Spring MVC Controllers Part I

"Code with Passion!"

Topics

- What is a Controller?
- Request mapping
- Handler method arguments – Implicit models
- Handler method return types (used for view selection)

What is a Controller?

What does a Controller do?

- Controller has a set of handlers (handler methods)
  - A HTTP request is mapped to a handler of a controller
- Controllers handles HTTP requests
  - Controller receives user input and transforms it into a model
  - Controller performs business logic and then and set attributes (key/value pairs) of the model
- Typically, a controller delegates business logic processing to a set of services
  - The services in turn access database through DAO interface (or sometimes called Repository interface)
  - Services are typically annotated with *@Service* while DAO classes are annotated with *@Repository*

Mapping Requests to Handlers with @RequestMapping or @GetMapping, @PostMapping, @PutMapping @DeleteMapping

Mapping requests with @RequestMapping

- *@RequestMapping* annotation is used to map an URL to a handler method of a Controller class
- *@RequestMapping* annotation can be specified at
  - Class level
  - Method level
- URL specified at the method level *@RequestMapping* annotation is relative to the one specified at the class level *@RequestMapping* annotation

@RequestMapping vs @XxxMaping

- *@GetMapping("/url")*
  - *Same as* @RequestMapping(value="/url", method = RequestMethod.GET)
- *@PostMapping ("/url")*
  - *Same as* @RequestMapping(value="/url", method = RequestMethod.POST)
- *@PutMapping ("/url")*
  - *Same as* @RequestMapping(value="/url", method = RequestMethod.PUT)
- *@DeleteMapping ("/url")*
  - *Same as* @RequestMapping(value="/url", method = RequestMethod.DELETE)

Mapping requests with @RequestMapping

```
@Controller
@RequestMapping("/appointments")      // Used at the class level
public class AppointmentsController {

   private final AppointmentBook appointmentBook;
   @Autowired
   public AppointmentsController(AppointmentBook appointmentBook) {
      this.appointmentBook = appointmentBook;
   }

   // Handle http://locahost:8080/myapp/appointments
   @RequestMapping(method = RequestMethod.GET)   // Used at the method level
   public Map<String, Appointment> get() {
      return appointmentBook.getAppointmentsForToday();
   }

   // Handle http://locahost:8080/myapp/appointments/4 or
   //            http://locahost:8080/myapp/appointments/5
   @RequestMapping(value="/{day}", method = RequestMethod.GET) // Used at the method level
   public Map<String, Appointment> getForDay (
      @PathVariable @DateTimeFormat(iso=ISO.DATE) Date day, Model model) {
      return appointmentBook.getAppointmentsForDay(day);
   }
```

@RequestMapping Only at Method Levels

```
// A @RequestMapping on the class level is not specified.
@Controller
public class ClinicController {

    private final Clinic clinic;
    @Autowired
    public ClinicController(Clinic clinic) {
        this.clinic = clinic;
    }

    // Handles http://locahost:8080/myapp/
    @RequestMapping("/")
    public void welcomeHandler() {
    }

    // Handles http://locahost:8080/myapp/vets
    @RequestMapping("/vets")
    public ModelMap vetsHandler() {
        return new ModelMap(this.clinic.getVets());
    }

}
```

Lab:

Exercise1: Build “Helloworld”
Spring MVC Application Step by Step
4945_spring4_mvc_controllers_part1.zip

Handler Method Arguments - Implicit Models

Implicit Model as a Handler Argument

- Spring MVC creates an empty model object and passes it to a handler method as an argument
  - You can then add attributes to the model in the form of key/value pairs
- The model object is then exposed to the view (i.e., jsp or thymeleaf pages)
  - View can access model attributes using Expression Language (EL)

Model Types that are supported

- *java.util.Map*
  - Most generic type
- *org.springframework.ui.Model*
  - Holder of attributes
- *org.springframework.ui.ModelMap*
  - Supports chained calls and auto-generation of model attribute keys

org.springframework.ui.Model

```
import org.springframework.ui.Model;

@GetMapping("/hotels-search")
// Spring MVC creates an empty model object and passes it as an argument.
// In order to access it, all you have to do is to use it as an argument.
public String list(SearchCriteria criteria, Model model) {

        // Using the "SearchCriteria", perform the search through
        // "bookingService".
        List<Hotel> hotels = bookingService.findHotels(criteria);

        // Add an attribute (key/value pair) to the model. The view now can access
        // “hotelList”  through ${hotelList} expression language notation
        model.addAttribute(“hotelList”, hotels);

        // Return logical view name "hotels/list", which results in displaying
        // ”resources/templates/hotels/list.html".
        return "hotels/list";
}
```

View that accesses Model Attributes (JSP)

```
<table class="summary">
    <thead>
        <tr>
            <th>Name</th>
            <th>Address</th>
            <th>City, State</th>
        </tr>
    </thead>
    <tbody>
        <c:forEach var="hotel" items="${hotelList}">
            <tr>
                <td>${hotel.name}</td>
                <td>${hotel.address}</td>
                <td>${hotel.city}, ${hotel.state}, ${hotel.country}</td>
            </tr>
        </c:forEach>
        <c:if test="${empty hotelList}">
            <tr>
                <td colspan="5">No hotels found</td>
            </tr>
        </c:if>
    </tbody>
</table>
```

hotelList is the key of the model attribute (key/value pair)

org.springframework.ui.ModelMap

```
import org.springframework.ui.ModelMap;

@GetMapping("/deposit")
// Empty ModelMap object is pre-created by Spring MVC and passed as an argument.
// In order to access, all you have to do is to add it as a handler argument.
protected String deposit(
        @RequestParam("accountNo") int accountNo,
        @RequestParam("amount") double amount,
        ModelMap modelMap) {

    accountService.deposit(accountNo, amount);

    // Chaining is allowed for ModelMap object
    modelMap.addAttribute("accountNo", accountNo)
                .addAttribute("balance", accountService.getBalance(accountNo));
    return "success";
}
```

Add “accountNo” and “balance” model attributes (key/value pairs)

Lab:

Exercise2: Modify “Helloworld” Spring MVC Application

Exercise3: Build Another Application

4945_spring4_mvc_controllers_part1.zip

Handler Method Return Types (for View Selection)

Return Types from Handler Method

- Option #1: ModelAndView
- Option #2: String
- Option #3: void

#1: ModelAndView Object (as Return Type)

```
@Controller
public class DisplayShoppingCartController {

   @GetMapping("/url")
   public ModelAndView handleRequest(HttpServletRequest request,
                                     HttpServletResponse response) {

      List cartItems = // get a List of CartItem objects
      User user = // get the User doing the shopping

      ModelAndView mav =
        new ModelAndView("displayShoppingCart"); //logical view name

      // Add attributes to ModelAndView object
      mav.addObject("cartItems", cartItems);
      mav.addObject("user", user);

      return mav;
   }
```

#2: String (as a Return type)

- Returned String is interpreted as the logical view name
- More commonly used than *ModelAndView*

```
// Logical view is returned as “someview”
@RequestMapping(value="html", method=RequestMethod.GET)
public String prepare(Model model) {
        model.addAttribute("foo", "bar");
        model.addAttribute("fruit", "apple");
        return "someview";
}
```

#3: void (as a Return type)

- Used when the view name is supposed to be implicitly determined through a *RequestToViewNameTranslator*

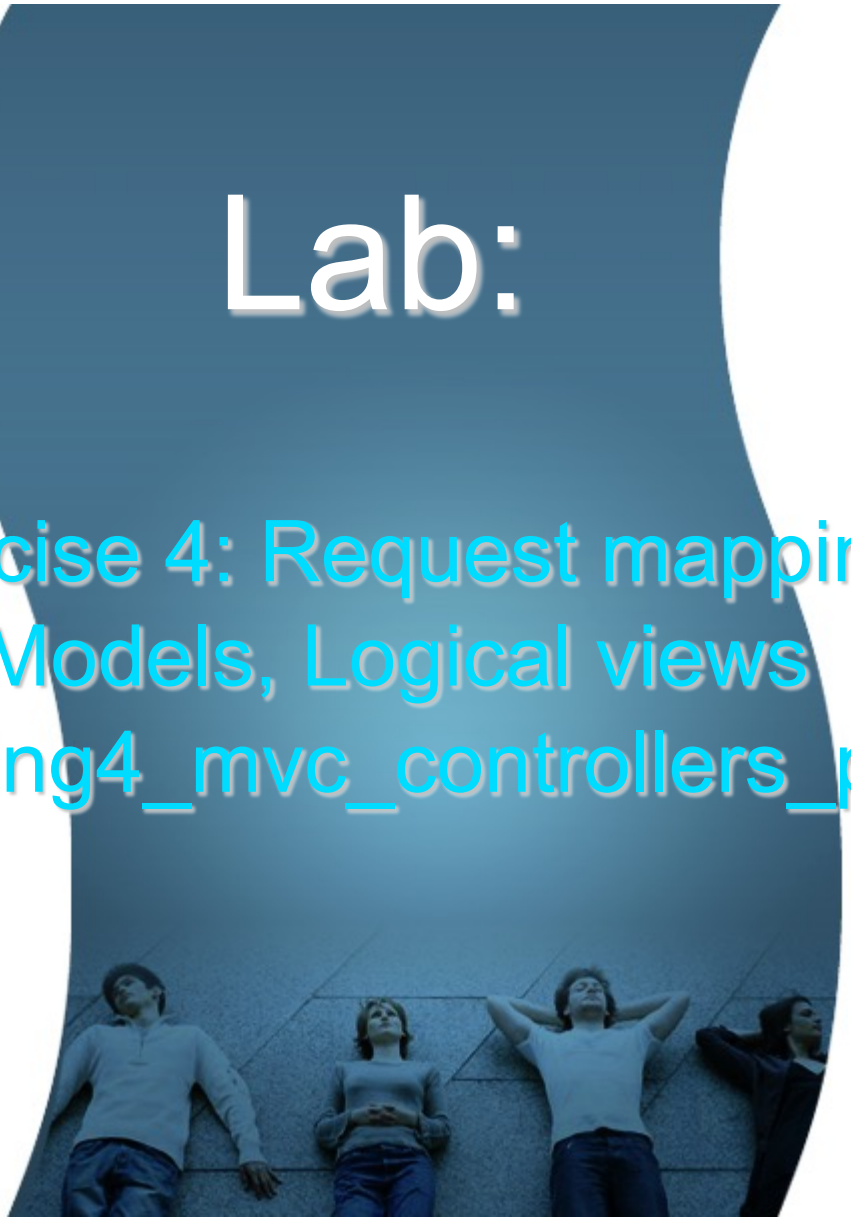
```
@Controller
@RequestMapping("/helloworld")
public class MyController {

  // The view name is implicitly set to "/helloworld/viewNameX"
  @RequestMapping(value="/viewNameX", method=RequestMethod.GET)
  public void usingRequestToViewNameTranslator(Model model) {
        model.addAttribute("foo", "bar");
        model.addAttribute("fruit", "apple");
  }
}
```

Lab:

Exercise 4: Request mapping, Models, Logical views

4945_spring4_mvc_controllers_part1.zip



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