Computer Science Department presents

Pumpkin Carving Contest 2008

Thursday, October 16, 2008
6:00 pm — 222 Clapp

All majors, minors, and prospective Computer Science majors/minors are welcome and encouraged to come to this fun event! Carve your own pumpkin, then vote on whose pumpkin is best! Prizes for first, second, and third places! Please RSVP to wqueiros@mtholyoke.edu

Graphical Objects

October 9, 2008
Creating Graphical Objects

FilledRect, FramedRect, FilledOval, FramedOval

- Specify left, top, width, height, canvas
- new FilledRect (50, 200, 300, 100, canvas);

FilledRect

FramedRect

FilledOval

FramedOval
Creating Graphical Objects

**Line**
- Specify 2 endpoints as x,y values, canvas
- new Line (0, 350, 300, 350, canvas);

Creating Graphical Objects

**Text**
- Specify String, left, top, canvas
- new Text ("Hi!", 20, 100, canvas);
**Constructing a Stick Figure**

```java
public StickFigure (DrawingCanvas figureCanvas) {
    new FramedOval (100, 100, 100, 100, figureCanvas);
    new Line (150, 200, 150, 400, figureCanvas);
    new Line (150, 250, 100, 200, figureCanvas);
    new Line (150, 250, 200, 200, figureCanvas);
    new Line (150, 400, 100, 500, figureCanvas);
    new Line (150, 400, 200, 500, figureCanvas);
}
```

---

**Too Many Numbers!**

```java
new FramedOval (100, 100, 100, 100, figureCanvas);
new Line (150, 200, 150, 400, figureCanvas);
new Line (150, 250, 100, 200, figureCanvas);
new Line (150, 250, 200, 200, figureCanvas);
new Line (150, 400, 100, 500, figureCanvas);
new Line (150, 400, 200, 500, figureCanvas);
```

- What do all the numbers mean?
- Is it important that some numbers are the same or is it coincidental?
Too Many Numbers!

new FramedOval (100, 100, 100, 100, figureCanvas);

vs.

new FramedOval (HEAD_LEFT, HEAD_TOP,
            HEAD_SIZE, HEAD_SIZE,
            figureCanvas);

- What do all the numbers mean?
- Is it important that some numbers are the same or coincidental?

Named Constants

private static final int HEAD_SIZE = 100;

- “static final” means constant
- Naming convention: all capital letters, words separated by _
- Useful to define constants in terms of each other

private static final int BODY_SIZE = HEAD_SIZE * 2;
Drawing a Stick Figure

private static final int HEAD_SIZE = 100;
private static final int BODY_SIZE = HEAD_SIZE * 2;

private static final int HEAD_LEFT = 100;
private static final int HEAD_TOP = 100;
private static final int BODY_LEFT = HEAD_LEFT + (HEAD_SIZE / 2);
private static final int BODY_TOP = HEAD_TOP + HEAD_SIZE;

public StickFigure (DrawingCanvas figureCanvas) {
    new FramedOval (HEAD_LEFT, HEAD_TOP,
                     HEAD_SIZE, HEAD_SIZE, figureCanvas);
    new Line (BODY_LEFT, BODY_TOP,
              BODY_LEFT, BODY_TOP + BODY_SIZE, figureCanvas);
    ...
}

Stick Figure Class

public class StickFigure {
    private static final int HEAD_SIZE = 100;
    private static final int BODY_SIZE = HEAD_SIZE * 2;
    ...

    private static final int HEAD_LEFT = 100;
    private static final int HEAD_TOP = 100;
    private static final int BODY_LEFT = HEAD_LEFT + (HEAD_SIZE / 2);
    private static final int BODY_TOP = HEAD_TOP + HEAD_SIZE;
    ...

    public StickFigure (DrawingCanvas figureCanvas) {
        new FramedOval (HEAD_LEFT, HEAD_TOP,
                        HEAD_SIZE, HEAD_SIZE, figureCanvas);
        new Line (BODY_LEFT, BODY_TOP,
                  BODY_LEFT, BODY_TOP + BODY_SIZE, figureCanvas);
        ...
    }
}

Thursday, October 9, 2008
**Constructing a Stick Figure**

To construct a stick figure, you must call the constructor in the StickFigure class, defined as:

```java
public StickFigure (DrawingCanvas figureCanvas) {
    ...
}
```

To call the constructor, say:

```java
new StickFigure (???);
```

means “call a constructor”

---

**begin Method**

- Like Alice’s “when the world starts” event
- Called when program first starts running
- Used to create the initial scene
- Let’s call the StickFigure constructor from the begin method of our program:

```java
public class DrawAStickFigure extends WindowController {
    public void begin() {
        new StickFigure (canvas);
    }
}
```
public class DrawAStickFigure extends WindowController
{
    public void begin()
    {
        new StickFigure(canvas);
    }
}

public class StickFigure
{
    private static final int HEAD_SIZE = 100;
    ...

    public StickFigure(DrawingCanvas figureCanvas)
    {
        new FramedOval(HEAD_LEFT, HEAD_TOP,
                        HEAD_SIZE, HEAD_SIZE, figureCanvas);
        ...
    }
}
Putting the Pieces Together

public class DrawAStickFigure extends WindowController {
    public void begin() {
        new StickFigure(canvas);
    }
}

class StickFigure {
    private static final int HEAD_SIZE = 100;
    ...

    public StickFigure(DrawingCanvas figureCanvas) {
        new FramedOval(HEAD_LEFT, HEAD_TOP,
            HEAD_SIZE, HEAD_SIZE, figureCanvas);
    }
    ...
}
Putting the Pieces Together

```java
public class DrawAStickFigure extends WindowController {
    public void begin() {
        new StickFigure(canvas);  // 4. Draw the framed oval for the head.
    }
}

public class StickFigure {
    private static final int HEAD_SIZE = 100;
    ... public StickFigure(DrawingCanvas figureCanvas) {
        new FramedOval(HEAD_LEFT, HEAD_TOP,
                       HEAD_SIZE, HEAD_SIZE, figureCanvas);
    }
}
```

5. Draw the other parts - statements not shown here.
Putting the Pieces Together

public class DrawAStickFigure extends WindowController {
    public void begin() {
        new StickFigure (canvas);
    }
}

public class StickFigure {
    private static final int HEAD_SIZE = 100;
    ...
    public StickFigure (DrawingCanvas figureCanvas) {
        new FramedOval (HEAD_LEFT, HEAD_TOP,
                         HEAD_SIZE, HEAD_SIZE, figureCanvas);
    ...
}
}

6. Return to the begin method. There is nothing more to do in the begin method. At this point the stick figure appears on the screen.

Reacting to the mouse

Let's have the stick figure say hi when the user presses the mouse button down

Mouse handling events go in the class that extends WindowController

public class DrawAStickFigure extends WindowController {
    public void begin () {
        ...
    }
    public void onMousePress (Location point) {
        new Text ("Hi!", 250, 150, canvas);
    }
}
Mouse Event Handling

Methods

public void onMouseClick (Location point)

Called when mouse pressed and released without moving it

Following methods have similar declarations

public void onMouseClick (Location point)

  onMousePress    onMouseRelease
  onMouseEnter    onMouseExit
  onMouseMove     onMouseDrag