Array lists

1. Learning aims

At the end of this exercise you should be able to:

- Build your own classes
- Use arrays and arrayLists with objects
- Work with the *PVector* class

2. Course Material

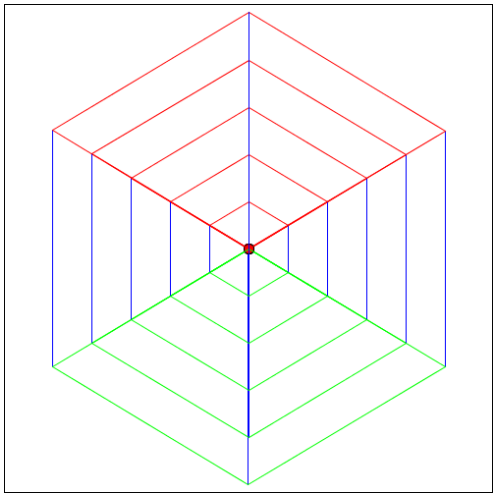
To make the exercises of this lab, you need the following parts of the book

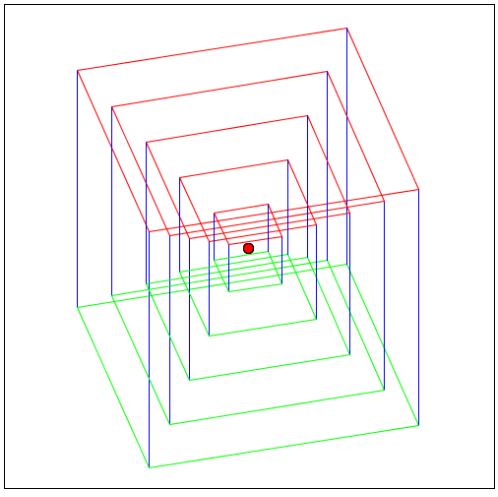
- Processing : A programming Handbook for Visual Designers and Artists (C. Reas & B. Fry)
- Slides PDF file
- https://www.youtube.com/results?search_query=processing+tutorial+from+beginner+to+games

3. Lab exercises

3.1. Sketch Demo_04_01_CubeControl

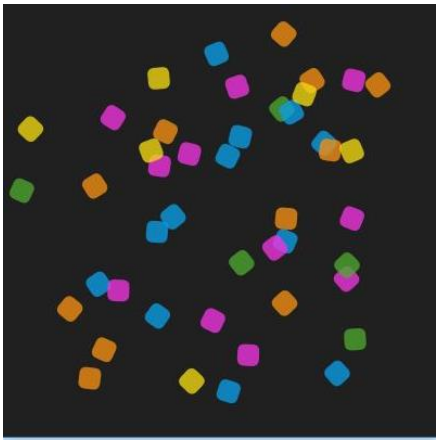
In this demo, we will use the exercise of Lab 3 – Classes-Arrays. Here we will add a cube when the user hits the 'a' key. When the user presses the mouse button, the cubes rotate. When a number between 1 and 5 is hit, the cube at that position will be removed.



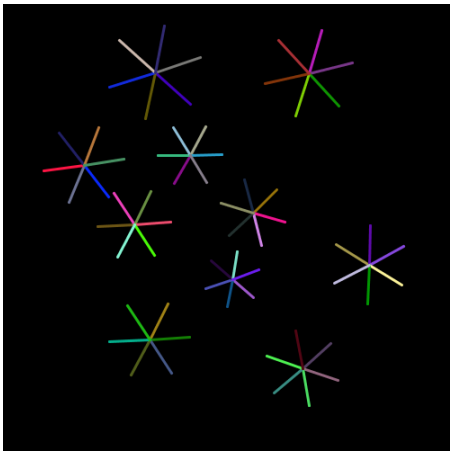


3.2. Sketch Demo_04_02_Dots

In this demo, we will create an arrayList that contains the position and colour for a shape. When the user presses the mouse button, a new shape is added to the arrayList. Up to 300 shapes can be added and when the spacebar is hit, the arrayList is reset.



3.3. Sketch Lab_04_01_RisingStars



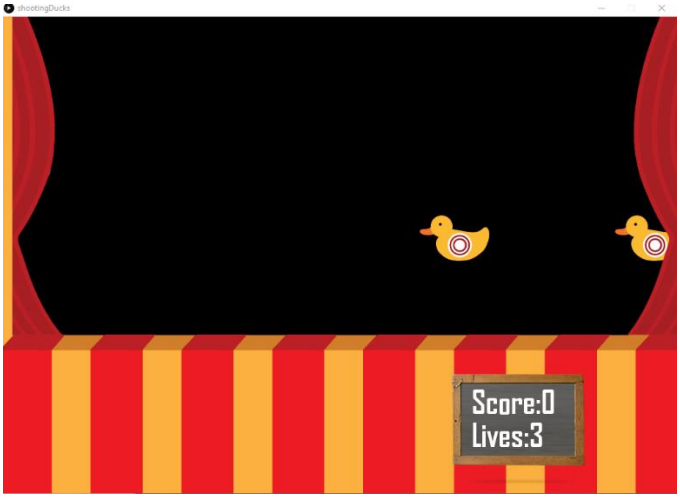
In this exercise, we draw stars.

The class **star**, is composed out of 6 lines and has a specific position (PVector). The 6 lines are divided over the complete circle, calculate the correct angle for each line and create the line. Each star-object is added to the array-list.

When the user presses the mouse-button, a star is drawn at the mouse-position.

3.4. Sketch Lab_04_02_ShootingDucks

The aim of the game is to shoot all the ducks by clicking on the duck. When a duck is hit, the score increases. If the player has missed 3 ducks, the game ends.



For this exercise, follow the instructions below:

- The window is 1020 x 720. Use the image "**background.png**" as background with a black fill color.
- Use the following font: **AgencyFB-Bold-48.vlw**
- An **arrayList** is **initialized** at startup and a first **duck object** is added to the array, with a starting position just outside the right side of the sketch window. **Every second** a new duck is added to the array.
- Create a **class** "**Duck**" with the required constructor(s) and methods.
- The ducks move across the screen from right to left, at a **speed** of **5** pixels (per frame), at a fixed **y-position** of **300** pixels.
- A **scoreboard** (scoreboard.png) is displayed at the bottom right (xpos= 2/3 of width, ypos=180 pixels of bottom). On this scoreboard the score is visible as well as the number of remaining lives.
- When the user **clicks inside the range of a duck** with the left mouse button, this object is no longer shown and is **removed** from the **array**. The score is increased by 1 point.

4. Reflection

What is the difference between an array and an ArrayList?
(advantages/disadvantages)

5. Saving instructions

- Make a folder named 1DAE***xx***_PROGFA**2**_**04**_***name_firstname***
  (e.g. 1DAE03_PROGFA**2**_**04**_Van_der_Veken_Jan)
- Add all the folders with the corresponding Lab04 pde-files.