4.3 (optional) Graphics Supplement: Outline
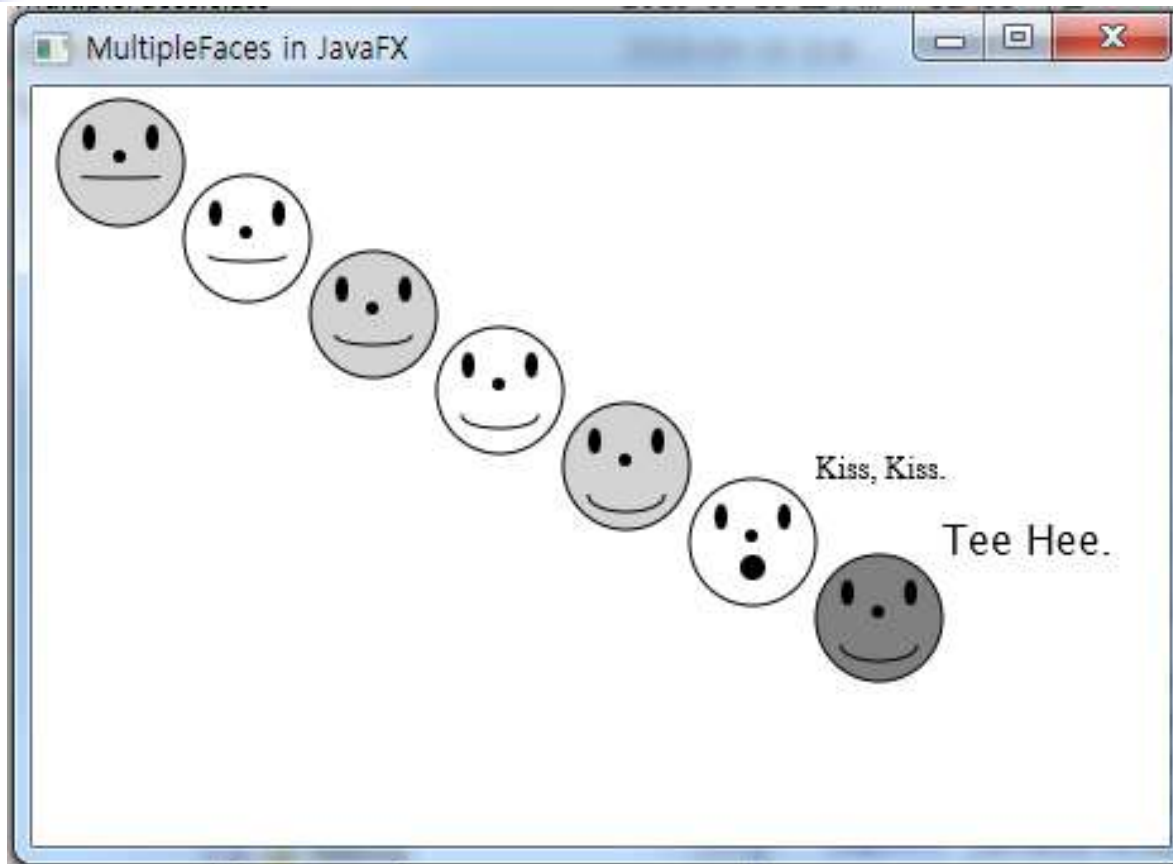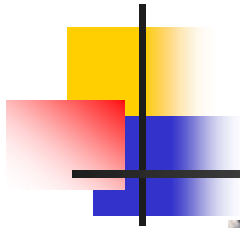
- JavaFX application that uses a loop to produce its drawing
- The Methods `setFont & fillText` to write text in the window

Programming Example : A Multiple Face Applet (LISTING 4.9)

```java
import javafx.application.Application;
import javafx.scene.canvas.Canvas;
import javafx.scene.Scene;
import javafx.scene.Group;
import javafx.stage.Stage;
import javafx.scene.canvas.GraphicsContext;
import javafx.scene.shape.ArcType;
import javafx.scene.paint.Color;
import javafx.scene.text.Font;

public class MultipleFaces extends Application
{
    public static final int WINDOW_WIDTH = 450;
    public static final int WINDOW_HEIGHT = 300;

    public static final int FACE_DIAMETER = 50;
    public static final int X_FACE0 = 10;
    public static final int Y_FACE0 = 5;
```

```java
public static final int EYE_WIDTH = 5;
    public static final int EYE_HEIGHT = 10;
    public static final int X_RIGHT_EYE0 = 20;
    public static final int Y_RIGHT_EYE0 = 15;
    public static final int X_LEFT_EYE0 = 45;
    public static final int Y_LEFT_EYE0 = Y_RIGHT_EYE0;

    public static final int NOSE_DIAMETER = 5;
    public static final int X_NOSE0 = 32;
    public static final int Y_NOSE0 = 25;

    public static final int MOUTH_WIDTH = 30;
    public static final int MOUTH_HEIGHT0 = 0;
    public static final int X_MOUTH0 = 20;
    public static final int Y_MOUTH0 = 35;
    public static final int MOUTH_START_ANGLE = 180;
    public static final int MOUTH_EXTENT_ANGLE = 180;

public static void main(String[] args)
{
    launch(args);
}
```

```java
@Override
  public void start(Stage primaryStage) throws Exception
  {
        Group root = new Group();
        Scene scene = new Scene(root);

        Canvas canvas = new Canvas(WINDOW_WIDTH, WINDOW_HEIGHT);
        GraphicsContext gc = canvas.getGraphicsContext2D();

        int i, xOffset, yOffset; //Want i to exist after the loop ends

        for (i = 0; i <= 4; i++)
        {//Draw one face:
                xOffset = 50 * i;
                yOffset = 30 * i;

                //Draw face circle:
                if (i % 2 == 0)//if i is even
                {//Make face light gray
                        gc.setFill(Color.LIGHTGRAY);
                        gc.fillOval(X_FACE0 + xOffset, Y_FACE0 + 30 * i,
                                        FACE_DIAMETER, FACE_DIAMETER);
                }
                gc.setFill(Color.BLACK);
                gc.strokeOval(X_FACE0 + xOffset, Y_FACE0 + yOffset,
                                FACE_DIAMETER, FACE_DIAMETER);
```

```
                    //Draw eyes:
                    gc.setFill(Color.BLACK);
                    gc.fillOval(X_RIGHT_EYE0 + xOffset, Y_RIGHT_EYE0 + yOffset,
                                EYE_WIDTH, EYE_HEIGHT);
                    gc.fillOval(X_LEFT_EYE0 + xOffset, Y_LEFT_EYE0 + yOffset,
                                EYE_WIDTH, EYE_HEIGHT);
                    //Draw nose:
                    gc.setFill(Color.BLACK);
                    gc.fillOval(X_NOSE0 + xOffset, Y_NOSE0 + yOffset,
                                NOSE_DIAMETER, NOSE_DIAMETER);
                    //Draw mouth:
                    gc.setFill(Color.BLACK);
                    gc.strokeArc(X_MOUTH0 + xOffset, Y_MOUTH0 + yOffset,
                                MOUTH_WIDTH, MOUTH_HEIGHT0 + 3 * i + 1,
                                MOUTH_START_ANGLE,
MOUTH_EXTENT_ANGLE,

                                ArcType.OPEN);
            }
        //i is 5 when the previous loop ends
        xOffset = 50 * i;
        yOffset = 30 * i;
```
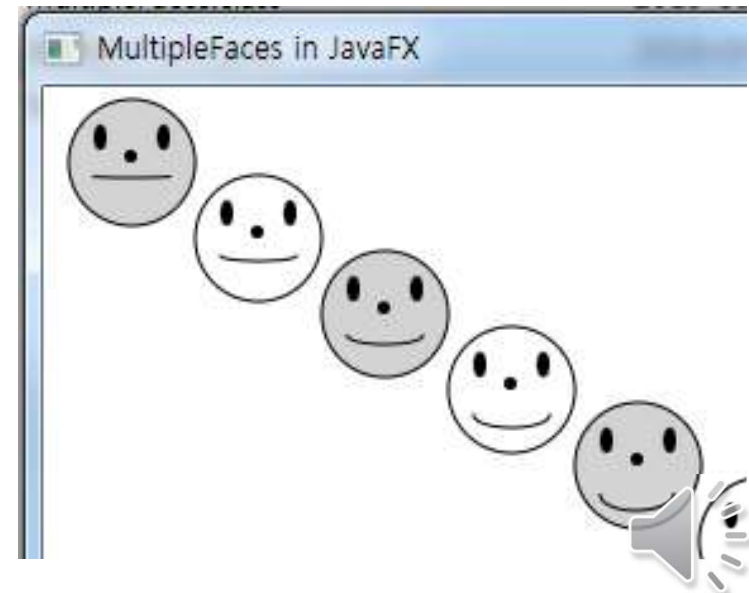
```java
//Draw kissing face:
//Draw face circle:
gc.setFill(Color.BLACK);
gc.strokeOval(X_FACE0 + xOffset, Y_FACE0 + yOffset,
                        FACE_DIAMETER, FACE_DIAMETER);
//Draw eyes:
gc.setFill(Color.BLACK);
gc.fillOval(X_RIGHT_EYE0 + xOffset, Y_RIGHT_EYE0 + yOffset,
                        EYE_WIDTH, EYE_HEIGHT);
gc.fillOval(X_LEFT_EYE0 + xOffset, Y_LEFT_EYE0 + yOffset,
                        EYE_WIDTH, EYE_HEIGHT);
//Draw nose:
gc.setFill(Color.BLACK);
gc.fillOval(X_NOSE0 + xOffset, Y_NOSE0 + yOffset,
                        NOSE_DIAMETER, NOSE_DIAMETER);
//Draw mouth in shape of a kiss:
gc.setFill(Color.BLACK);
gc.fillOval(X_MOUTH0 + xOffset + 10, Y_MOUTH0 + yOffset,
                        MOUTH_WIDTH - 20, MOUTH_WIDTH - 20);
//Add text in Times New Roman, 12 point:
gc.setFont(Font.font("Times New Roman", 12));
gc.fillText("Kiss, Kiss.",
                        X_FACE0 + xOffset + FACE_DIAMETER, Y_FACE0 +
yOffset);
```
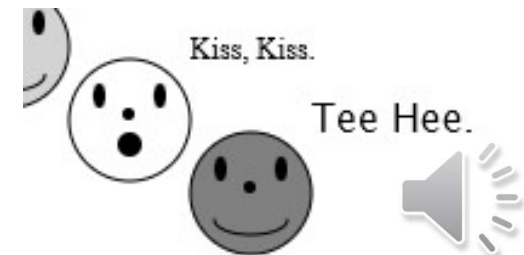
Kiss, Kiss.

Tee Hee.

```java
//Draw blushing face:
i++;
xOffset = 50 * i;
yOffset = 30 * i;

//Draw face circle:
gc.setFill(Color.GRAY);
gc.fillOval(X_FACE0 + xOffset, Y_FACE0 + yOffset,
                              FACE_DIAMETER, FACE_DIAMETER);
gc.setFill(Color.BLACK);
gc.strokeOval(X_FACE0 + xOffset, Y_FACE0 + yOffset,
                              FACE_DIAMETER, FACE_DIAMETER);
//Draw eyes:
gc.setFill(Color.BLACK);
gc.fillOval(X_RIGHT_EYE0 + xOffset, Y_RIGHT_EYE0 + yOffset,
                              EYE_WIDTH, EYE_HEIGHT);
gc.fillOval(X_LEFT_EYE0 + xOffset, Y_LEFT_EYE0 + yOffset,
                              EYE_WIDTH, EYE_HEIGHT);
//Draw nose:
gc.setFill(Color.BLACK);
gc.fillOval(X_NOSE0 + xOffset, Y_NOSE0 + yOffset,
                              NOSE_DIAMETER, NOSE_DIAMETER);
//Draw mouth:
gc.setFill(Color.BLACK);
gc.strokeArc(X_MOUTH0 + xOffset, Y_MOUTH0 + yOffset, MOUTH_WIDTH,
                      MOUTH_HEIGHT0 + 3 * (i - 2),
                      MOUTH_START_ANGLE, MOUTH_EXTENT_ANGLE, ArcType.OPEN);
//Add text in Courier New Font, 16 point:
gc.setFont(Font.font("Courier New ", 16));
gc.fillText("Tee Hee.",
                      X_FACE0 + xOffset + FACE_DIAMETER, Y_FACE0 + yOffset);

root.getChildren().add(canvas);
primaryStage.setTitle("MultipleFaces in JavaFX");
primaryStage.setScene(scene);
primaryStage.show();
        }
}
```
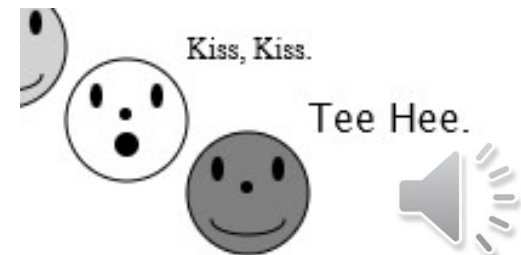

Kiss, Kiss.

Tee Hee.

Drawing Text

- Set the current font to Times New Roman in 12 point.

  `gc.setFont(Font.font("Times New Roman",12);`

- Write the word "Hello" String at the point (10,20) in the current font

  `gc.fillText("Hello",10,20);`

```
//Add text in Courier New Font, 16 point:
gc.setFont(Font.font("Courier New ", 16));
gc.fillText("Tee Hee.",
                 X_FACE0 + xOffset + FACE_DIAMETER, Y_FACE0 + yOffset);
```