Note:

- Think about different inputs which might help you to assure that your implementation is correct.
- If you add any details or make any ssumptions, please clearly describe in your submission.

Problem 1

Write a program that:

- takes two inputs (i.e., length and width of a rectangle);
- calculates the perimeter, the length of the diagonal, and the area of the rectangle;
- outputs the perimeter, diagonal length, and the area.

An example is shown below.

Enter the length of the rectangle: 4

Enter the width of the rectangle : 5

Calculating the properties of the rectange!

Perimeter: 18.0

Diagonal length: 6.4031

Area: 20.0

Solution 1 (simplest)

```
In [1]:  # A simple solution (based on what has been taught so far)

         # Ask input
         # Input is converted to float, to avoid problem with string input
         length = float(input("Enter the length of the rectangle: "))
         width = float(input("Enter the width of the rectangle: "))

         # Do calculations
         perimeter = (length+width)*2
         diagonal = ((length**2)+(width**2))**0.5
         area = length*width

         # Print outputs
         print("Calculating the properties of the rectange!")
         print("Perimeter: ", perimeter)
         print("Diagonal length: ", diagonal)
         print("Area: ", area)
```

```
Calculating the properties of the rectange!
Perimeter:  21.0
Diagonal length:  7.5
Area:  27.0
```

Solution 2 (with function, no check on input)

```
In [2]:  # This solution gives wrong if the input(s) is/are not proper.

         def calc_rectangle_perimeter(length, width):
             return (length+width)*2

         def calc_rectangle_diagonal(length, width):
             return ((length*length)+(width*width))**0.5

         def calc_rectangle_area(length, width):
             return length*width

         # Ask inputs
         # Cast input to float, to avoid problem with string input
         length = float(input("Enter the length of the rectangle: "))
         width = float(input("Enter the width of the rectangle: "))

         # Print outputs
         print("Calculating the properties of the rectange!")
         print(f'Perimeter: {calc_rectangle_perimeter(length, width)}')
         print(f"Diagonal length: {calc_rectangle_diagonal(length, width)}")
         print("Area: ", calc_rectangle_area(length, width))
```

```
Calculating the properties of the rectange!
Perimeter: 4.0
Diagonal length: 3.1622776601683795
Area:  -3.0
```

Solution 3 (include function specification (docstring), and input check)

```python
In [3]: def calc_rectangle_perimeter(length, width):
            """
            Given the length and width of a rectangle, the function calculates
            the perimeter of the rectangle.

            Parameters/inputs
            -----------------
            length, width: length and width of the rectangle (must be greater tha

            Returns
            -------
            The perimeter of the rectangle
            """
            return (length+width)*2

        def calc_rectangle_diagonal(length, width):
            """
            Given the length and width of a rectangle, the function calculates
            the diagonal length of the rectangle.

            Parameters/inputs
            -----------------
            length, width: length and width of the rectangle (must be greater tha

            Returns
            -------
            The diagonal length of the rectangle
            """
            return ((length*length)+(width*width))**0.5

        def calc_rectangle_area(length, width):
            """
            Given the length and width of a rectangle, the function calculates
            the area of the rectangle.

            Parameters/inputs
            -----------------
            length, width: length and width of the rectangle (must be greater tha

            Returns
            -------
            The area of the rectangle
            """
            return length*width

        if __name__ == "__main__":
            # Ask inputs
            # Cast input to float, to avoid problem with string input
            length = float(input("Enter the length of the rectangle: "))
            width = float(input("Enter the width of the rectangle: "))

            # Check if length and width are both greater than zero
            if (length > 0) and (width > 0):
                print("Calculating the properties of the rectange!")
                print(f'Perimeter: {calc_rectangle_perimeter(length, width)}')
                print(f"Diagonal length: {calc_rectangle_diagonal(length, width)}
                print("Area: ", calc_rectangle_area(length, width))
            else: print("The length and the width of the rectangle must be greate
```

The length and the width of the rectangle must be greater than zero.