

CS320 Web and Internet Programming MVC Architecture

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Java Web Application

- ◆ Servlets
- ◆ Beans
- ◆ JSPs
 - Scripting elements, EL, JSTL
- ◆ Static resources
 - HTML, CSS, images, ...
- ◆ Metadata files
 - web.xml, ...

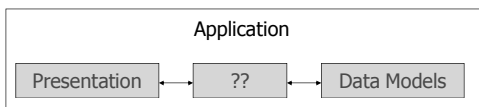
Model 1 Architecture

- ◆ JSP + Bean
 - JSP for presentation
 - Bean for business logic
- ◆ Example
 - GuestBook (Bean, EL, and JSTL)

Problems of Model 1 Architecture

- ◆ Using scripting elements mixes presentation and processing
 - Hard to debug, maintain, or reuse code
- ◆ Not using scripting elements limits the interaction between presentation and processing to getters and setters
 - Tedious to program
 - Beans are no longer independent of the presentation layer, i.e. special getters/setters are needed

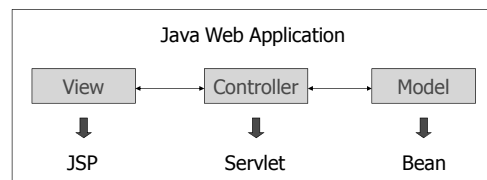
Improve Model 1 Architecture



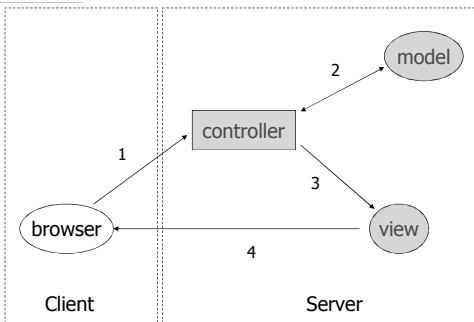
- ◆ Presentation
 - Create UI
 - Input and output
 - JSP, JFC/Swing ...
- ◆ Data Models
 - Independent of UI
 - Bean (POJO)
 - E.g. the `GuestBookEntry` class

Model 2 Architecture

- ◆ A.K.A. Model-View-Controller (MVC) Architecture



MVC in a Web Application ...



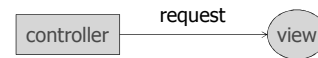
... MVC in a Web Application

1. Browser sends a request to controller
2. Controller processes the request, updates some data
3. Controller forwards the request and data to view
4. View generates the response that is sent back to the client

Guest Book Example Using MVC

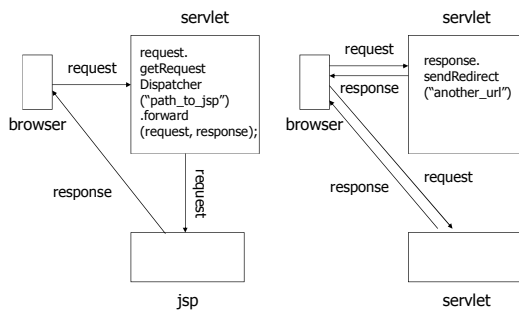
- ◆ **Model**
 - GuestBookEntry.java
- ◆ **View**
 - GuestBook.jsp, AddComment.jsp, EditEntry.jsp
 - *Redirect*
- ◆ **Controller**
 - GuestBook.java, AddComment.java, EditEntry.java

Forward Request From Controller to View



```
request.getRequestDispatcher("path_to_jsp")
    .forward( request, response );
```

Forward vs. Redirect



Send Data From Controller to View

- ◆ Objects in *application* and *session* scope are shared by all servlets and JSPs of the application
- ◆ Additional data can be passed from servlet to JSP in *request* scope

```
request.setAttribute("objName", obj);
request.getRequestDispatcher("path_to_jsp")
    .forward( request, response );
```

More About the MVC Example

- ◆ One operation, one controller
- ◆ Requests always go to controllers first
 - "Hide" JSPs under `/WEB-INF/`
- ◆ Controllers do not generate HTML
 - No `out.println()`
- ◆ JSPs are only used for display
 - No scripting elements in JSP