



National University of Sciences and Technology (NUST)
School of Electrical Engineering and Computer Science

Department of Computing

CS 212: Object Oriented Programming

Class: BESE-7AB

Lab 11: Graphics & Java2D

Date: May 19, 2017

Instructor:

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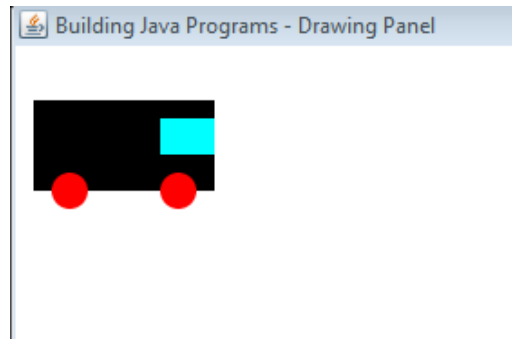


Learning Objectives

The learning objective of this lab is to understand and practice the concept of Graphics and Java2D APIs in Java.

Lab Task #1

The following Java Program uses Java Graphics APIs to draw a truck on a Drawing Panel:



```
import java.awt.Color;
import java.awt.Graphics;

public class Truck
{
    public static void main(String[] args)
    {
        DrawingPanel panel = new DrawingPanel(500, 500);
        panel.setBackground(Color.WHITE);
        Graphics g = panel.getGraphics();

        // recall the x and y indicate the upper left
        // corner of the rectangle or oval bounding box
        // draw the body
        g.setColor(Color.BLACK);
        g.fillRect(10, 30, 100, 50); // x, y, width, ht

        // draw the wheels
        g.setColor(Color.RED);
        g.fillOval(20, 70, 20, 20);
        g.fillOval(80, 70, 20, 20);

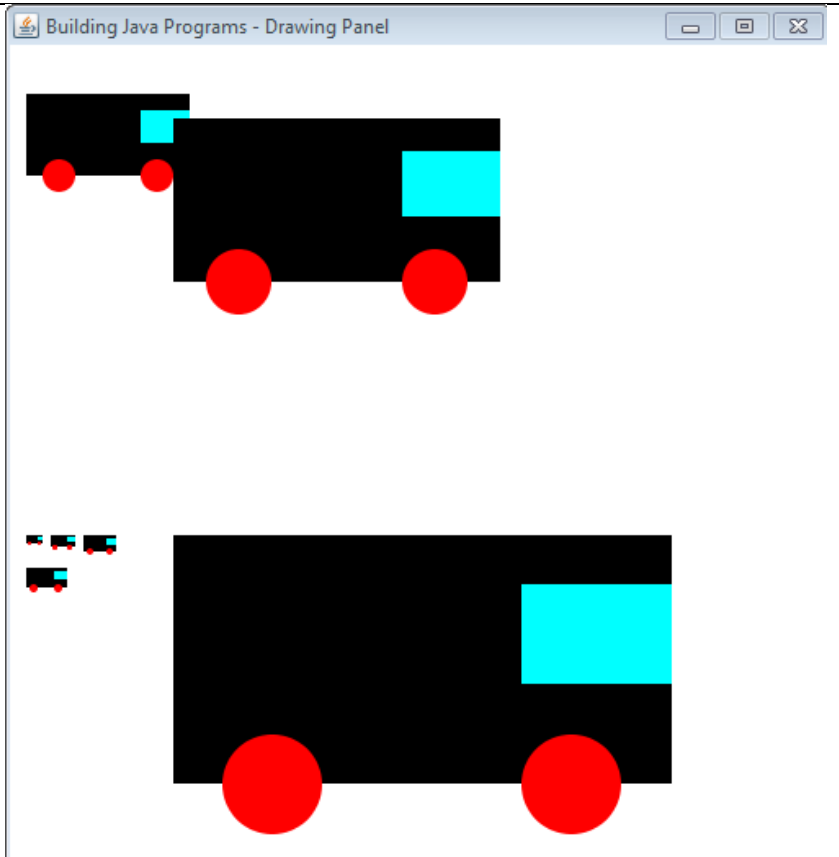
        // draw the window
        g.setColor(Color.CYAN);
        g.fillRect(80, 40, 30, 20);
    }
}
```



Your task is to change the program so that it can draw trucks of any "size" at any location. The method you write should accept 4 parameters: the Graphics object, the upper left x and y of the body of the truck, and a "size". You can use whatever size you want but the rest of the truck shall be proportional as in the hard coded example above.

The following calls to the method would produce the output shown:

```
drawTruck(g, 10, 30, 20);  
drawTruck(g, 100, 45, 40);  
drawTruck(g, 10, 300, 2);  
drawTruck(g, 100, 300, 61);  
drawTruck(g, 25, 300, 3);  
drawTruck(g, 45, 300, 4);  
drawTruck(g, 10, 320, 5);
```

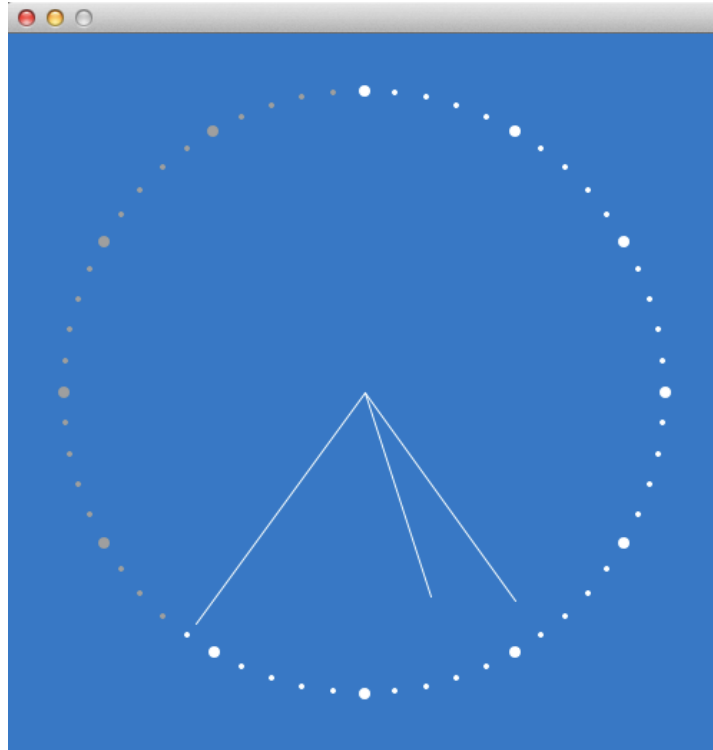


The initial code for `Truck.java` and `DrawingPanel.java` is available on LMS.



Lab Task #2

In this task you will create an Analog Clock, as shown below, using the Java2D APIs:



This clock has three hands for **hours**, **minutes** and **seconds**, which are identified by their relative lengths. The clock operates as expected and gets the system time from the `java.util.Calendar` class. The dots on the dial have different sizes, depending on their position and change color as the seconds hand moves around.

In order to see how it works, you can download the **Clock.class** & **ClockPanel.class** files from LMS and test it using the following command:

```
java Clock
```

An initial template **Clock.java** is provided on LMS to get you started. Pay special attention to the TODO comments and fill in the appropriate code. The initial **Clock.java** will compile but it will not be a working clock.



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Hand in

Hand in the source code from this lab at the appropriate location on the LMS system. You should hand in a single compressed/archived file named Lab_11_<Your CMS_ID. Your_NAME >.zip (without angle brackets) that contains ONLY the following files.

- 1) All completed java source files representing the work accomplished for this lab. The files should contain author in the comments at the top.
- 2) A plain text file named **README.TXT** that includes a) author information at the beginning, b) a brief explanation of the lab, and c) any comments, or suggestions.

To Receive Credit

1. By showing up on time for lab, working on the lab solution, and staying to the end of the class period, only then you can receive full credit for the lab assignment.
2. Comment your program heavily. Intelligent comments and a clean, readable formatting of your code account for 20% of your grade.
3. The lab time is not intended as free time for working on your programming/other assignments. Only if you have completely solved the lab assignment, including all challenges, and have had your work checked off for completeness by your TA/Lab Engineer should you begin the programming/other assignments.