

## Assignment - 3

Deadline: **30.12.25**

- Each task in its own .py file
- All completed task files must be pushed to the designated GitHub repository.
- **Assessment:** Successful submission requires **GitHub push**

### Task 1.

1. Write a program to calculate the area of various geometric shapes.
2. Given 3 different arrays of integers (the size of each does not exceed 15). In each array, find the sum of the elements and the arithmetic mean.

### Task 2.

1. Calculate the area of a regular hexagon with side a using the triangle area subroutine.
2. The user enters two sides of three rectangles. Bring out their area.

### Task 3.

1. The legs of two right triangles are given. Write a function to calculate the length of the hypotenuse of these triangles. Compare and deduce which of the hypotenuses is greater and which is smaller.
2. Convert a string so that the letters of each word in it are sorted alphabetically.

### Task 4.

1. Two fractions  $A/B$  and  $C/D$  are given ( $A, B, C, D$  are natural numbers). Write a program for dividing a fraction by a fraction. The answer must be an irreducible fraction. Use a subroutine of the Euclid algorithm to determine the gcd.
2. Given a circle  $(x-a)^2 + (y-b)^2 = R^2$  and points  $P(p1, p2)$ ,  $F(f1, f1)$ ,  $L(l1, l2)$ . Find out and display on the screen how many points lie inside the circle. Checking whether a point lies inside a circle should be done in the form of a procedure.

### Task 5.

1. Two fractions  $A/B$  and  $C/D$  are given ( $A, B, C, D$  are natural numbers). Write a program to subtract the second fraction from the first fraction. The answer must be an irreducible fraction. Use a subroutine of the Euclid algorithm to determine the gcd.
2. Write a program that prints all the divisors of the given number in one line, separating them with spaces.

#### **Task 6.**

1. Write a program to find the greatest common divisor (GCD) and the least common multiple (LCM) of two natural numbers  $LCM(A, B) = (A*B)/GCD(A,B)$ . Use a subroutine of the Euclid algorithm to determine the gcd.
2. Write a program to calculate the area of a convex quadrilateral given the lengths of four sides and a diagonal.

#### **Task 7.**

1. Numbers  $X, Y, Z, T$  are given — the lengths of the sides of the quadrilateral. Calculate it

area if the angle between sides of length  $X$  and  $Y$  is a right angle. Use two routines to calculate areas: a right triangle and a rectangle.

2. Write a program that converts a non-negative integer given to it into a 10-digit octal code, preserving leading zeros.

#### **Task 8.**

1. Find all natural numbers not exceeding the given  $n$  that are divisible by each of their digits.
2. Enter a one-dimensional array  $A$  of length  $m$ . Swap the first and last elements in it. Enter the length of the array and its elements from the keyboard. In a program, describe a procedure for replacing elements of an array. Output the original and resulting arrays.