Slide 1

Server-Side Web Development

JSP

Lecture #5 2007

Slide 2

1. Requests
   - CGI
   - JSP
   - Cookies
   - Sessions

2. Responses
   - MIME Types

Slide 3

Request Methods

- GET - data in URL-encoded name/value-pairs
- POST - data encoded in HTTP request body
- PUT - data stream in HTTP request body

Slide 4

Common Gateway Interface (CGI)

- The original way to send dynamic data to web servers
- Data delivered URL-encoded in specific parameters
- Scripts located and invoked by the web server on demand
- Data parsing was difficult and error-prone
- Serious security issues

Slide 5

URL Encoding

- A way to escape data in text form
- Reserved and un-recognized characters are hex-coded
- Used to encode data-carrying URLs

Character	URL Encoding
A-Z, a-z, 0-9	not escaped
$-_.+!*'(),	not escaped
others	hex-coded
e.g., (whitespace)	%20

Slide 6

CGI variables

- The original way to send dynamic data to web servers
- Data delivered URL-encoded in specific parameters
- Still available to web servers
- Contains useful metadata
  (such as client IP, username, length of data stream etc)

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The Request Object

- Represents the HTTP request
- Contains all info in the request
- Exposes an API for traversing request data
- Performs URL-decoding of data
- Provides uniform ways to read data regardless of method

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Reading Parameters

- request.getParameter("name")
- request.getParameterValues("name")
- request.getParameterNames()
- request.getParameterMap()
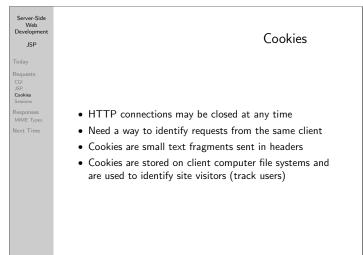
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Reading Parameters

- Always check for null
- Always provide a default value (as appropriate)

Parameter	getParameter() returns
not present in request	null
contains empty string	empty string

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Model View Controller

- Model represents data (JSP or Servlet)
- View represents interfaces (JSP)
- Controller manages state and control flow (Servlet)

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Code Reuse

- Declare reusable functions in JSP fragments
- Use include directives to import them into JSP
- Very useful for small utility functions

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Raw Data

- Can access (PUT) data streams directly
- request.getReader() - gets a character reader
- request.getInputStream() - get a binary input stream
- NOTE: request data no longer available via getParameter()
- Usually used for file upload scenarios
- Apache Jakarta common library contains utilities for accessing raw data streams
- Plenty of third party file upload Servlets available

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Filtering Data

- Data validation necessary
- Always check data size
- Always check for illegal characters
- Consider site impact of invalid data

```
<    Escape to \&lt;   (XML, XHTML, HTML)
>    Escape to \&gt;   (    - " -      )
&    Escape to \&amp;  (    - " -      )
"    Escape to \&quot; (    - " -      )
'    Escape to \'      (   databases   )
```
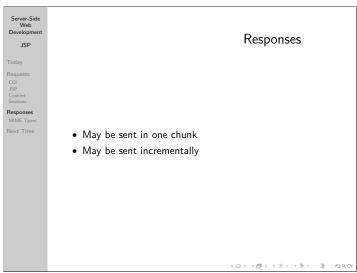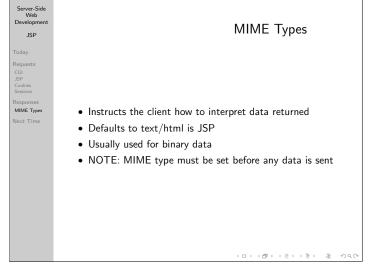
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Cookies

- HTTP connections may be closed at any time
- Need a way to identify requests from the same client
- Cookies are small text fragments sent in headers
- Cookies are stored on client computer file systems and are used to identify site visitors (track users)

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Browsers & Cookies

- Maximal cookie size 4096 bytes
- Max 20 cookies per site 20
- Max 300 cookies in total
- Stored on client computer file systems
- Cookies can be blocked by browsers
- Cookies can be removed from client computer
- Cookies can be altered
- Don't store sensitive data in cookies
- Use cookies, but don't depend on them

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Sessions

- Data contexts stored on the web server and shared between requests from the same user
- Can store anything (POJO)
- Can be serialized to databases or short-lived
- Need a way to identify session for new requests
  - Cookies
  - URL rewrites
  - hidden form fields
- The JSP session API hides the session identification

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Responses

- May be sent in one chunk
- May be sent incrementally

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MIME Types

- Instructs the client how to interpret data returned
- Defaults to text/html is JSP
- Usually used for binary data
- NOTE: MIME type must be set before any data is sent

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MIME Type Examples

MIME type	data type
text/css	HTML cascading style sheet
text/html	HTML (JSP default)
text/plain	plain text
application/pdf	PDF document
application/postscript	Postscript document
application/zip	ZIP file
application/octet-stream	binary data
image/gif	GIF image
image/jpeg	JPEG image
image/png	PNG image
audio/x-wav	Microsoft Windows sound
video/mpeg	MPEG video
video/quicktime	Quicktime video

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Next Time

- Data storage, validation & access
- JDBC & XML