Laboratory work #3 | Basic graphical UI

Objectives

As a result of this laboratory work you will master basic principles of hierarchical UI organization. You will also have an understanding of event handling principle.

Instructions

Create a program capable of checking if a point of given coordinates hits in the area of a geometric shape. Use different UI controls to specify different parameters required to compute point and shape locations.

1. Create a program displaying a window with the content described below:
    a. Visualization of a geometrical shape according to variant
    b. Different UI control according to the variant
2. Implement a logic responsible for getting the parameters from the UI controls
3. Implement a logic responsible for checking if given point located inside of the shape's area according to the parameters being specified
4. Implement result visualization so that the checked point would be displayed on the shape. Change the color of the point depending on the checking result. Also display a message saying if the point hits the area of a shape, or not.

Use colors of your choice for a geometry visualization. Note that the point visualization should be visible.

Variants

Each variant described by the string of 7 numbers; here is the example:

1, 4, 3; 1, 3, 18, 10.

First three of them "1, 4, 3" denote UI controls to use for a selection of the parameters. First number for X, second for Y, third for R. See Table 1 for a values interpretation. Example "1, 4, 3" says:

- Use a few Buttons to get the value of X from the user
- Use a List to get the value or Y
- Use a TextField to get the value of R

Depending on the control you'll need one of them having multiple elements (List, Choice) or a few of the for a different values (Button, Checkbox).

The rest of numbers of a variant string denote the shape of geometrical area. Each number corresponds to some quadrant according to the Table 2. See Table 3 for a particular part of your shape and its dimensions based on the R parameter. Example "1, 3, 18, 10" says:

- First quadrant has a square of a=R and b=R
- Second quadrant has a quarter of a circle with a=R and b=R
- Third quadrant has a quarter of a circle with a=R/2 and b=R/2
- Fourth quadrant has triangle with a=R and b=R/2

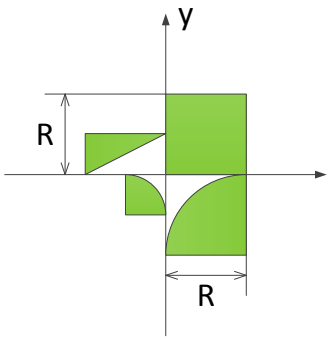


Table 1: UI controls to use

Number	Kind of UI control
1	Button
2	Checkbox
3	TextField
4	List
5	Choice

Table 2: Location for a part of the shape

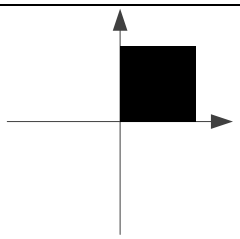
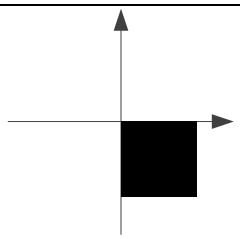
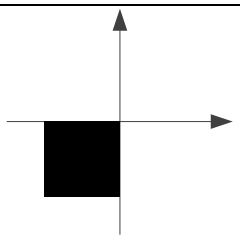
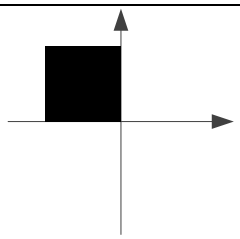
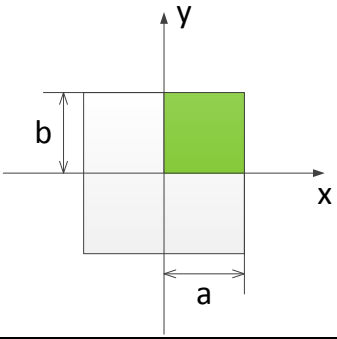
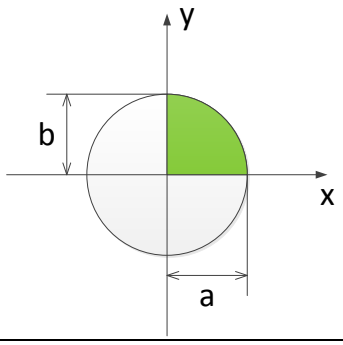
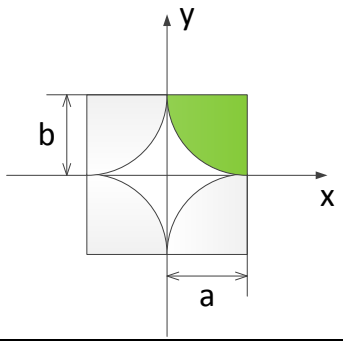
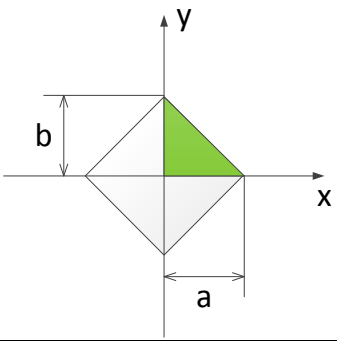
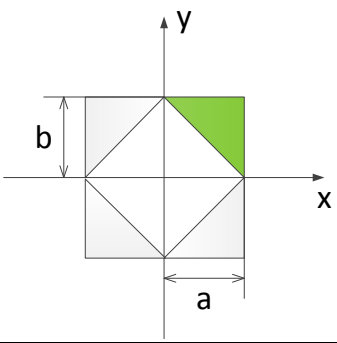
Number position in the variant string	1	2	3	4
Quadrant				

Table 3: Part of the shape and its dimensions

Part of shape	Dimensions			
	a=R, b=R	a=R, b=R/2	a=R/2, b=R	a=R/2, b=R/2
	1	6	11	16
	2	7	12	17
	3	8	13	18
	4	9	14	19
	5	10	15	20