Spring Boot Training

BCA 2080 4th Semester

Nepathya College

Web Server

- Facilitates remote function calls
- Any device anywhere in the network can call functions of a particular device.
- Each function call is executed in that particular device, called the server; and the function returns some output back to the caller.
- In this way, data communication and operation on the data happens seamlessly without the requirement of architecture compatibility.

Each web request is a function call

- getImage(“cat.jpg”)
- getVideo(“cat.mpeg”, 55, 480)
- storeMyInfo({ ‘name’: ‘Acer’, ‘price’: 55000 })
- /image/cat.jpg
- /profile/save?name=Acer&price=55000
- <item name=“Acer” “price”=“55000”></item>

Function ⇔ Route

```
@GetMapping(“/hello”)
public String greet() {
    return "Hello World!";
}
```

This greet() function exists in the server. But we can execute it via browser using route “/hello”

URL routes

- /user/123 /user/{id}
- /blog/tilottama-mun /blog/{title}
- /image/cat.jpg /image/{filename}

- ```
  @GetMapping("/user/{placeholder}")
  public String getData(@PathVariable("placeholder") int
  userID) {
        // method body
  }
  ```
  ```

HTML Form

```
@GetMapping("/register")
public String getRegisterPage() {
   return """
        <form action="/save" method="get">
        <input type="text" name="fullname" />
        <input type="text" name="address" />
        <input type="submit" value="SUBMIT" />
        </form>""";
}

URL: /save?fullname=Prakash&address=Tilottama

@GetMapping("/save")
public String saveRegisterPage(
   @RequestParam("fullname") String fullname,
   @RequestParam("address") String address) {
        System.out.println(fullname);      //Prakash
        System.out.println(address);       //Tilottama

}
```

Create a **getRegisterPage()** method to return this form as string

Personalization

- Currently the server is storing only a single shopping list.
- How to store shopping list for multiple users?
- Alice’s shopping list must only be seen and modified by Alice. But Bob also has his own shopping list in the same server. Every user has their own personal shopping list.

Personalization

- HTTP server doesn’t remember previous requests.
- So each HTTP request must be uniquely identified by the server based on request data.
- HTTP client (user) should provide identification information in every request.
- Identification information should be unique to avoid misidentification.

Improvements

- How to make sure User A cannot impersonate as User B?
  - Using un-guessable name

HTTP Headers

- Contains metadata about message
- Contains info about server (HTTP response)
- Contains info about client (HTTP request)
- Format:

```
key: value
key: value
key: value
Set-Cookie: cookiename=value   (sent by server)
Cookie: cookiename=value (sent by client)
```

User Identification using Cookie

1. Server checks if token is present in cookie
2. If yes, go to 7.
3. Server generates a new token
4. Server stores the token in its database
5. Server sets that token to client as cookie
6. Go to 9.
7. Checks given token against its database.
8. If present, user is identified! (User is auth-ed)
9. Perform the identified user's request

Task

- Write a method to generate a string of n length containing alphanumeric characters (A-Za-z0-9)
  - `getRandomString(20)` returns a random string of 20 characters

Page Walkthrough

- When user lands on homepage
  - Check if user has a valid token
    - If yes; show his personal info
    - If no; redirect to **login** page
- When user lands on login page
  - Generate a new token and store it along with username in server database
  - Send the token as cookie

Authentication

```
If username exists in db; then
  If password matches; then
     Allow user login
  Else
     Disallow user login
Else
  Create new user with given info
```

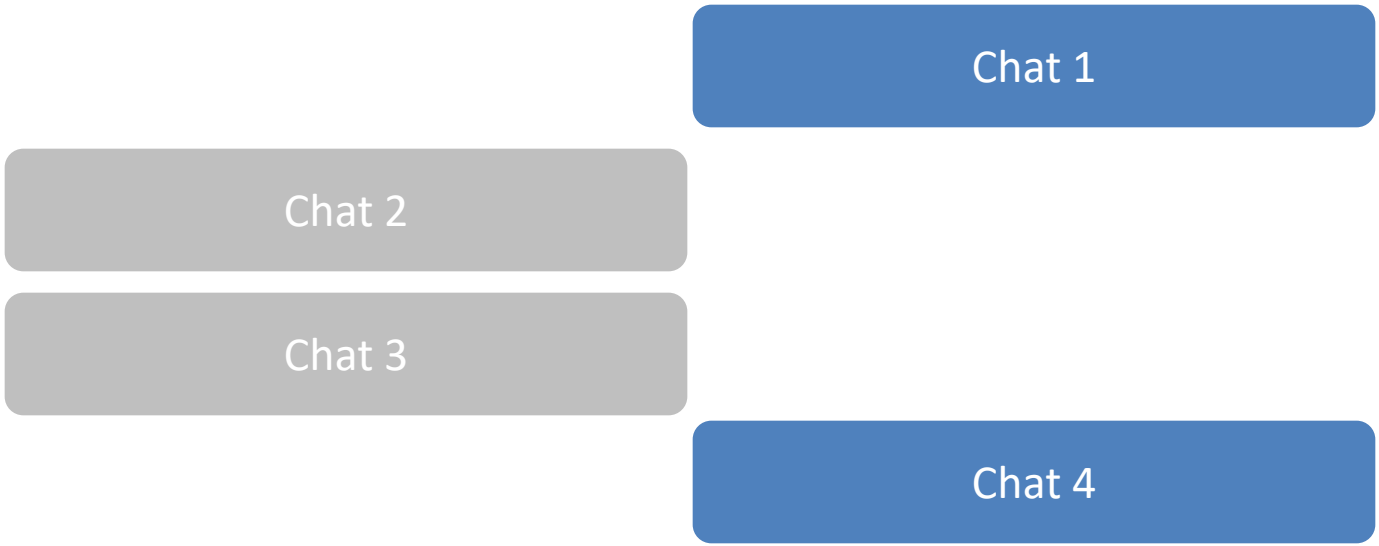
Chat Message System

- A user can send chat message to any other user in the system by username
- A user can view received chat messages
- A user can open chat box to chat with any user
- A user can broadcast a chat message so that every user can receive it
- PRO: user can send HTML formatted chats

Database

Chat:

- fromUsername (String)
- toUsername (String)
- message (String)
- time (Datetime)
- seen (Boolean)



POST method

GET	POST
Data can be transferred only via URL parameters	Data can be transferred in HTML data body
Used to transfer public facing data	Used to transfer sensitive data
Supports only small string data	Supports large data such as complex forms, images, etc.
Used to request data from server	Used to send data to the server

POST method

HTTP Request Format
GET /profile/save?name=nepathya&address=Tilottama HTTP/1.1 Accept: Connection: Cookie:
POST /profile?id=12345 HTTP/1.1 Accept: Connection: Cookie: <binary-data-body>

POST method

HTTP Request Pattern	

`GET /login HTTP/1.1`
`Accept:`
`Connection:`
`Cookie:`
	To get HTML page for login

`POST /login HTTP/1.1`
`Accept:`
`Connection:`
`Cookie:`
 	
`username=nepathya&password=nepal123`
	To send Login form data to server

Controller Types

@RestController	@Controller
The mapping can return any kinds of data.	The mapping returns only a string (i.e. name of a html page in templates directory)
Used for API based servers	Used for server-side rendering
Javascript based frameworks can be used to interact with the server.	Server side rendering engines like Thymeleaf can be used.

Thymeleaf

- Add the last line to your project's file **`build.gradle`** as follows:

```
dependencies {
implementation 'org.springframework.boot:spring-boot-starter-web'
testImplementation 'org.springframework.boot:spring-boot-starter-test'
testRuntimeOnly 'org.junit.platform:junit-platform-launcher'
implementation 'org.springframework.boot:spring-boot-starter-thymeleaf'
}
```

- Then **Gradle** > **Refresh Gradle Project**
- Now you can use Thymeleaf rendering in your spring boot project

Thymeleaf th:text

```
public String getHome(Model model) {
        LoginInfo info = /* get logged in user */;
    1   model.addAttribute("name", "Nepathya");
        model.addAttribute("user", info);
        return "home.html";
}
```

Controller

```
1   <h1 th:text="${name}"></h1>
        <h1>Nepathya</h1>

    <h2 th:text="${user.username}"></h2>
        <h2>Ram</h2>
```

generates

generates

View

```
public class LoginInfo {
        private String username;
        private String password;
…
}
```

Model

Thymeleaf **th:text**

```
<p th:text="${name}"></p>
```

```
<p>Nepathya</p>
```

```
<p th:text="'Welcome, ' + ${name} + '!'"></p>
```

```
<p>Welcome, Nepathya!</p>
```

Thymeleaf **th:if**

```
<p th:if="${isActive}">Active</p>
```

```
<p>Active</p>    <!-- visible only when isActive = true -->
```

```
<p th:if="${user.email != null}">Email is present!</p>
```

```
<p>Email is present!</p>
```

Thymeleaf **th:each**

```
<ol>
  <li th:each="item: ${items}" th:text="${item.name}"></li>
</ol>
```

```
<ol>
    <li>Mouse</li>
    <li>Keyboard</li>
    <li>External HDD</li>
</ol>
```