is 1326.65
```

Program 2: Design (pseudocode) and implement (source code) a program (name it `SumDigits`) to sum the total of all digits in an input integer number between 0 and 1000. Notice that you need to extract individual digits from the input number using the remainder and division mathematical operators. For example, if the input number is 123, the sum of its digits is 6. Document your code and properly label the input prompts and the outputs as shown below.

Sample run 1:

```
Entered number: 123
Sum of digits: 6
```

Sample run 2:

```
Entered number: 5588
Sum of digits: 26
```

Sample run 3:

```
Entered number: 100
Sum of digits: 1
```

Program 3: Design (pseudocode) and implement (source code) a program (name it `Distance`) to compute the distance between 2 points. The program prompts the user to enter 2 points (X1, Y1) and (X2, Y2). The distance between 2 points formula is:

$$\text{Square_Root } [(X2 - X1)^2 + (Y2 - Y1)^2]$$

Document your code, properly label the input prompts, and organize the outputs as shown in the following sample runs.

Sample run 1:

```
Entered X1: 1.5
Entered Y1: -3.4
Entered X2: 4
Entered Y2: 5
Distance:      8.764131445842194
```

Sample run 2:

```
Entered X1: -5.5
Entered Y1: -8.8
Entered X2: 25
Entered Y2: 4.5
Distance:    33.27371334852784
```

Sample run 3:

```
Entered X1: 2
Entered Y1: 2
Entered X2: 10
Entered Y2: 10
Distance:    811.313708498984761
```

Program 4: Design (pseudocode) and implement (source code) a program (name it `DrivingCost`) to compute the cost of a road trip. The program prompts the user to enter the distance to be traveled, the car fuel efficiency (mile per gallon), and the fuel cost per gallon. The program computes and displays the trip cost. Document your code and properly label the input prompts and the outputs as shown below.

Sample run 1:

```
Distance traveled (miles): 100
Miles per gallon (miles): 20
Price per gallon (dollars): 2.0
Trip cost (dollars): 10.00
```

Sample run 2:

```
Distance traveled (miles): 500
Miles per gallon (miles): 35
Price per gallon (dollars): 2.50
Trip cost (dollars): 35.71
```

Sample run 3:

Distance traveled (miles): 78
Miles per gallon (miles): 25
Price per gallon (dollars): 3.0
Trip cost (dollars): 9.36

Submission:

Part 1: Pseudocode:

1. Review the assignment submission requirements and grading guidelines.
2. Upload the pseudocode files (Word doc or PDF) to the assignment submission folder in D2L.
3. The files must be uploaded to D2L by the due date.
4. The Pseudocode must be complete and following the standards listed at <http://ccse.kennesaw.edu/fye/Pseudocode.php>

Part 2: Source Code:

1. Review the assignment submission requirements and grading guidelines.
2. Upload the source code files to the assignment submission folder in D2L.
3. The files must be uploaded to D2L by the due date.