Programming using Processing

Assignment – Drag, Drop and Draw (30 marks)

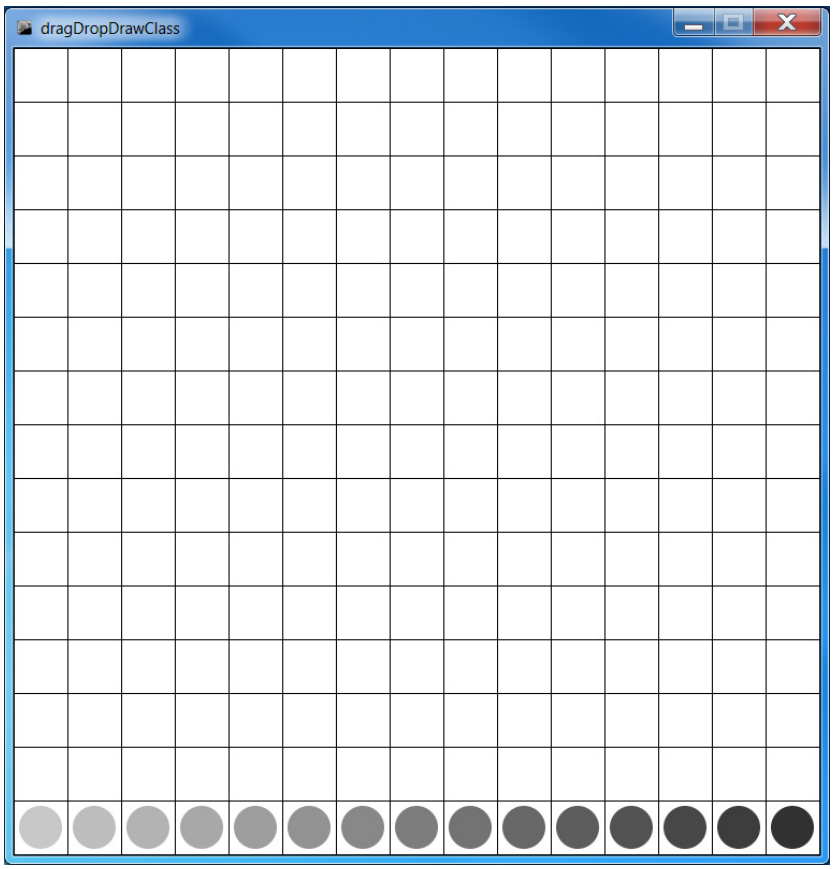
submit your solution
by 10:00pm Friday 20th July

In this assignment, you are required to demonstrate your understanding in the following topics in Processing in your solution.

1. two-dimensional array
2. classes

A basic version (worth 80%)

Draw a square grid with white background consisting of 15 *15 square cells. Each cell is empty, or displays a ball. The cells in the bottom row consist of 15 balls with different gray scales in color.

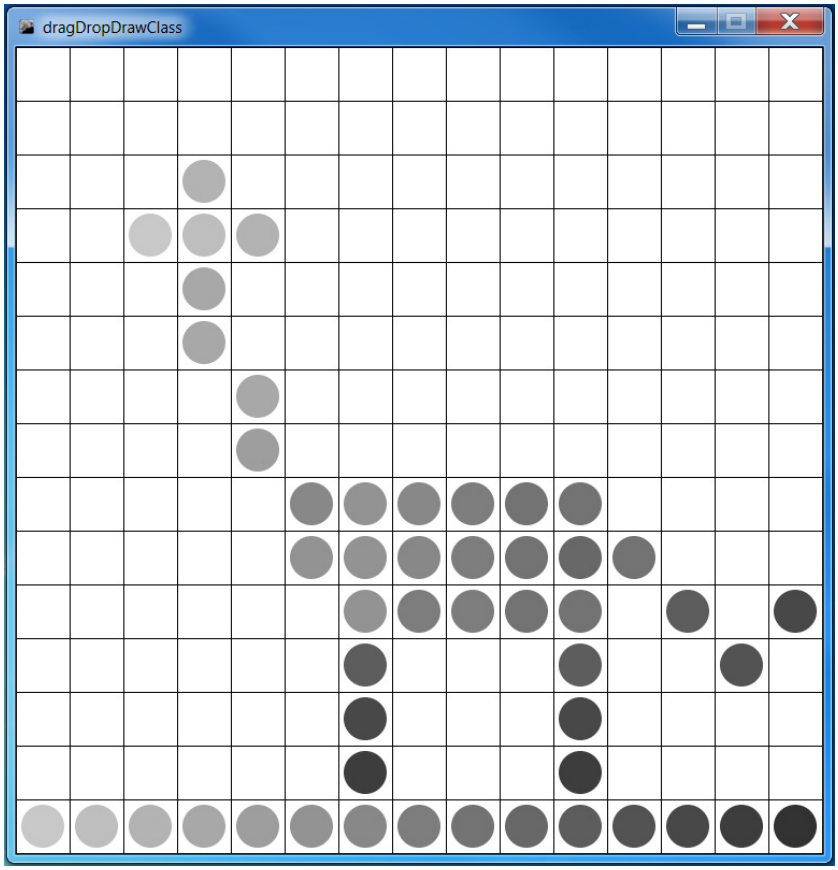


A few operations are allowed in the grid.

1. **Replicate a ball**

A ball displayed in the grid can be dragged and dropped to another cell if the destination cell is not in the bottom row. For doing so, you can left-click a ball and drag it to another cell. After releasing your mouse in a cell, the ball is dropped to the cell and displayed in the centre of the cell. In the meantime, the clicked ball is still displayed in its original cell. If originally the destination cell displays a ball, after dropping, the ball is replaced by the dropped ball.

By replicating balls, we can draw a picture.

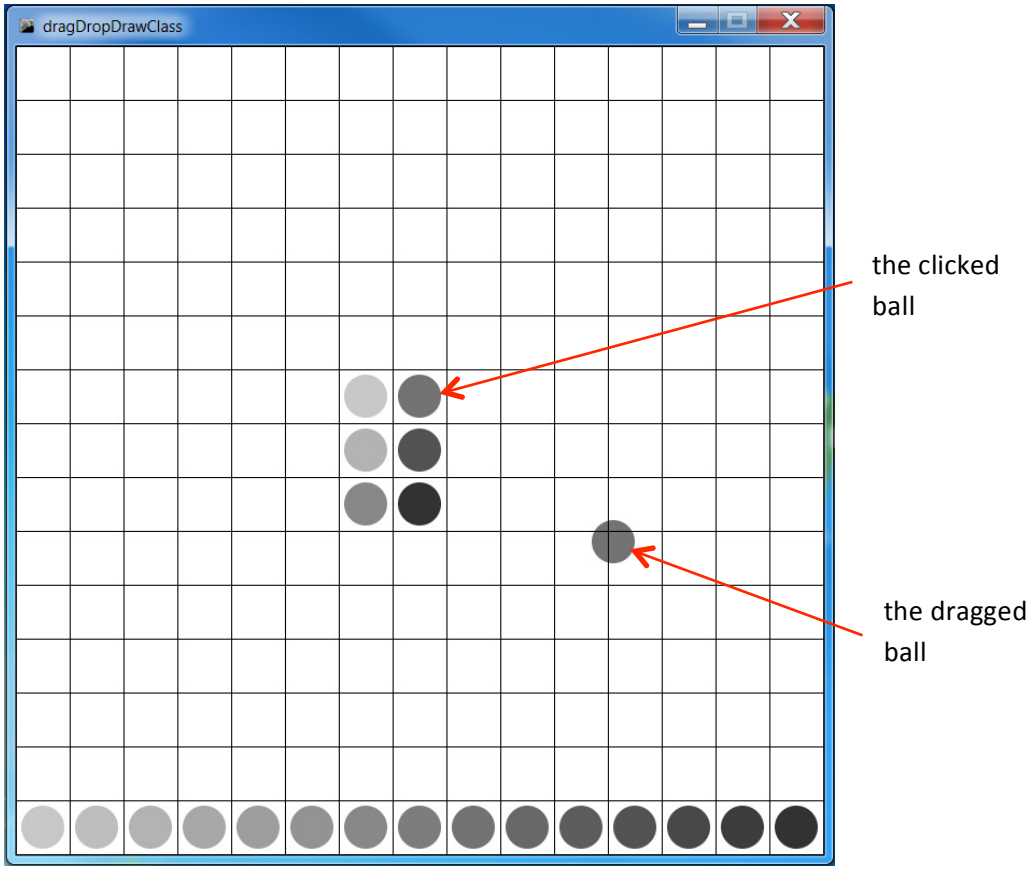


2. Reset the grid

When the space key is pressed, the grid is reset to its initial state with all balls appearing in the bottom row only (refer to the first picture).

Note the following rules.

1. Any ball in the bottom row is not replaceable;
2. A clicked ball should be displayed while it is being dragged;
3. Any ball in a cell, if not being dragged, should be displayed in the centre of the cell;
4. When displaying a dragged ball, the ball should not hide any line it covers;
5. When a ball is dropped, it should be displayed in the cell within which the mouse is released;
6. A dragged ball should not be replicated if the mouse is released out of the grid.



Requirements in your solution:

1. Define a two-dimensional array; an element in the array corresponds to a cell in the grid;
2. Define a **`class Ball`** with necessary properties, constructor(s) and methods.

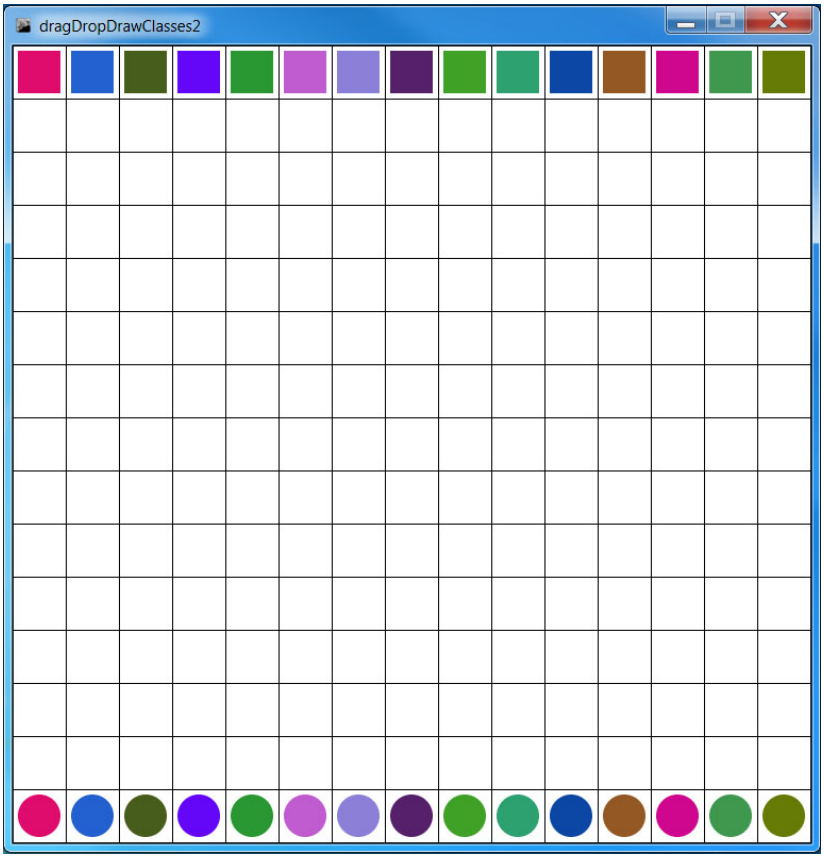
An advanced version (worth 20%)

In the advanced version, additional to balls in the bottom row, there are 15 squares appearing in the top row. These squares are not replaceable too. Both balls and squares have randomly generated RGB colors. A ball or square in grid can be dragged and dropped to another cell if the cell is in neither the top row nor the bottom row. A cell can contain one ball or one square.

In your solution of the advanced version, a **`class Square`** should be defined to represent a square.

Submission

You are allowed to submit **one pde file ONLY**, which should contain all the class(s) that you have to define.



Marking criteria:

1. (10%) Grid initialization and display with balls;
2. (15%) Drag and drop balls;
3. (30%) Definition of a two-dimensional array, an element of which corresponds to a cell in the grid;
4. (10%) Proper names of variables, functions, classes, array and methods;
5. (5%) Brief comments, appropriate use of data types , indentation and layout of code ;
6. (10%) Proper definition of **`class Ball`** with proper class instances used in the program;
7. (10%) Proper definition of **`class Square`**; Grid display with squares;
8. (10%) Drag and drop squares;