Workshop #1: **Geometric primitives and transformations**

**Learning Outcomes:**

Upon successful completion of this workshop, you will have demonstrated the abilities to:

* Practice basic Python language syntax and semantics to write python programs.
* Use concepts geometric primitives to draw rectangle.
* Learn about transformations and write a program to perform transformations like translation, rotation, scaling
* Compile and run a program.

**Requirements:**

In this assignment, students will learn the basics of geometric primitives and transformations. By writing a program that draws a rectangle, and performs 2D transformations. Use the mouse to draw a rectangle on a white background (you can choose a color for the line). Then manipulate the mouse to perform the following transformations: translation, rotation, scaling.

Instructions are as follows:

Function 1: Create a white background

Function 2: Use the mouse to click on a coordinate p1(x1,y1), drag to the position p2(x2,y2) then release the mouse to draw a rectangle corresponding to 2 coordinates p1(x1,y1) and p2(x2, y2). cv.EVENT\_LBUTTONDOWN:

Function 3:. Select translation transformation: enter translation information to create a new rectangle corresponding to the new coordinates.

Function 4: select rotation transform: enter rotation angle information to create a new rectangle corresponding to the new coordinates.

Function 5: Select the scaling transformation: enter the scaling factors information to draw a new rectangle corresponding to the new coordinates.

Evaluation Criteria

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Criteria | Requires | Mark | Note |
| 1 | Function 1: Create a white background | Create a white background | 2 | Executed in the background when the program is running. |
| 2 | Function 2: draw rectangle | draw rectangle | 2 | Using mouse |
| 3 | Function 3: translation transformation | Implement translation transformation | 2 | Using mouse or keyboard |
| 4 | Function 4: rotation transformation | Implement rotation transformation | 2 | Using mouse or keyboard |
| 5 | Function 5: scaling transformation | Implement scaling transformation | 2 | Using mouse or keyboard |
| 6 | Total |  | 10 |  |