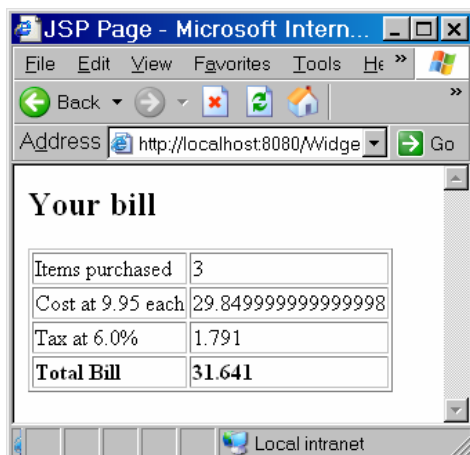


Server-side Web Programming

Lecture 10: Formatting and Internationalization

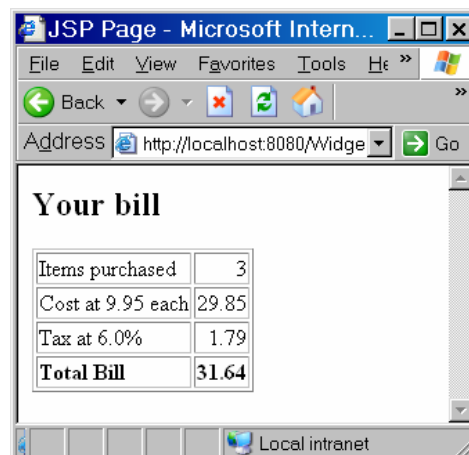
Formatting Numbers

- Goal: More readable numeric output
 - Specific numbers of digits after decimal place, etc.



A screenshot of a Microsoft Internet Explorer browser window titled "JSP Page - Microsoft Intern...". The address bar shows "http://localhost:8080/Widge". The page content is titled "Your bill" and contains a table with the following data:

Items purchased	3
Cost at 9.95 each	29.849999999999998
Tax at 6.0%	1.791
Total Bill	31.641



A screenshot of a Microsoft Internet Explorer browser window titled "JSP Page - Microsoft Intern...". The address bar shows "http://localhost:8080/Widge". The page content is titled "Your bill" and contains a table with the following data:

Items purchased	3
Cost at 9.95 each	29.85
Tax at 6.0%	1.79
Total Bill	31.64

Formatting Numbers

- **NumberFormat** object
 - Object that sets Strings in some desired format
 - In `java.text.*` package
- Get a new instance
`NumberFormat nf = NumberFormat.getInstance();`
- Set properties of that object
`nf.methodsThatSetProperties(parameters);`
- Use that object to format numeric strings for output
`<%= nf.format(some string) %>`

Formatting Numbers

- Example:
`nf.setMinimumFractionDigits(n)` can be used to set max,
`nf.setMaximumFractionDigits(n)` min digits after decimal

```
int quantity = Integer.parseInt(request.getParameter("quantity"));
double pricePerItem = 9.95;
double cost = quantity * pricePerItem;
double taxRate = 6.0;
double tax = cost * taxRate/100;
double total = cost + tax;
```

Always force exactly
2 digits to be shown

```
NumberFormat nf = NumberFormat.getInstance();
nf.setMinimumFractionDigits(2);
nf.setMaximumFractionDigits(2);
```

Formatting Numbers

- Can use to set strings in output

```
29 <body>
30     <h2>Your bill</h2>
31     <table border="1">
32         <tr>
33             <td>Items purchased</td>
34             <td align="right"><%= quantity %></td>
35         </tr>
36         <tr>
37             <td>Cost at <%= pricePerItem %> each</td>
38             <td align="right"><%= nf.format(cost) %></td>
39         </tr>
40         <tr>
41             <td>Tax at <%= taxRate %>%</td>
42             <td align="right"><%= nf.format(tax) %></td>
43         </tr>
44         <tr>
45             <td><b>Total Bill</b></td>
46             <td align="right"><b><%= nf.format(total) %></b></td>
47         </tr>
..     . . .
```

Format Types

- Java has formats for different types of numbers:
 - Currency: Automatically 2 digits, inserts \$ in front
6.3 → \$6.30
 - Percent: Automatically multiplies by 100, adds % to end
0.67 → 67%

- Syntax:

```
NumberFormat nf = NumberFormat.getFormatInstance();
```

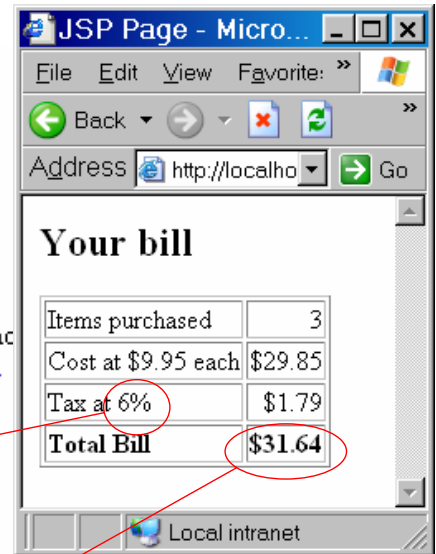
```
NumberFormat cf = NumberFormat.getCurrencyInstance();
NumberFormat pf = NumberFormat.getPercentInstance();
%>
```

```
<body>
    <h2>Your bill</h2>
```

Format Types

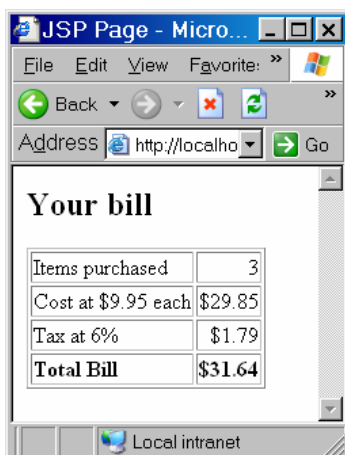
- Use format to apply to a string as before

```
<h2>Your bill</h2>
<table border="1">
  <tr>
    <td>Items purchased</td>
    <td align="right"><%= quantity %></td>
  </tr>
  <tr>
    <td>Cost at <%= cf.format(pricePerItem) %> eac
    <td align="right"><%= cf.format(cost) %></td>
  </tr>
  <tr>
    <td>Tax at <%= pf.format(taxRate) %></td>
    <td align="right"><%= cf.format(tax) %></td>
  </tr>
  <tr>
    <td><b>Total Bill</b></td>
    <td align="right"><b><%= cf.format(total) %></b></td>
  </tr>
</table>
```

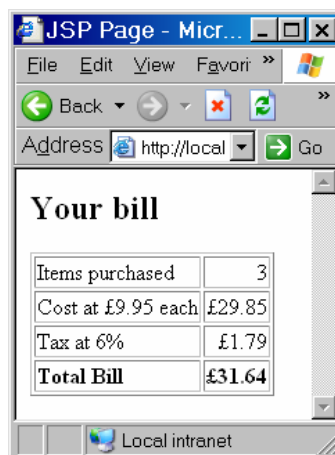


Internationalization

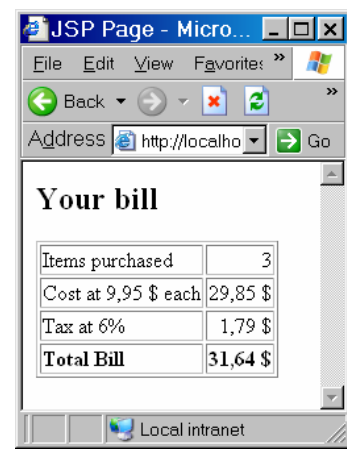
- Formats use different conventions in different parts of the world!
- Your applications must adjust to this!



United States



Great Britain



French Canada

Locales

- Every computer has a locale
 - Set when computer shipped/set up
 - May be accessed using Control Panel
- Locale passed with request
`Locale here = request.getLocale();`
- Pass to `get_____Instance` methods to get proper form for locale of this customer
- **format** uses correct format for the given locale

```
24 |  
25 |     Locale here = request.getLocale();  
26 |     NumberFormat cf = NumberFormat.getCurrencyInstance(here);  
27 |     NumberFormat pf = NumberFormat.getPercentInstance(here);  
28 |     %>
```

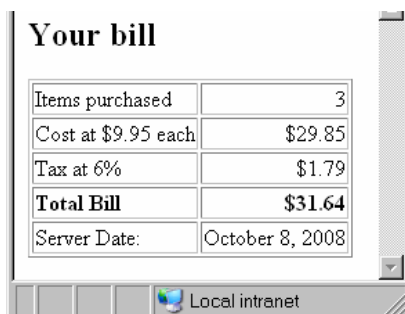
Dates and Internationalization

- Formats of dates also locale specific
- Create DateFormat object for locale
`DateFormat df =
 DateFormat.getDateFormat(DateFormat.style, here);`
 - FULL style: Wednesday, October 8, 2008
 - LONG style: October 8, 2008
 - MEDIUM style: Oct 8, 2008
 - SHORT style: 10/8/08
- Apply **format** to new calendar object to show current date in correct format

Dates and Internationalization

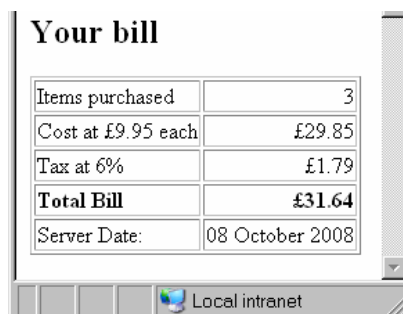
```
Locale here = request.getLocale();  
NumberFormat cf = NumberFormat.getCurrencyInstance(here);  
NumberFormat pf = NumberFormat.getPercentInstance(here);  
  
DateFormat df = DateFormat.getDateInstance(DateFormat.LONG, here);
```

```
<td>Server Date:</td>  
<td><%= df.format(new GregorianCalendar().getTime()) %></td>
```



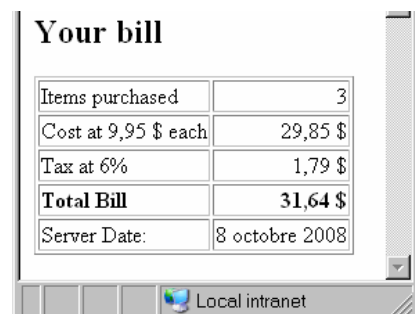
Local intranet

Your bill	
Items purchased	3
Cost at \$9.95 each	\$29.85
Tax at 6%	\$1.79
Total Bill	\$31.64
Server Date:	October 8, 2008



Local intranet

Your bill	
Items purchased	3
Cost at £9.95 each	£29.85
Tax at 6%	£1.79
Total Bill	£31.64
Server Date:	08 October 2008



Local intranet

Your bill	
Items purchased	3
Cost at 9,95 \$ each	29,85 \$
Tax at 6%	1,79 \$
Total Bill	31,64 \$
Server Date:	8 octobre 2008

Locale Information

- Can extract country and language of locale
 - Country = 2 character abbreviation (“US”, “CA”, etc.)
 - Language = ISO-639 language code (“en”, “fr”, “zh”, etc.)
- `Locale here = request.getLocale();`
`String lang = here.getLanguage();`
`String country = here.getCountry();`
- Can use to make decisions about what to display
 - More likely, which text files to forward to or include

Locale Information

```
Locale here = request.getLocale();
NumberFormat cf = NumberFormat.getCurrencyInstance(her
NumberFormat pf = NumberFormat.getPercentInstance(her

DateFormat df = DateFormat.getDateInstance(DateFormat.

String lang = here.getLanguage();
String billString = "Your Bill";
if (lang.equals("fr")) billString = "Votre Addition";
%>
<body>
  <h2><%= billString %></h2>
  <table border="1">
    <tr>
```

