

CS320 Web and Internet Programming

Web Application and MVC

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Java Web Application

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

Putting It All Together – The User Registration Example

- ◆ Register a new user
- ◆ List all existing users

Using JSP + Bean

- ◆ Beans: `User` and `UserManager`
- ◆ JSPs: `Register.jsp` and `Users.jsp`
- ◆ *Problems??*

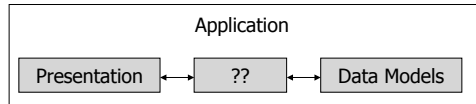
Model 1 Architecture

- ◆ JSP + Bean
 - JSP for presentation
 - Bean for business logic

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

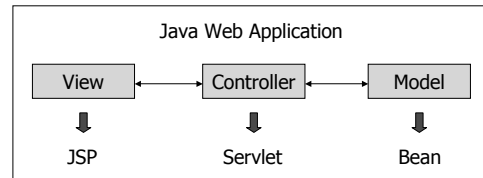
- Create UI
- Input and output
- JSP, JFC/Swing ...

◆ Data Models

- Independent of UI
- Bean (POJO)
- E.g. the *User* class

Model 2 Architecture

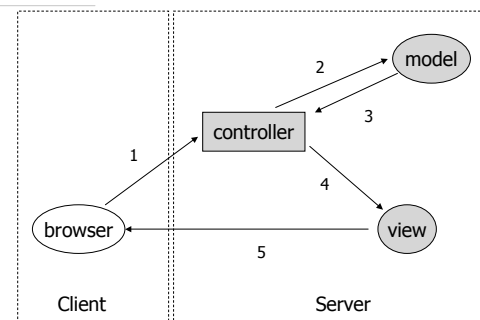
◆ A.K.A. Model-View-Controller (MVC) Architecture



About MVC

- ◆ Originate from the work on *Smalltalk*
- ◆ Widely used in GUI applications

MVC in a Web Application ...



... MVC in a Web Application

1. Process request
2. Create/update beans
3. Store beans in request, session, or application scope
4. Forward request to JSP page
5. Extract data from beans and display

User Registration Example Using MVC

◆ Model

- User.java

◆ View

- Register.jsp, Users.jsp

◆ Controller

- Register.java, Users.java

About the MVC Example

- ◆ Servlets do NOT generate HTML directly
 - No `out.println()`
 - Redirect and Forward
- ◆ JSPs are only used for display
- ◆ Use of scopes
 - Application and session scopes are shared by all servlets and JSPs
 - Request scope is used for passing data from a servlet to a JSP

Model 1 vs. MVC

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|--|--|
| ◆ Model 1 | ◆ MVC |
| ■ Requires less code <ul style="list-style-type: none">• Custom tags and EL | ■ Requires more code <ul style="list-style-type: none">• Java is verbose |
| ■ Good for simple applications <ul style="list-style-type: none">• E.g. labs and exams | ■ Good for complex applications <ul style="list-style-type: none">• E.g. homeworks |