

Java Graphics

Slides derived from the work of
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How Do I Control How a Panel is Rendered (at a pixel level)?

- Extend the component
- Override:
 - `protected void paintComponent(Graphics g)`
 - Draw your graphics inside `paintComponent`
 - This method is called autonomously using event handling & **never in your own code**

Drawing in the right spot

Remember to manage your coordinates

- Where is 0,0?
- How “tall” is the screen?
- How “wide” is the screen?
- Which way is positive x? Positive y?
- Are coordinates relative or absolute?

Drawing Images

- `ImageIcon` is fixed size
 - Rendering: `ImageIcon.paintIcon()`
 - Example ...
- `Image` is flexible
 - Rendering: `Graphics.drawImage`

Drawing shapes

Graphics class provides a LOT of useful drawing utilities ***

- Drawing icons
 - `Icon.paintComponent()`
 - Example
- Primitive shapes: `drawLine`, `drawArc`, `drawRect`, `drawString`, ...
 - Can do fill versions of those too
 - Example...

Graphics Words/Strings

- `drawString` draws the string
- `Font` class: can select the font
- `FontMetrics` class: managing fonts
 - Can measure the extent of a `String` before it is displayed
 - Use to center text automatically
- Example...

Drawing shapes

Graphics2D provides more operations:

- `draw(Shape s)`
- Define a general shape and draw it to the screen
- Examine Shape API (and Graphics2D API)
- Example....

Adding Animation

Need:

- An object to keep track of where the item you are drawing is
 - `paintComponent()` will use this information to properly place the object
- Control loop to update its coordinates
- Sleep between animation frames:
 - `Thread.sleep(ms)`
- Don't forget to call `repaint()`!

Adding Animation: Alternative

Need:

- Use a Timer to trigger the control loop (coming soon)

Example

- Make a bouncing smiley ...

Example

- What do you want to draw/animate?

