COM2002 INTERMEDIATE PROGRAMMING
2024 – 2025 SPRING

Laboratory Week: 17 – 21 March 2025

Topic **:** Structures, Unions, and Enumerations

Program : Geometric Figures (GeometricFigures.c)

Definition : The program that finds the area and perimeter (or circumference) of a geometric figure.

- Define structure types for each figure of interest including components for the figure's area and perimeter (or circumference), as well as components for those dimensions of the figure that are needed in computations of its area and perimeter.
- Then, define a union type with a component for each figure type.
- Finally, define a structure containing both a component of the union type and a component whose value denotes the correct interpretation of the union.

  Circle: area, circumference, radius (radius must be greater than zero.)
  Rectangle: area, perimeter, width, height (width and height must be greater than zero and not equal to each other.)
  Square: area, perimeter, side (side must be greater than zero.)

Operations supported by the program:

- gets the dimension data necessary to compute a figure's area and perimeter.
- computes the area of a figure given relevant dimensions.
- computes the perimeter of a figure given relevant dimensions.
- prints each component of a given object.

The program prompts the user to enter an operation code, then calls a function to perform the requested action. The codes C (circle), R (rectangle) and S (square) will be used to represent these operations. Repeats until the user enters the command 'q'.

Expected output:

```
Area and Perimeter Computation Program

Enter a letter to indicate the object shape or Q to quit.
C(circle), R(rectangle) or S(square)> c
Enter radius> 0
        The value must be greater than ZERO.
Enter radius> -1
        The value must be greater than ZERO.
Enter radius> 2
Object is a circle whose members:
        Area:12.57
        Circumference:12.57
        Radius:2.00

Enter a letter to indicate the object shape or Q to quit.
C(circle), R(rectangle) or S(square)> r
Enter height> 0
        The value must be greater than ZERO.
Enter height> -1
        The value must be greater than ZERO.
Enter height> 3
Enter width> 0
        The value must be greater than ZERO or Width and height must not equal to each other.
Enter width> -2
        The value must be greater than ZERO or Width and height must not equal to each other.
Enter width> 3
        The value must be greater than ZERO or Width and height must not equal to each other.
Enter width> 6
Object is a rectangle whose members:
        Area:18.00
        Perimeter:18.00
        Width:6.00
        Height:3.00

Enter a letter to indicate the object shape or Q to quit.
C(circle), R(rectangle) or S(square)> s
Enter length of a side> 0
        The value must be greater than ZERO.
Enter length of a side> -2
        The value must be greater than ZERO.
Enter length of a side> 3
Object is a square whose members:
        Area:9.00
        Perimeter:12.00
        Side:3.00

Enter a letter to indicate the object shape or Q to quit.
C(circle), R(rectangle) or S(square)> Q
```