Computer Graphics
Exercises for Chapter 4

4.1 Develop a Java applet with at least two of the following image processing functionalities:

- Draw the histogram of the gray level image.
- Apply Binarization to the gray level image by choosing the threshold interactively.
- Apply the algorithm of histogram stretching studied in class to improve the contrast of the image (read the document about the algorithm).
- Apply a mirror effect to the image (horizontally or vertically).
- Apply a convolution filter different from the ones studied in class (research in Internet to find a different one).

Program the applet to read a specific color RGB image from a project folder called "Images".

4.2 Implement an applet similar to the Windows Paint application to make black and white drawings like the one shown in the next figure. The applet should have only one drawing tool (a pencil) that works in the following manner:

- Draws black pixels at the mouse cursor coordinates when the user presses the left button and drags the mouse;
- Draws white pixels at the mouse cursor coordinates when the user presses the right button and drags the mouse.

Use the class **WritableRaster** to access and change the color of the pixels.

Add a button to the applet in order to print the image when the user presses the button.

4.3 Implement a very simple game invented by you, where the gamer must move an object from point A to point B (using the mouse or the keyboard) without touching other animated objects in the scene.

The following figure illustrates the idea. In this case the gamer must move the ball from the bottom-left corner to the top-right corner without touching any of the crosses that rotate in place.

Do not implement the game of the figure, implement your won idea. Use what you learn until now like different paints, personalize shapes, interaction between shapes, etc.