CS5220 Advanced Topics in Web Programming

Spring – Web MVC

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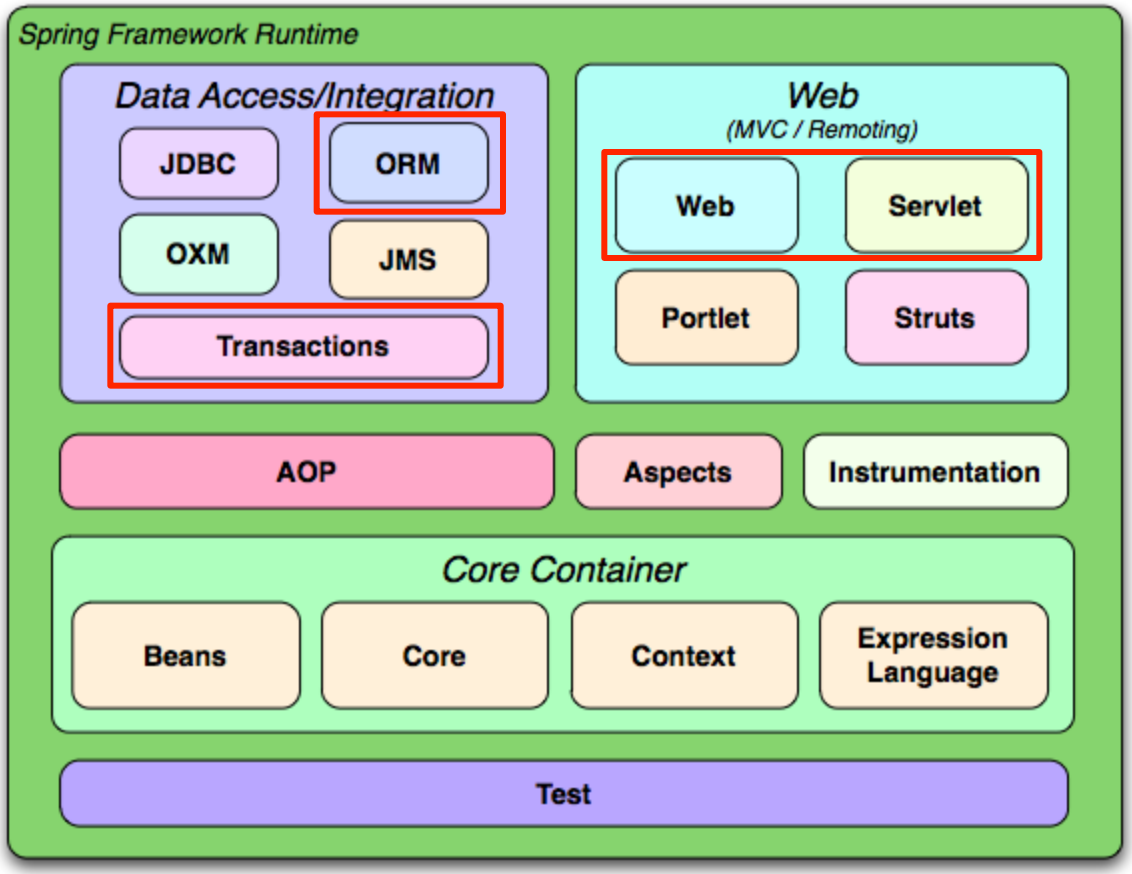
Spring Framework



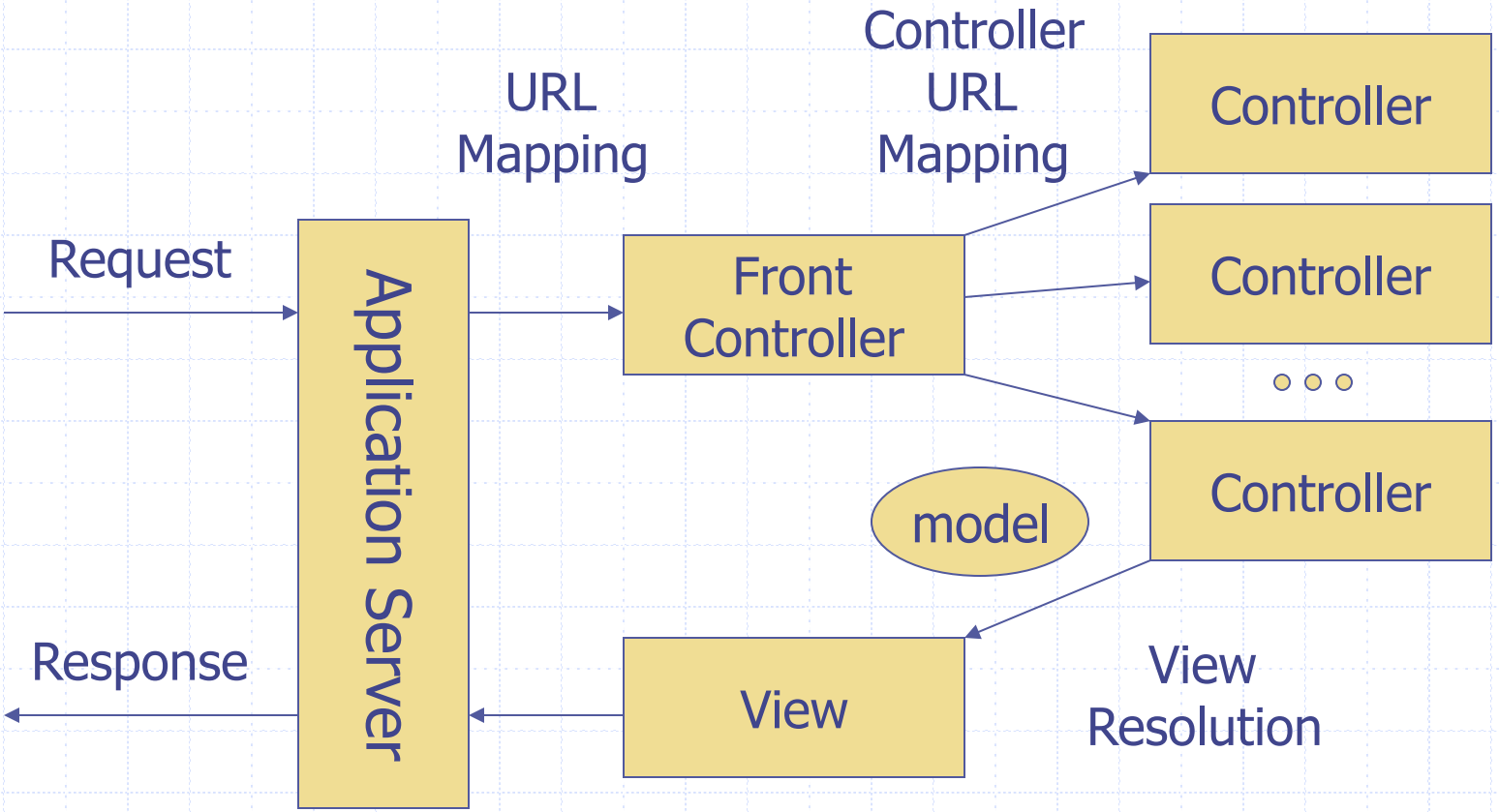
The SpringMVC Example

- Spring and Hibernate from Scratch
  - http://csns.calstatela.edu/wiki/content/cysun/course_materials/cs520/sham/

Add Spring MVC to A Maven Webapp

- Spring dependencies
  - `spring-webmvc`
- Front controller
  - `DispatcherServlet` in web.xml
- Bean configuration file
  - /WEB-INF/<servlet-name>-servlet.xml

Request Processing in Spring Web MVC



Spring Controllers

- Spring controllers are *beans* annotated with `@Controller`
- In <servlet-name>-servlet.xml
  - `<mvc:annotation-driven>`
  - `<context:component-scan>`

Controller URL Mapping

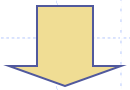
- Requests are mapped to controller methods using `@RequestMapping`
  - `value`: URL pattern(s)
  - Mapping can be further refined by using `method`, `params`, and `headers`
  - https://docs.spring.io/spring/docs/current/spring-framework-reference/web.html#mvc-ann-requestmapping

View

- A controller method returns a view name, which will be resolved to a view implementation by a view resolver

Resolve JSP Views

```
<bean id="viewResolver"
   class="org.springframework.web.servlet.view.InternalResourceViewResolver">
      <property name="prefix" value="/WEB-INF/jsp/" />
      <property name="suffix" value=".jsp" />
</bean>
```



Prefix + ViewName + Suffix = JSP File

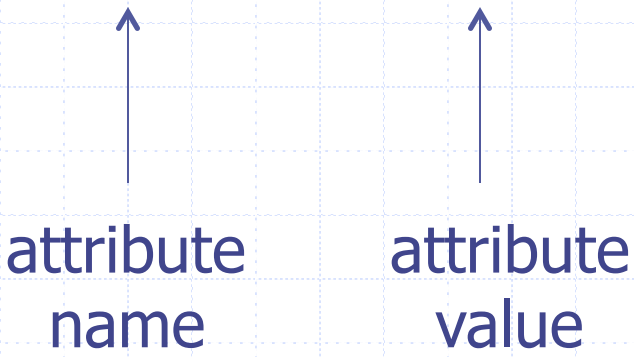
Why not just return the path to the JSP file??

View Technologies and Resolvers

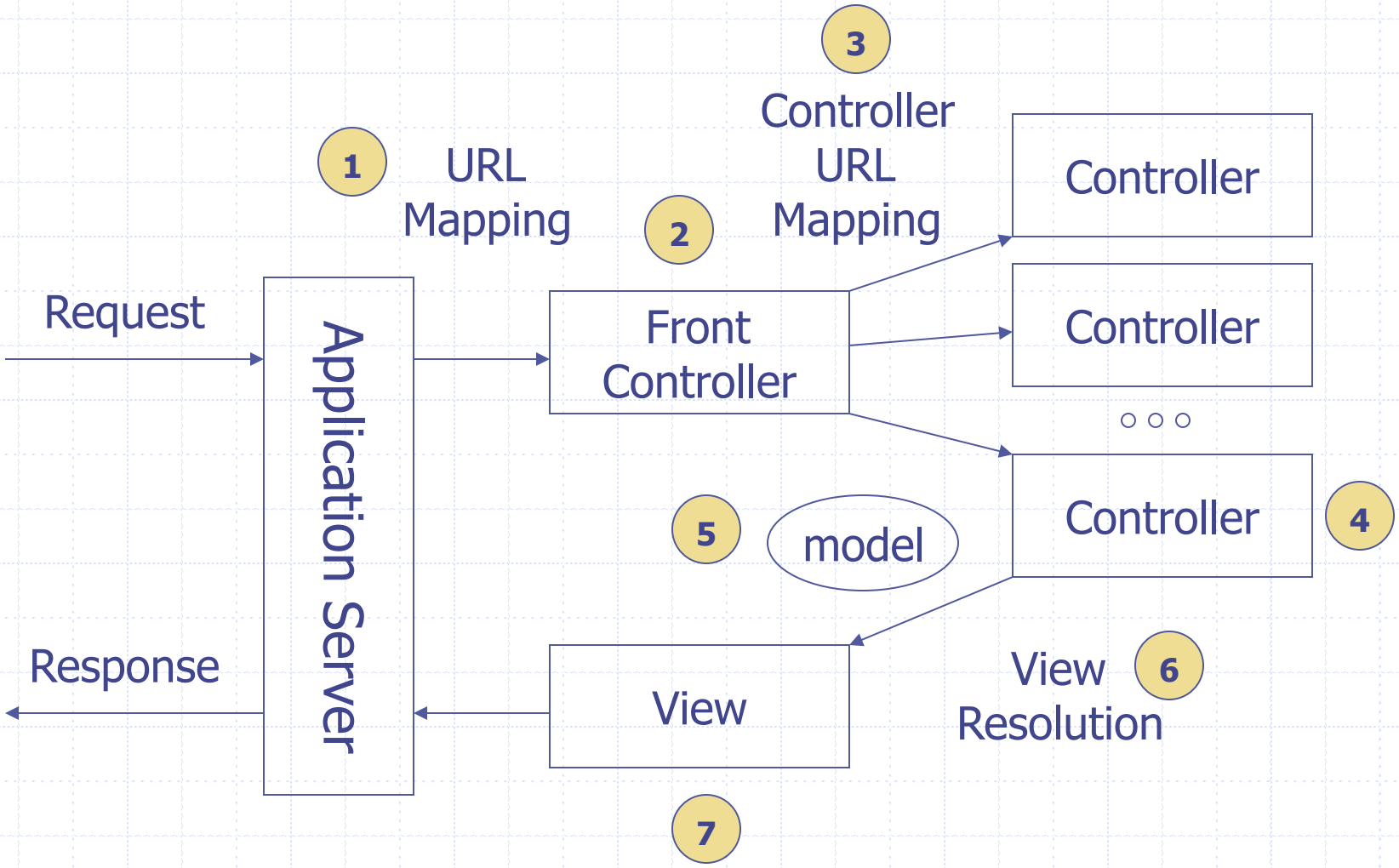
- https://docs.spring.io/spring/docs/current/spring-framework-reference/web.html#mvc-view

Model

- Model objects are passed to view using a `ModelMap`
  - `put( String, Object )`



Request Processing Recap



Database Access Dependencies

- Hibernate
- Spring ORM
- Database connection pooling
  - DBCP vs. Tomcat JDBC
- Database driver

Configuration

- Hibernate JPA
  - persistence.xml
- Spring
  - web.xml
  - applicationContext.xml

Spring Transaction Management

- Transaction management code is added through AOP
- <context:annotation-config> enables annotations like `@Autowired` and `@PersistenceContext`
- <tx:annotation-driven> enables annotations like `@Transactional`

Model Classes and Database

- Model classes, e.g. `User`
  - JPA annotations
- Database
  - SQL scripts
  - `hibernate_sequence`

Database Access

- DAO interfaces, e.g. `UserDao`
- DAO implementations, e.g. `UserDaoImpl`

Spring DAO Annotations

- @Repository for DAO implementation classes
- @PersistenceContext injects an entity manager to the class
- @Transactional for methods that write to the database

Controller Examples

- List all users
- Display a selected user
- Add a new user
- Edit a user

Example: List All Users

- Controller basics
  - `@Controller`
  - `@RequestMapping`
  - `@ModelMap`
  - Using DAO

Example: Display A User

- Using `@RequestParam`
  - `required`
- Using `@PathVariable`

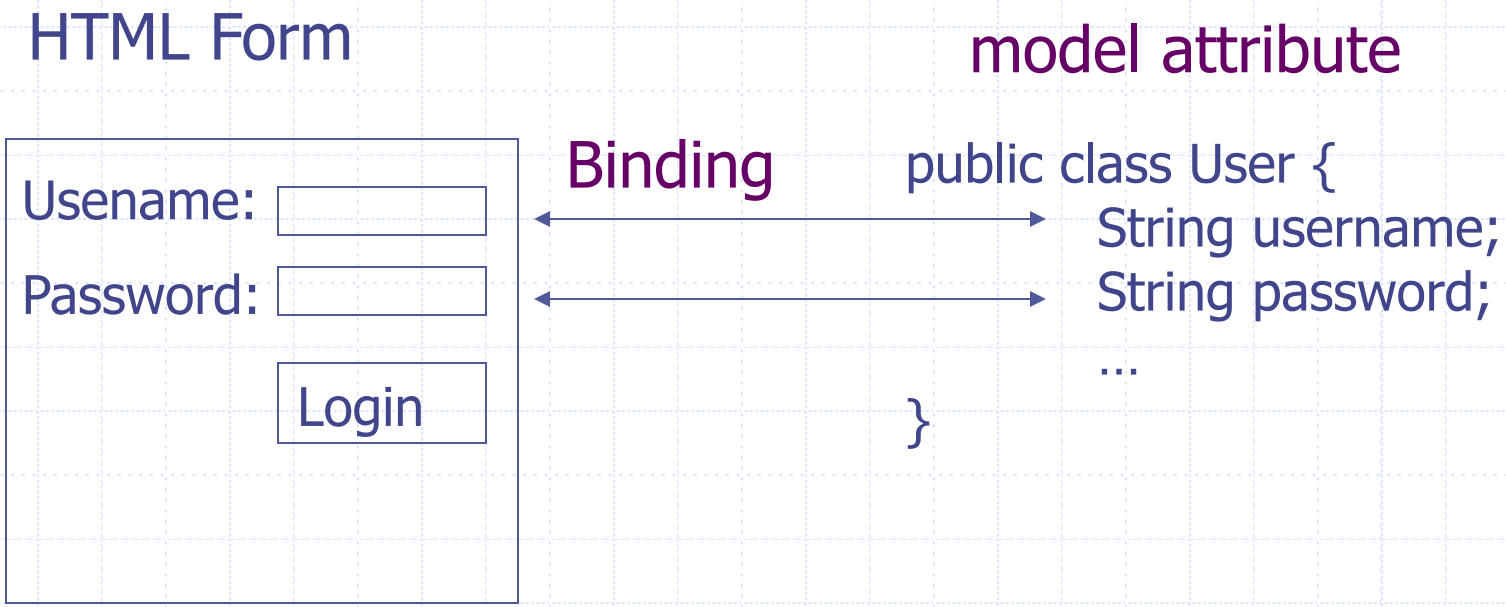
Access HTTP Request, Response, and Session

- Simply add an argument of that type to the controller method
- https://docs.spring.io/spring/docs/current/spring-framework-reference/web.html#mvc-ann-methods

Example: Add A User

- Model attribute (a.k.a. command object, form backing object, form object)
  - Concept
  - Binding
  - `@ModelAttribute`
- `@RequestMapping`
  - `method`
- The “redirect” view

Model Attribute



- Bind form fields to properties of the object

Spring's `form` Tag Library

- Documentation – https://docs.spring.io/spring/docs/current/spring-framework-reference/web.html#mvc-view-jsp-formtaglib
- Tag reference – https://docs.spring.io/spring/docs/4.3.x/spring-framework-reference/html/spring-form-tld.html

Handling Forms

- One controller method for
  - Creating a model attribute
  - Returning the form view
- Form view
  - Use Spring `<form>` tags to bind the model attribute to the form
- One controller method for
  - Processing the model attribute (annotated with `@ModelAttribute`)
  - Returning the success view

Example: Edit A User

- Store model attribute in session
  - `@SessionAttributes`
  - `SessionStatus`
    - Use `setComplete()` to remove the model attribute in session

Non-Session Model Attributes

Form request

Create a model attribute in controller

Use the model attribute to populate the form fields in view

Form Submission

Create a model attribute

Populate the model attribute with submitted data

Pass the model attribute to controller

Session Model Attributes

Form request

Create a model attribute in controller

↓

Save the model attribute in session

↓

Use the model attribute to populate the form fields in view

Form Submission

Retrieve the model attribute from session

↓

Populate the model attribute with submitted data

↓

Pass the model attribute to controller

Readings

- Spring Framework Documentation – Web Servlet
  - Chapter 1. Spring Web MVC