Chapter 2: Color and Applets
Introduction to Graphics

- A picture is made up of *pixels* (picture elements), and each pixel is stored separately.

- The number of pixels used to represent a picture is called the *picture resolution*.

- The number of pixels that can be displayed by a monitor is called the *monitor resolution*.

Coming up: Coordinate Systems
Coordinate Systems

- Each pixel can be identified using a two-dimensional coordinate system
- When referring to a pixel in a Java program, we use a coordinate system with the origin in the top-left corner

Coming up: Representing Color
Representing Color

- A black and white picture could be stored using one bit per pixel (0 = white and 1 = black)

- A colored picture requires more information; there are several techniques for representing colors

- For example, every color can be represented as a mixture of the three additive primary colors Red, Green, and Blue

- Each color is represented by three numbers between 0 and 255 that collectively are called an RGB value
The java.awt.Color Class

- A color in a Java program is represented as an object created from the `Color` class.

- The `Color` class also contains several predefined colors, including the following:

<table>
<thead>
<tr>
<th>Object</th>
<th>RGB Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color.black</td>
<td>0, 0, 0</td>
</tr>
<tr>
<td>Color.blue</td>
<td>0, 0, 255</td>
</tr>
<tr>
<td>Color.cyan</td>
<td>0, 255, 255</td>
</tr>
<tr>
<td>Color.orange</td>
<td>255, 200, 0</td>
</tr>
<tr>
<td>Color.white</td>
<td>255, 255, 255</td>
</tr>
<tr>
<td>Color.yellow</td>
<td>255, 255, 0</td>
</tr>
</tbody>
</table>

http://www.web-source.net/216_color_chart.htm
Applets

- A Java **application** is a stand-alone program with a **main** method (like the ones we've seen so far)
- A Java **applet** is a program that is intended to be transported over the Web and executed using a web browser
- An applet also can be executed using the appletviewer tool of the Java Software Development Kit or from a webpage
- An applet doesn't need a **main** method
- Instead, there are several special methods that serve specific purposes
Applets

- The `paint` method, for instance, is executed automatically and is used to draw the applet’s contents.

- The `paint` method accepts a parameter that is an object of the `Graphics` class.

- A `Graphics` object defines a `graphics context` on which we can draw shapes and text.

- The `Graphics` class has several methods for drawing shapes.

Coming up: Applets
Applets

- The class that defines an applet extends the Applet class.

- This makes use of inheritance, which is explored in more detail in Chapter 8.

- An applet is embedded into an HTML file using a tag that references the bytecode file of the applet.

- The bytecode version of the program is transported across the web and executed by a Java interpreter that is part of the browser.

Coming up: The HTML applet Tag
The HTML applet Tag

<html>
  <head>
    <title>The Einstein Applet</title>
  </head>
  <body>
    <applet code="Einstein.class" width=350 height=175>
      </applet>
  </body>
</html>
Let's explore some of the methods of the Graphics class that draw shapes in more detail.

- A shape can be filled or unfilled, depending on which method is invoked.
- The method parameters specify coordinates and sizes.
- Shapes with curves, like an oval, are usually drawn by specifying the shape's bounding rectangle.
- An arc can be thought of as a section of an oval.

Coming up: Drawing an Oval
Drawing an Oval

page.drawOval (175, 20, 50, 80);

Coming up: Let's try it out!
Let's try it out!

• Create an Applet
• Add in some shapes
• Add in some text
• Set the background color
Netbeans Notes

• To run your applet you will need an HTML file. You can create an HTML file in the “default package” in Netbeans.
• To run it you can open the HTML file FROM THE “build/classes” directory.
• You can right-click on the class and run the class (which will start the Java appletviewer).