University of Auckland

415.101

Java

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Tutorial #11

The SportingEvent Applet

- We are going to modify the **Event** program from previous tutorials to use GUI programming.
- The applet consists of 4 classes: **SportingEvent, Competition, Contestant, BarGraph.**
- **Competition, Contestant** are unchanged from previous tutorials. **BarGraph** has been altered to use graphics.
- We also need an **html** file:

```
<title> SportingEvent </title>
<hr>
<applet codebase = "Java Classes"
        code="SportingEvent.class"
        width=300 height= 400 >
</applet>
</hr>
```

Slide 11–1

SportingEvent I

- Starting up the applet.

Slide 11–2

SportingEvent II

- Adding the first contestant.

Slide 11–3

SportingEvent III

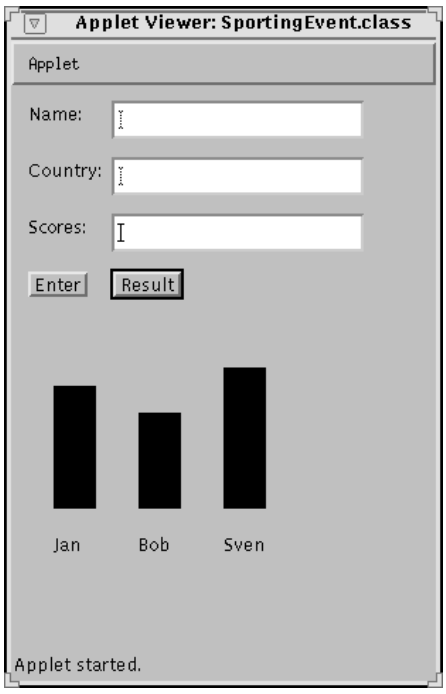
- The text fields are automatically emptied when **`Enter`** is pressed.

SportingEvent IV

- Adding the second contestant.

SportingEvent V

- Pressing **`Result`** prints the bar graph.



The SportingEvent Applet

```
import java.awt.*; import java.applet.Applet; import java.util.*;

public class SportingEvent extends Applet {
   public SportingEvent () {...}
   public void layout () {...}
   private void enterAction() {...}
   private void resultAction() {...}
   public boolean action (Event event, Object argument) {
      if (event.target == enter) enterAction();
      else if (event.target == result) resultAction();
      return true; }
   public void paint (Graphics g) {
      graph.print(g, size().width, size().height);}
}
```

Fields in SportingEvent

- We have three text fields where the user can enter data: `name, country, score`.
- Each text field should have a label: `nameLabel, countryLabel, scoreLabel`.
- We also have two buttons: `enter, result`.
- The `competition` variable has to be global so that the `enterAction` and `resultAction` methods both can get to it.

```
private Label nameLabel;
private Label countryLabel;
private Label scoreLabel;
private TextField name, country, score;
private Button enter, result;
private Competition competition;
private BarGraph graph;
```

Slide 11–8

The SportingEvent Constructor

```
public SportingEvent () {
    nameLabel    = new Label ("Name:");
    name         = new TextField(20);
    countryLabel = new Label ("Country:");
    country      = new TextField(20);
    scoreLabel   = new Label ("Scores:");
    score        = new TextField(20);
    enter        = new Button("Enter");
    result       = new Button("Result");

    add(nameLabel);  add(name);
    add(countryLabel);
    add(country); add(scoreLabel);
    add(score); add(enter); add(result);

    competition = new Competition("Golf");
    graph = new BarGraph("Golf");
  }
```

Slide 11–9

Component Layout

- The `layout` method gets called by the system to place the different components in their right position.
- We use a private method `place` to move the components.

```
public void layout () {
  place(nameLabel, 10, 10);
  place(name, 70, 10);
  place(countryLabel, 10, 50);
  place(country, 70, 50);
  place(scoreLabel, 10, 90);
  place(score, 70, 90);
  place(enter, 10, 130);
  place(enter, 10, 130);
  place(result, 70, 130);
}

public void place (
   Component c, int x, int y) {
   c.resize(c.preferredSize());
   c.move(x, y);
}
```

Slide 11–10

Actions on Pressing Enter

```
private void enterAction() {
  Contestant contestant = new Contestant(
      name.getText(), country.getText());
  competition.addContestant(contestant);

  StringTokenizer T = new StringTokenizer(score.getText());
  while (T.hasMoreTokens()) {
      int score = Integer.parseInt(T.nextToken());
      contestant.addScore(score);
  }
  name.setText(""); country.setText("");  score.setText("");
}
```

Slide 11–11

Slide 11–14

Printing Labels and Bars I

```
private static int barWidth = 30;
private static int bottom   = 100;
private static int maxHeight= 100;

private void printLabels (Graphics g, int width, int height) {
   for (int c=0; c<valueCount; c++)
      g.drawString(labels[c],
                   barWidth * (c * 2 + 1),
                   height - bottom + 30);
}
```

Slide 11–12

Actions on Pressing Result

- When the `Result` button is pressed we go through all the contestants' results and add them to the bar graph.
- We the call `repaint()` which calls `paint()` (in `SportingEvent`) which calls `print()` (in `BarGraph`).

```
private void resultAction() {
   for (int c=0; c<competition.getNumberOfContestants(); c++)
      graph.addValue(competition.getContestant(c).getName(),
                     competition.getContestant(c).getTotal());
   repaint();
}
```

Slide 11–15

Printing Labels and Bars II

```
private void printBars (Graphics g, int width, int height) {
  if (valueCount > 0) {
     int max = getMaxValue();
     for (int v=0; v < valueCount; v++) {
        int x1 = (2*v+1)*barWidth;
        int barHeight = maxHeight * values[v]/max;
        g.fillRect(x1, (height-bottom)-barHeight,
                   barWidth, barHeight);
     }
  }
}
```

Slide 11–13

The BarGraph Class

```
class BarGraph {
   BarGraph (String banner) { }
   public void addValue (String label, int value) { }
   private int getMaxValue () { }

   private void printLabels (Graphics g, int width, int height) {
   private void printBars (Graphics g, int width, int height) { }

   public void print (Graphics g, int width, int height) {
      printBars(g, width, height);
      printLabels(g, width, height);
   }
}
```