1.4 (optional) Graphics Supplement: Outline

- 1. A Sample JavaFX Application
- 2. Size and Position of Figures
- 3. Drawing Ovals and Circles
- 4. Drawing Arcs

JavaFX

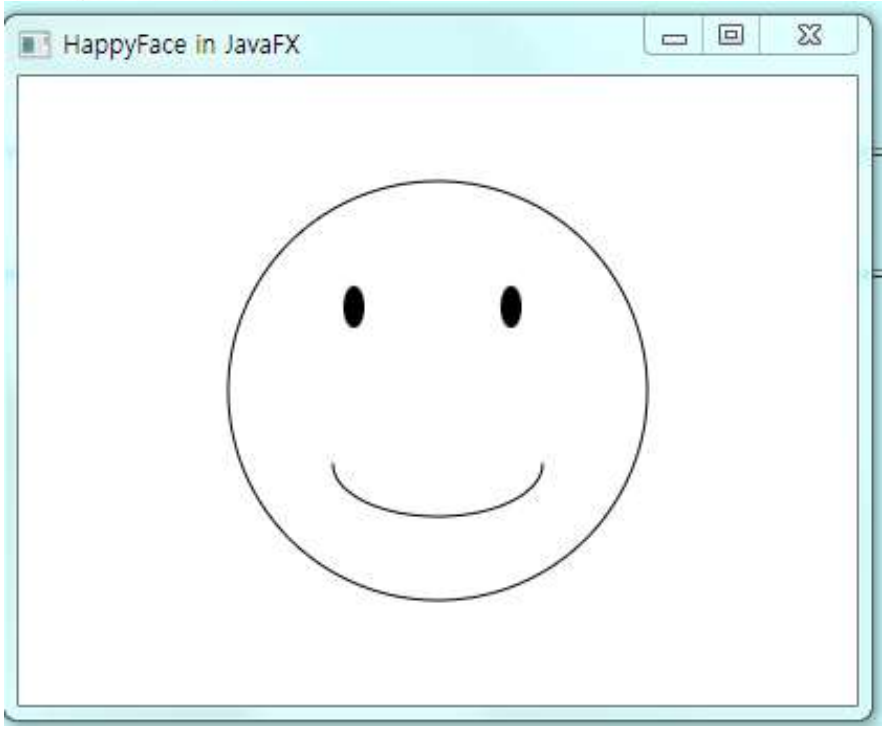
- JavaFX is a set of [illegible] that allow Java programmers to create graphics and media applications
  - 2D, 3D games
  - Visual effects
  - Touch-enabled applications
  - Successor to AWT and Swing for making graphical applications

  - In JavaFX you add *scenes* to the [illegible]. A *canvas* is an object that you can draw shapes on.

A Sample JavaFX Application

- View sample program Listing 1.2
  - **`class HappyFace`**

Program Output



Sample screen output

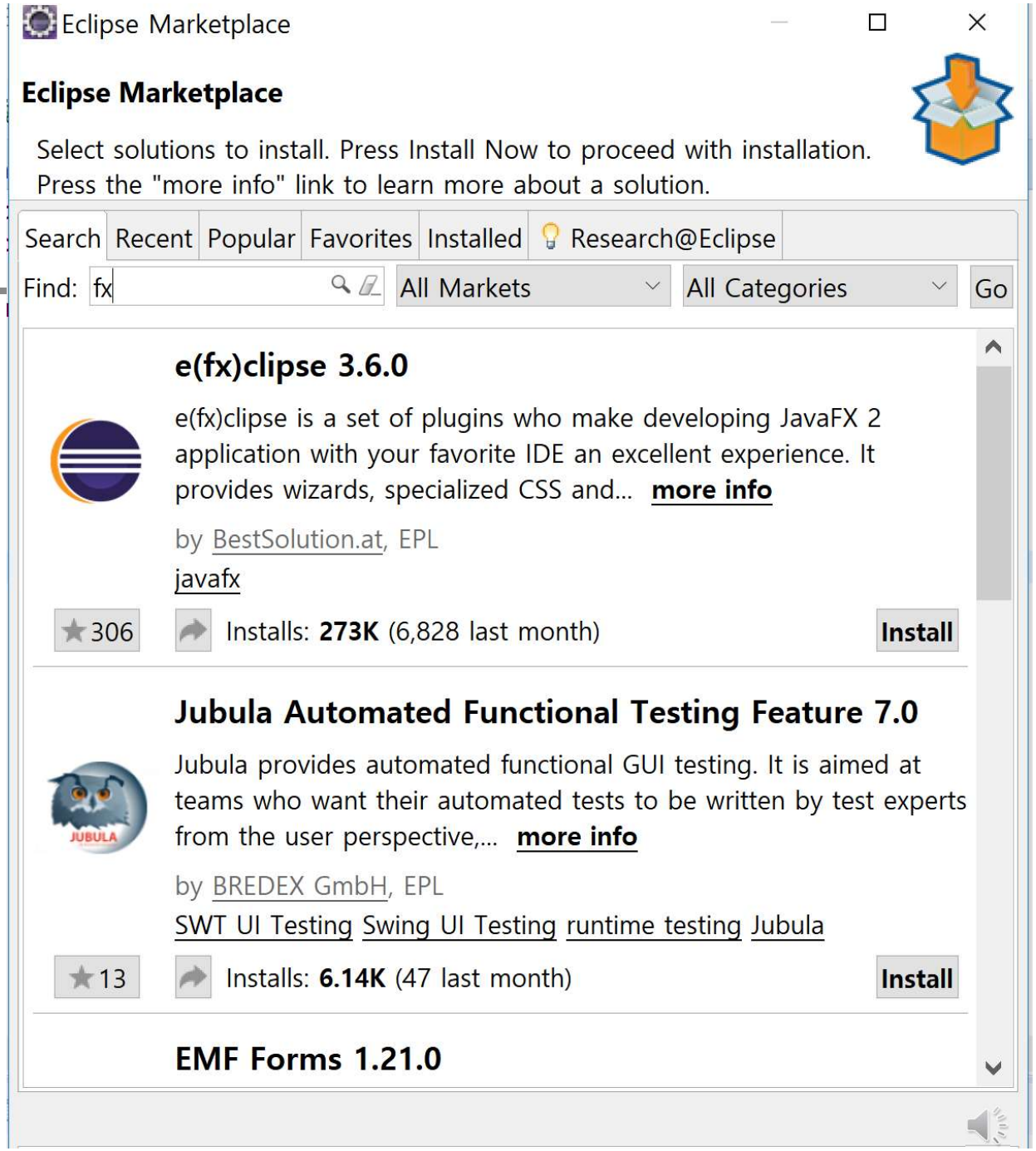
// Listing 1.2

```
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;

public class HappyFace extends Application
{
  public static void main(String[] args)
  {
    launch(args);
  }

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

            Canvas canvas = new Canvas(400, 300);
            GraphicsContext gc = canvas.getGraphicsContext2D();
            gc.strokeOval(100, 50, 200, 200);
            gc.fillOval(155, 100, 10, 20);
            gc.fillOval(230, 100, 10, 20);
            gc.strokeArc(150, 160, 100, 50, 180, 180, ArcType.OPEN);

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

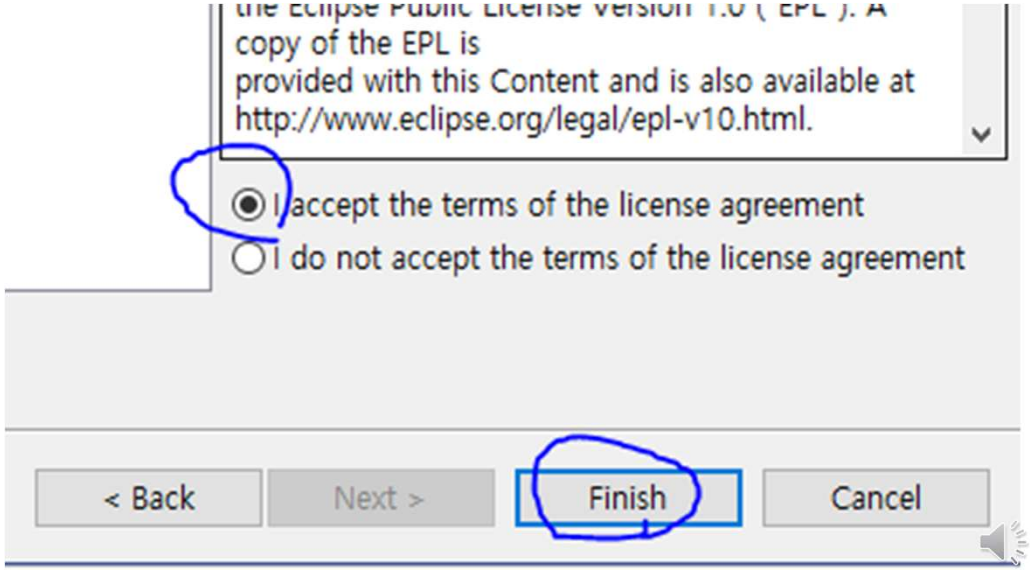
이클립스에서 JavaFX 설치하기

- 1) 이클립스를 키고 Help -> eclipse Market place에 접속
- 2) 검색에서 fx로 검색을 하면 e(fx)clipse 플러그인이 나옴 (이클립스 마켓플레이스는 이클립스에서 사용할 다양한 플러그인을 받아서 설치하는 곳)

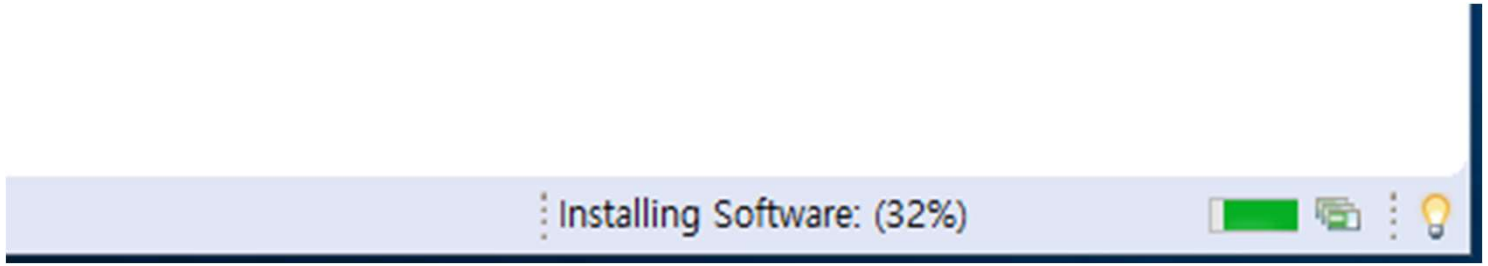
- 3) Install 버튼을 눌러서 설치
- 4) 두 설치가 완료된 후에는 이클립스를 반드시 재시작해주어야 합니다.
- (반드시 최신버전의 이클립스를 사용해야함. 구버전의 이클립스를 사용할 경우 설치가 안될 수 있음)



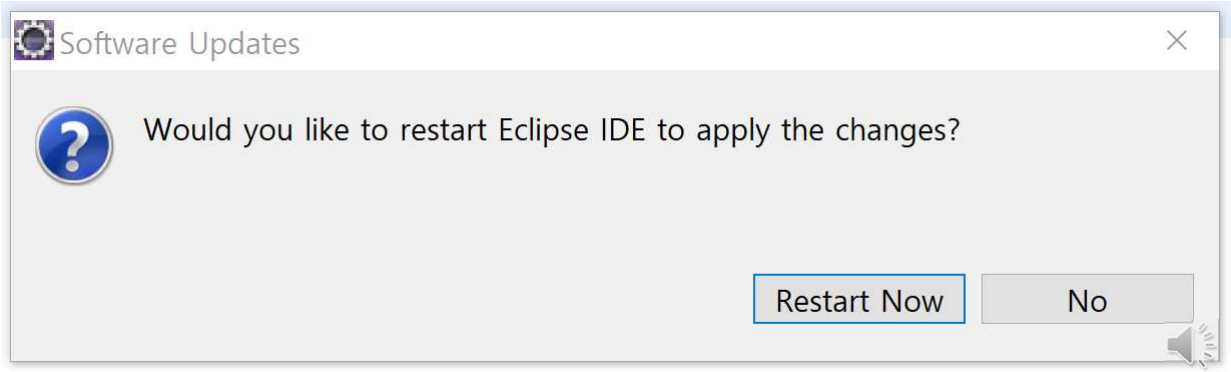
- 설치 중간에 나오는 라이선스 관련 물음은 I accept the terms of the license agreement 를 선택후 finish를 눌러줌



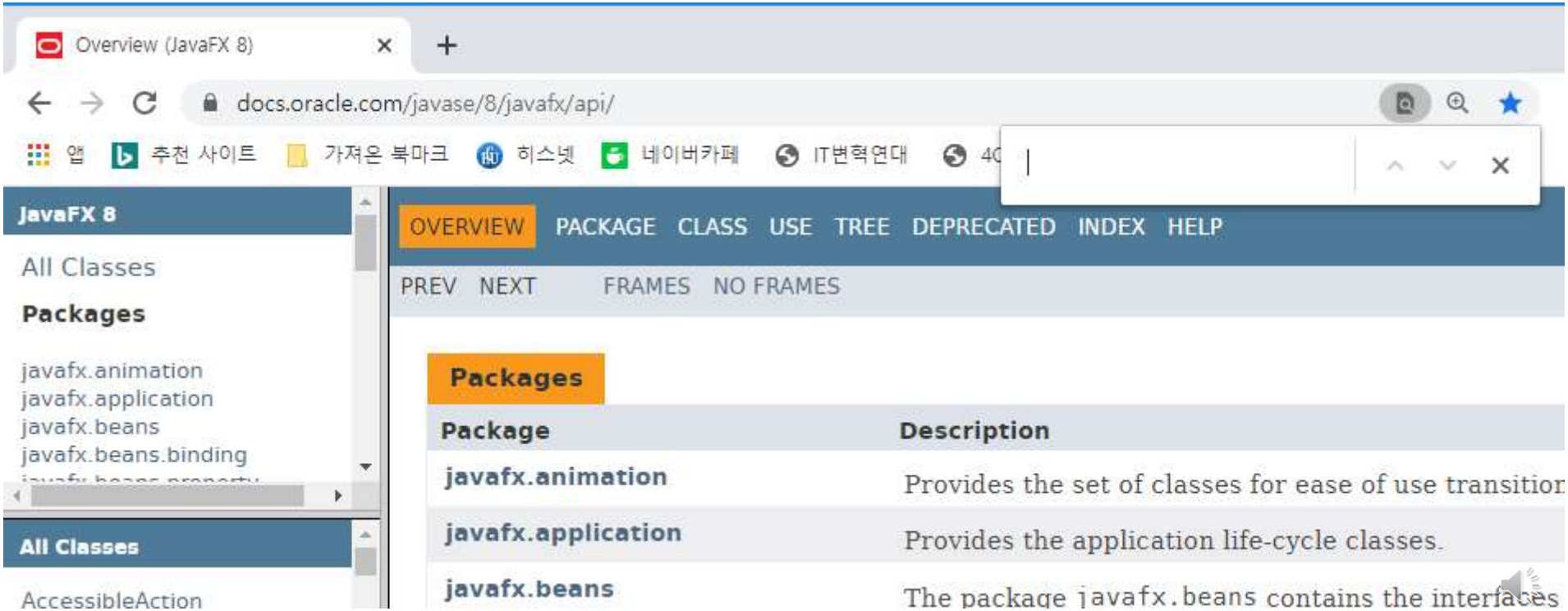
- 하단에 초록색 게이지가 올라가면서 설치되고 있는 것을 확인할 수 있음



- Restart



- https://docs.oracle.com/javase/8/javafx/api/



A Sample JavaFX Application

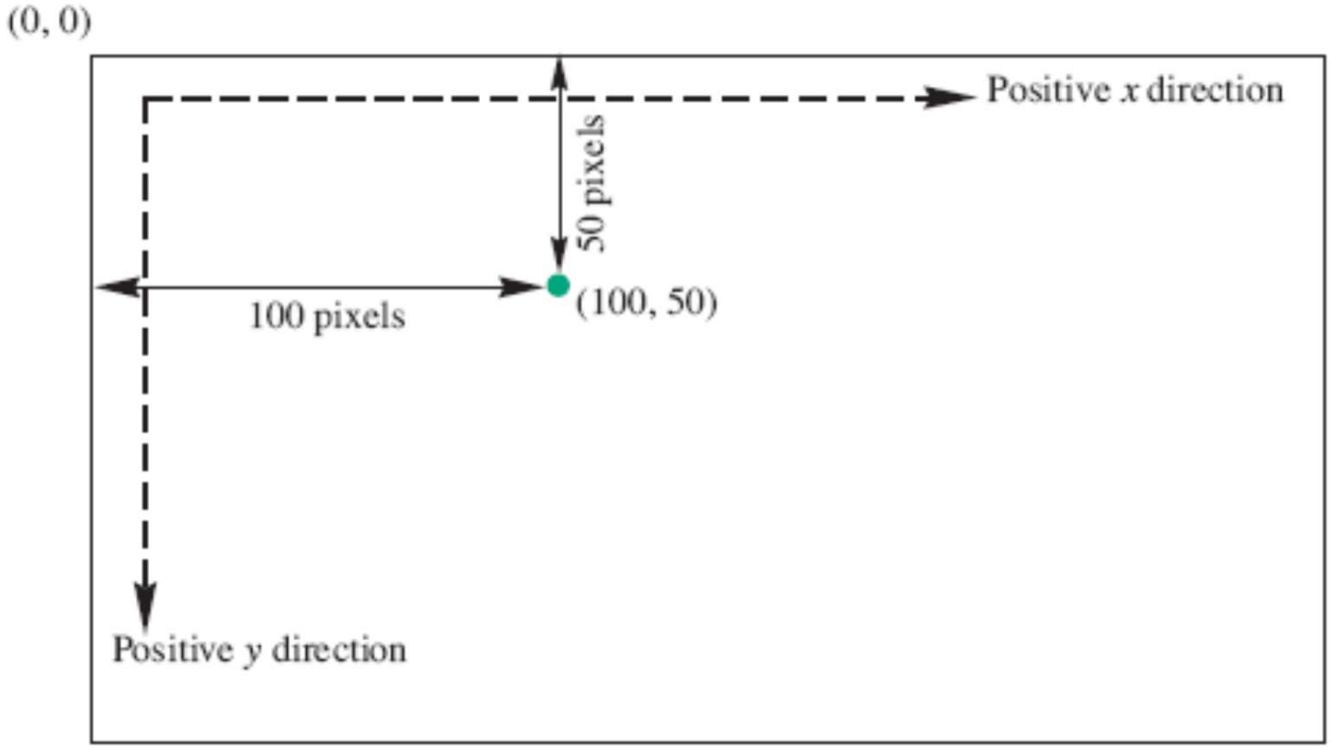
- The [illegible] method
  - the starting method for a JavaFX application, not t he *main* method
- The first four lines of the **`start`** method
  - set up a canvas on a scene for you to draw simple graphics

// Listing 1.2

```
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;

public class HappyFace extends Application
{
  public static void main(String[] args)
  {
    launch(args);
  }

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

        Canvas canvas = new Canvas(400, 300);
        GraphicsContext gc = canvas.getGraphicsContext2D();
        gc.strokeOval(100, 50, 200, 200);
        gc.fillOval(155, 100, 10, 20);
        gc.fillOval(230, 100, 10, 20);
        gc.strokeArc(150, 160, 100, 50, 180, 180, ArcType.OPEN);

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

Screen Coordinate System

- Figure 1.6



Screen Coordinate System

- The x-coordinate the the number of pix
  els from the left.
- The y-coordinate is the number of pixel
  s from the top (not from the bottom).

Drawing Ovals and Circles

- The [redacted] method
  - draws only the outline of the oval.

```
gc.[redacted](100, 50, 90, 50);
```

- The [redacted] method
  - draws a filled-in oval.

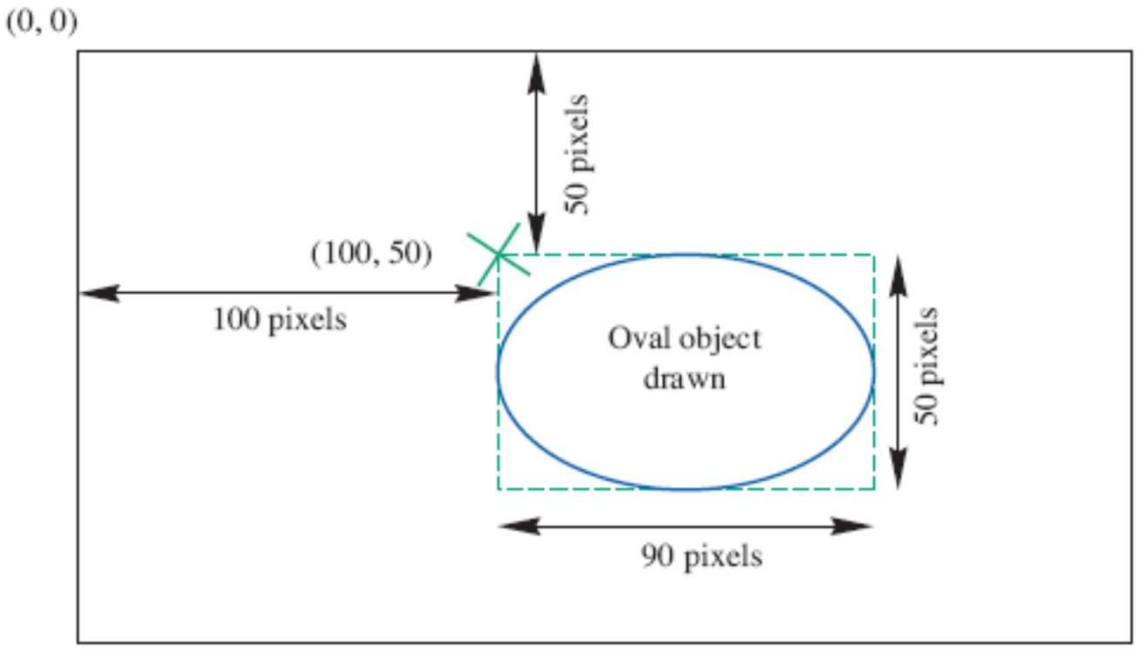
```
gc.[redacted](100, 50, 90, 50);
```

Drawing Ovals and Circles

- The **`strokeOval`** and **`fillOval`** methods tak e four arguments.
  - The first two arguments indicate the upper-left cor ner of an invisible rectangle around the oval.
  - The last two arguments indicate the width and heig ht of the oval.
- A circle is just an oval whose height is the sa me as its width.

Drawing Ovals and Circles

- Figure1.7 The Oval Drawn by `gc.strokeOval(100, 50, 90, 50)`



Size and Positions of Figures

- Sizes and positions in a JavaFX program are given in

- Think of the display surface for the applet as being a two-dimensional grid of indivi dual pixels.

Drawing Arcs

- The [redacted] method draws an arc.

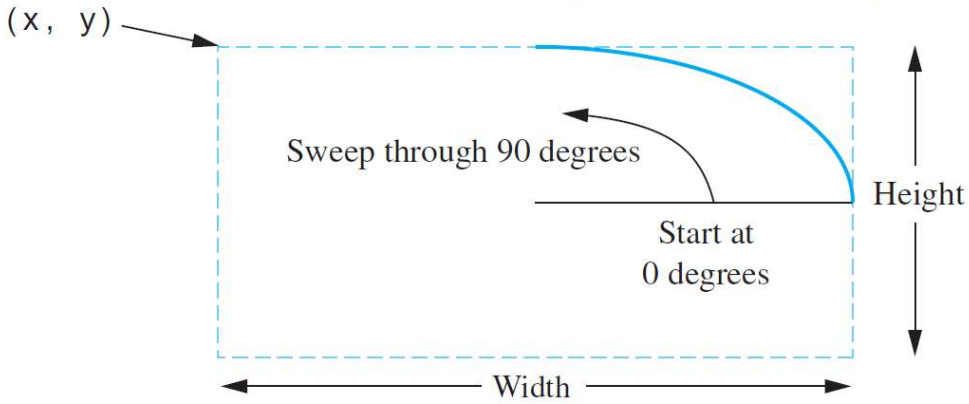
```
[redacted](100, 50, 200, 200, 180, 180,
          ArcType.OPEN);
```

- The [redacted] method takes seven arguments.
  - The first four arguments are the same as the four arguments needed by the [redacted] method.
  - The next two arguments indicate where the arc starts, and the number of degrees through which is sweeps.
  - 0 degrees is horizontal and to the right.
  - The last argument indicates if the arc is open or closed
    - closure type (Round, Chord, Open)

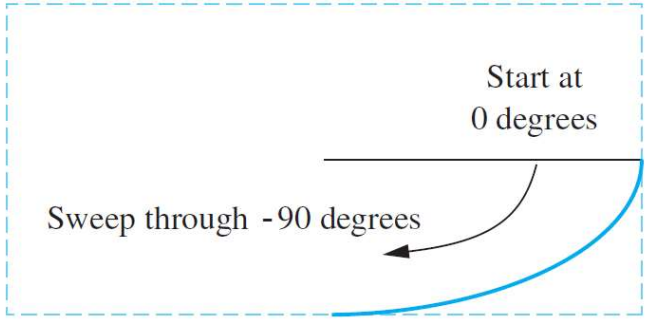
Specifying an Arc

FIGURE 1.8 Specifying an Arc

(a) `gc.strokeArc(x, y, width, height, 0, 90, ArcType.OPEN);`



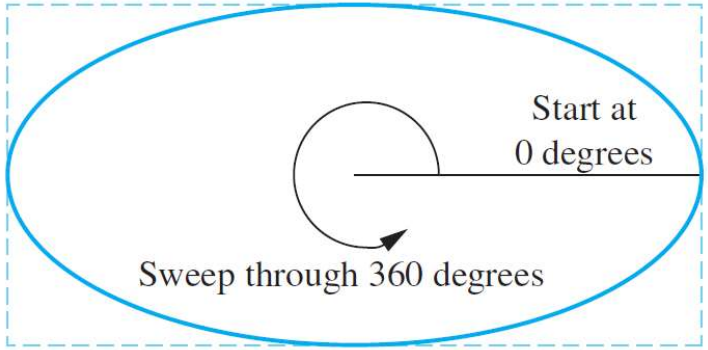
(b) `gc.strokeArc(x, y, width, height, 0, -90, ArcType.OPEN);`



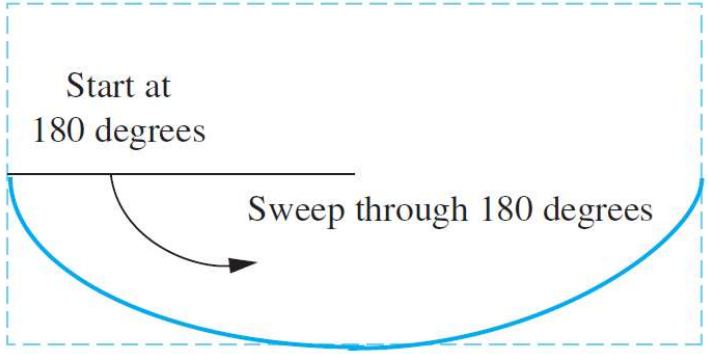
Chord

Specifying an Arc

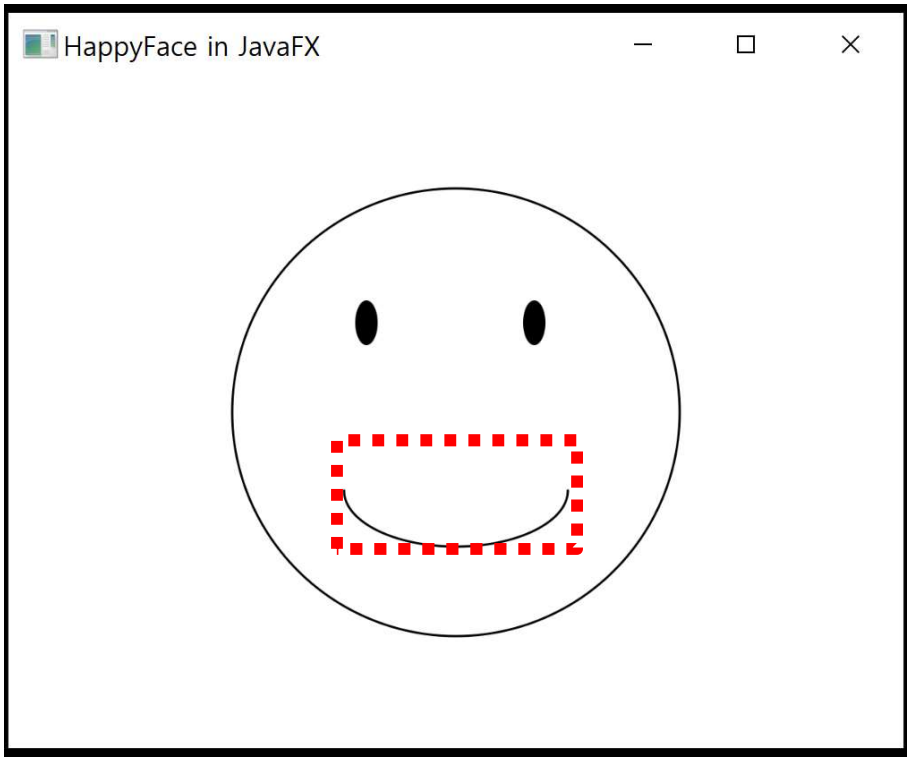
(c) `gc.strokeArc(x, y, width, height, 0, 360, ArcType.OPEN);`



(d) `gc.strokeArc(x, y, width, height, 180, 180, ArcType.OPEN);`



// Listing 1.2




```
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import javafx.scene.Scene;
import javafx.scene.Group;
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            gc.strokeArc(150, 160, 100, 50, 180, 180, ArcType.OPEN);

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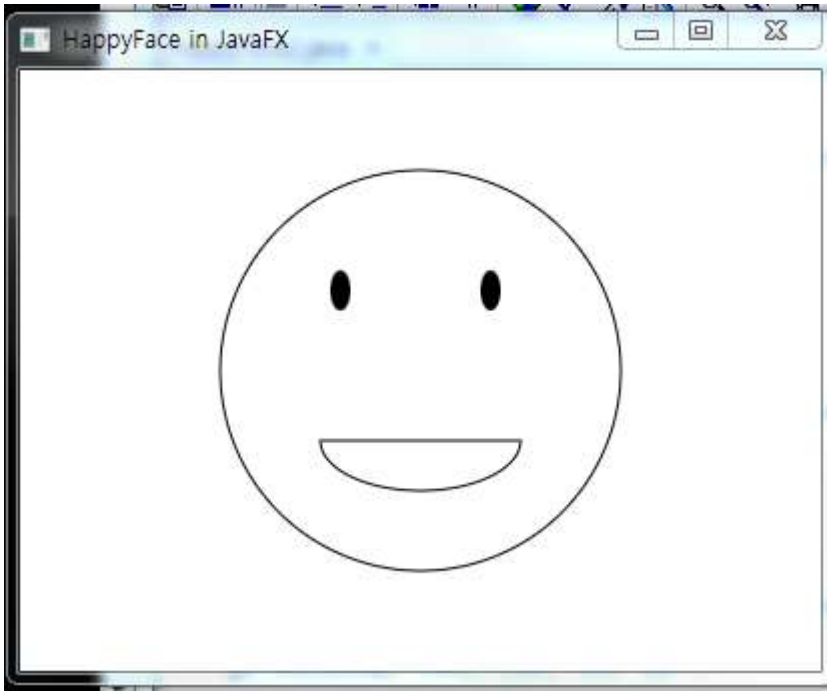
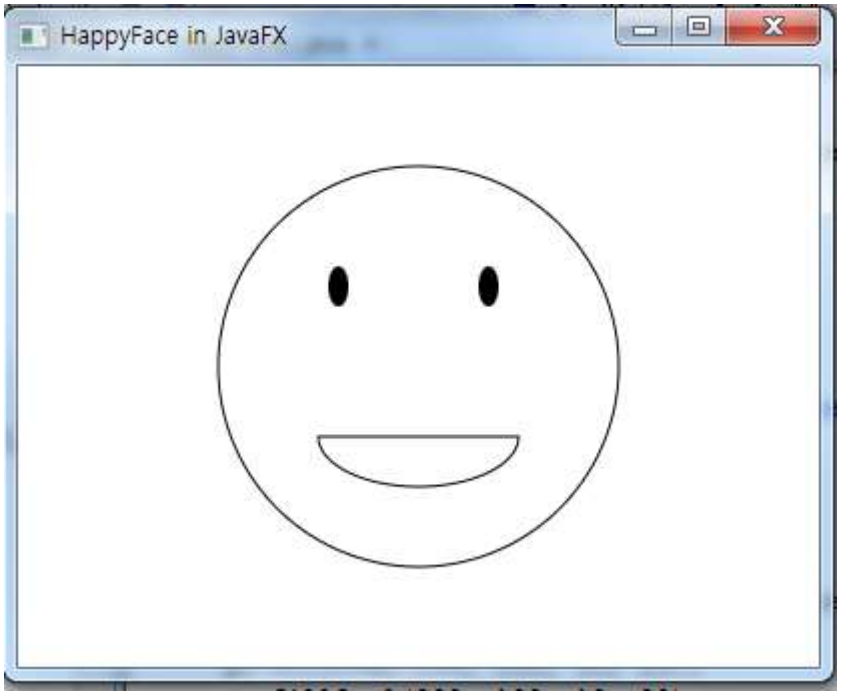

closure type (Round, Chord, Open)

- ArcType.ROUND ArcType.CHORD





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