MVC Patterns | OOAD LAB-9

Details :

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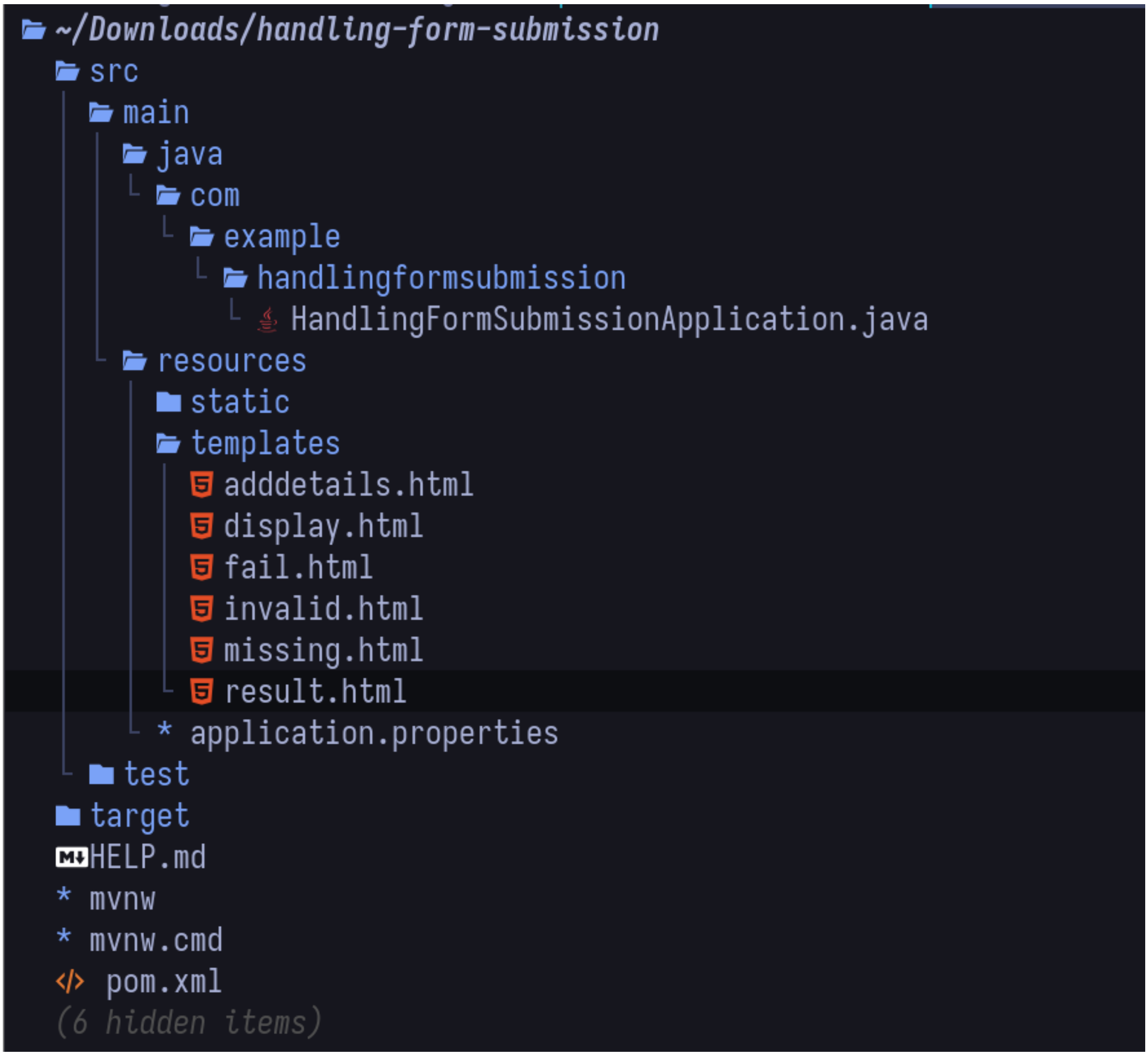
Lab content :

- File structure :

  Used this spring starter to create this project. This gives us a structure like so :



```
~/Downloads/handling-form-submission
  src
  │ main
  │ │ java
  │ │ └ com
  │ │   └ example
  │ │     └ handlingformsubmission
  │ │       └ HandlingFormSubmissionApplication.java
  │ └ resources
  │   │ static
  │   │ templates
  │   │ │ adddetails.html
  │   │ │ display.html
  │   │ │ fail.html
  │   │ │ invalid.html
  │   │ │ missing.html
  │   │ └ result.html
  │   └ * application.properties
  └ test
  target
  HELP.md
  * mvnw
  * mvnw.cmd
  pom.xml
  (6 hidden items)
```

> Note : The `html` files were later added by me as per requriments

- Code [Controller and Model]:

```java
package com.example.handlingformsubmission;

import java.util.HashMap;

import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;
import org.springframework.stereotype.Controller;
import org.springframework.ui.Model;
import org.springframework.web.bind.annotation.GetMapping;
import org.springframework.web.bind.annotation.ModelAttribute;
import org.springframework.web.bind.annotation.PostMapping;
import org.springframework.web.bind.annotation.RequestParam;

class Employee {
   private String ID;
   private String name;
   private String age;
   private String Department;
   private String role;

   Employee(){}

   Employee(String ID, String name, String age, String department, String role) {
      this.ID = ID;
      this.name = name;
```

```
        this.age = age;
        this.Department = department;
        this.role = role;
    }

    public String getID() {
        return ID;
    }

    public void setID(String iD) {
        ID = iD;
    }

    public String getName() {
        return name;
    }

    public void setName(String name) {
        this.name = name;
    }

    public String getAge() {
        return age;
    }

    public void setAge(String age) {
        this.age = age;
    }

    public String getDepartment() {
        return Department;
    }

    public void setDepartment(String department) {
        Department = department;
    }

    public String getRole() {
        return role;
    }

    public void setRole(String role) {
        this.role = role;
    }
}

class EmployeeDataModel {
    private static HashMap<String, Employee> m;
    static {
        m = new HashMap<String, Employee>();
    }

    public static void addEmployee(String ID, String
name, String age, String department, String role) {
        Employee e = new Employee(ID, name, age,
department, role);
        m.put(ID, e);
    }

    public static Employee getEmployee(String ID) {
        Employee e = m.get(ID);
        return e;
    }
}

@Controller
class EmployeeController {
    @GetMapping("/getdetails")
    public String displayDetails(@RequestParam("ID")
String ID, Model model) {
        Employee e = EmployeeDataModel.getEmployee(ID);
        if (e == null) {
            return "invalid";
        }
        model.addAttribute("e", e);
        return "display";
```

```
   }

   @GetMapping("/adddetails")
   public String adddetailsForm(Model model) {
      model.addAttribute("employee",new Employee());
      return "adddetails";
   }

   @PostMapping("/adddetails")
   public String adddetailsSubmit(@ModelAttribute
Employee e, Model model) {
      model.addAttribute("adddetails", e);
      if(EmployeeDataModel.getEmployee(e.getID())!=null)
{
         return "fail";
      }
      if (e.getID() == "" || e.getName() == "" ||
e.getAge() == "" || e.getDepartment() == "" ||
e.getRole() == ""){
         return "missing";
      }
      EmployeeDataModel.addEmployee(e.getID(),
e.getName(), e.getAge(), e.getDepartment(),
e.getRole());
      return "result";
   }
}

@SpringBootApplication
public class HandlingFormSubmissionApplication {

   public static void main(String[] args) {

SpringApplication.run(HandlingFormSubmissionApplication.
class, args);
   }

}
```

- As we can see in the above code and FS structure screenshot, I have 6 view. The code for 6 views :
  adddata.html :

```
<!DOCTYPE HTML>
<html xmlns:th="https://www.thymeleaf.org">

<head>
   <title>Getting Started: Handling Form Submission</title>
   <meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
</head>

<body>
   <h1>Add employee details</h1>
   <form action="#" th:action="@{/adddetails}" th:object="${employee}" method="post">
      <p>Id: <input type="text" th:field="*{ID}" /></p>
      <p>Name: <input type="text" th:field="*{name}" /></p>
      <p>Age: <input type="text" th:field="*{age}" /></p>
      <p>Department: <input type="text" th:field="*{department}" /></p>
      <p>Role: <input type="text" th:field="*{role}" /></p>
      <p><input type="submit" value="Submit" /> <input type="reset" value="Reset" /></p>
   </form>
</body>

</html>
```

display.html :

```
<!DOCTYPE HTML>
<html xmlns:th="https://www.thymeleaf.org">

<head>
   <title>Displaying Employee details!</title>
   <meta http-equiv="Content-Type" content="text/html;
charset=UTF-8" />
</head>

<body>
   <h1>Employee Record Result :</h1>
   <p th:text="'ID: ' + ${e.ID}" />
   <p th:text="'Name: ' + ${e.name}" />
   <p th:text="'Age: ' + ${e.age}" />
   <p th:text="'Department: ' + ${e.department}" />
   <p th:text="'Role: ' + ${e.role}" />
</body>
</html>
```

fail.html :

```
<!DOCTYPE HTML>
<html xmlns:th="https://www.thymeleaf.org">

<head>
   <title>Getting Started: Handling Form
Submission</title>
   <meta http-equiv="Content-Type" content="text/html;
charset=UTF-8" />
</head>

<body>
   <h1>Failed to insert Employee records :(, possibly
cus of repeating ID.</h1>
</body>
</html>
```

invalid.html :

```html
<!DOCTYPE HTML>
<html xmlns:th="https://www.thymeleaf.org">

<head>
   <title>Displaying Employee details!</title>
   <meta http-equiv="Content-Type" content="text/html;
charset=UTF-8" />
</head>

<body>
   <h1>Result</h1>
   <p> Invalid Employee ID, no employee with that ID
found! </p>
</body>
</html>
```

missing.html :

```html
<!DOCTYPE HTML>
<html xmlns:th="https://www.thymeleaf.org">

<head>
   <title>Getting Started: Handling Form
Submission</title>
   <meta http-equiv="Content-Type" content="text/html;
charset=UTF-8" />
</head>

<body>
   <h1>Missing fields, please provide all fileds!</h1>
</body>

</html>
```

result.html :

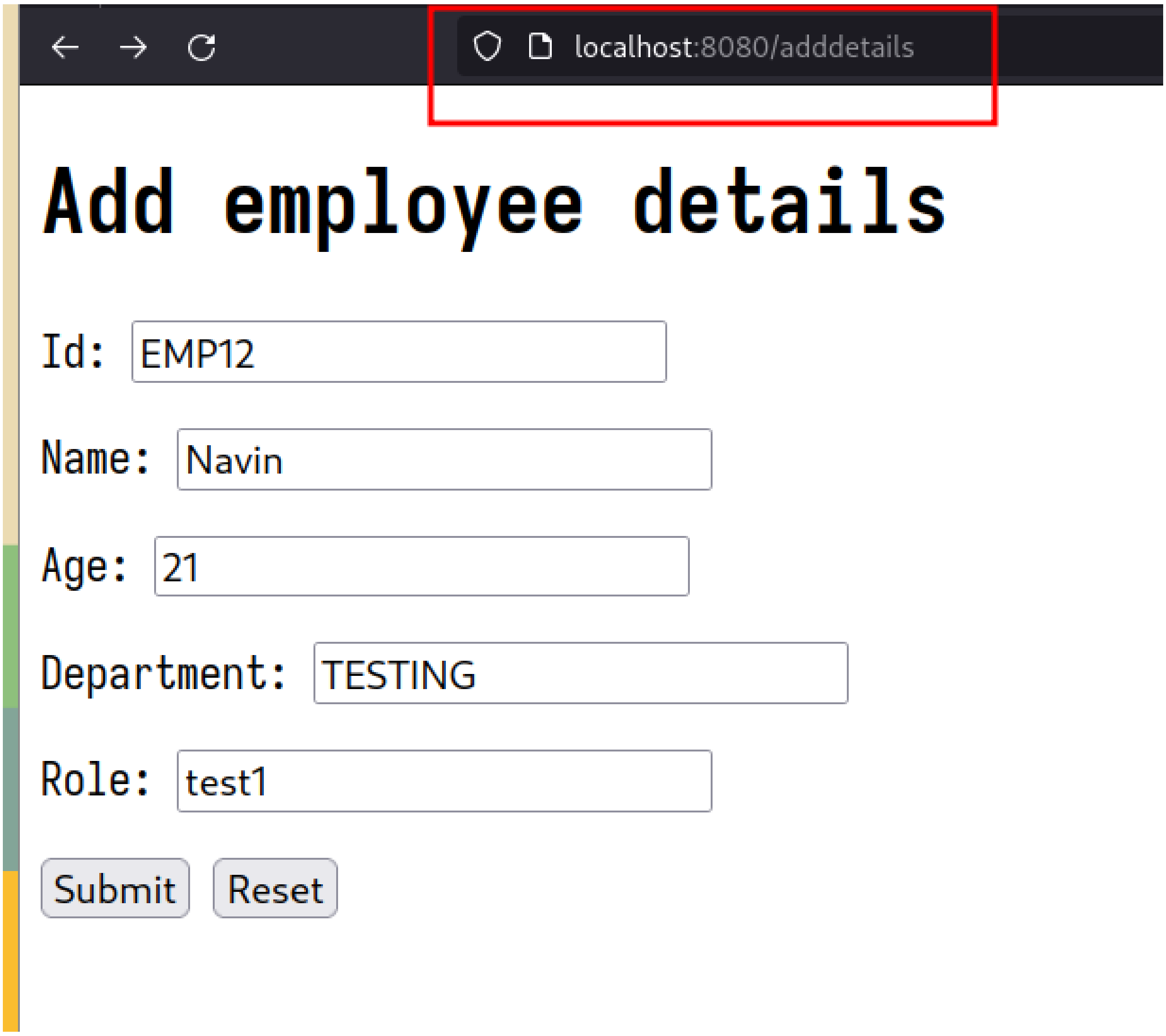
```html
<!DOCTYPE HTML>
<html xmlns:th="https://www.thymeleaf.org">

<head>
   <title>Getting Started: Handling Form Submission</title>
   <meta http-equiv="Content-Type" content="text/html; charset=UTF-8" />
</head>

<body>
   <h1>Inserted Employee records!</h1>
</body>

</html>
```

- Screenshot :



localhost:8080/adddetails

Add employee details

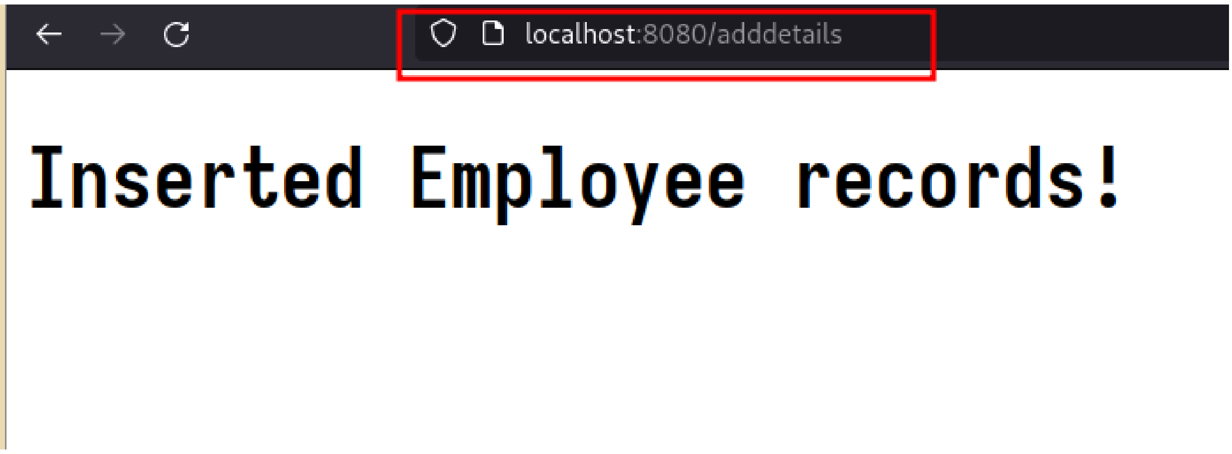
Id: EMP12

Name: Navin

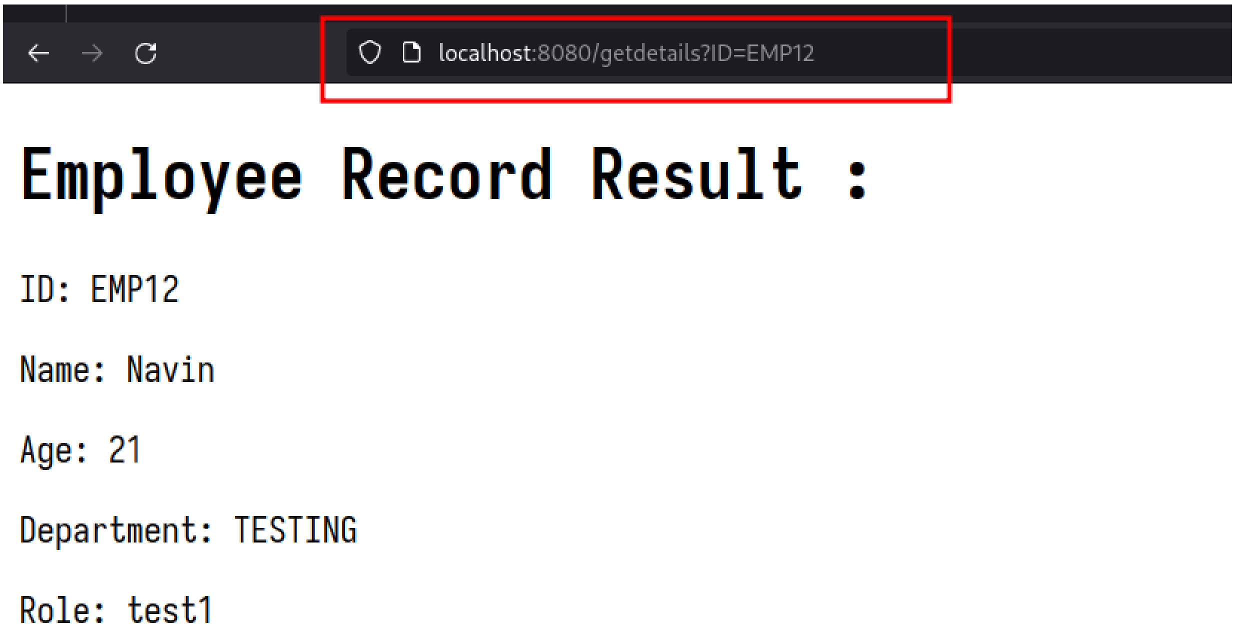
Age: 21

Department: TESTING

Role: test1



Inserted Employee records!



Employee Record Result :

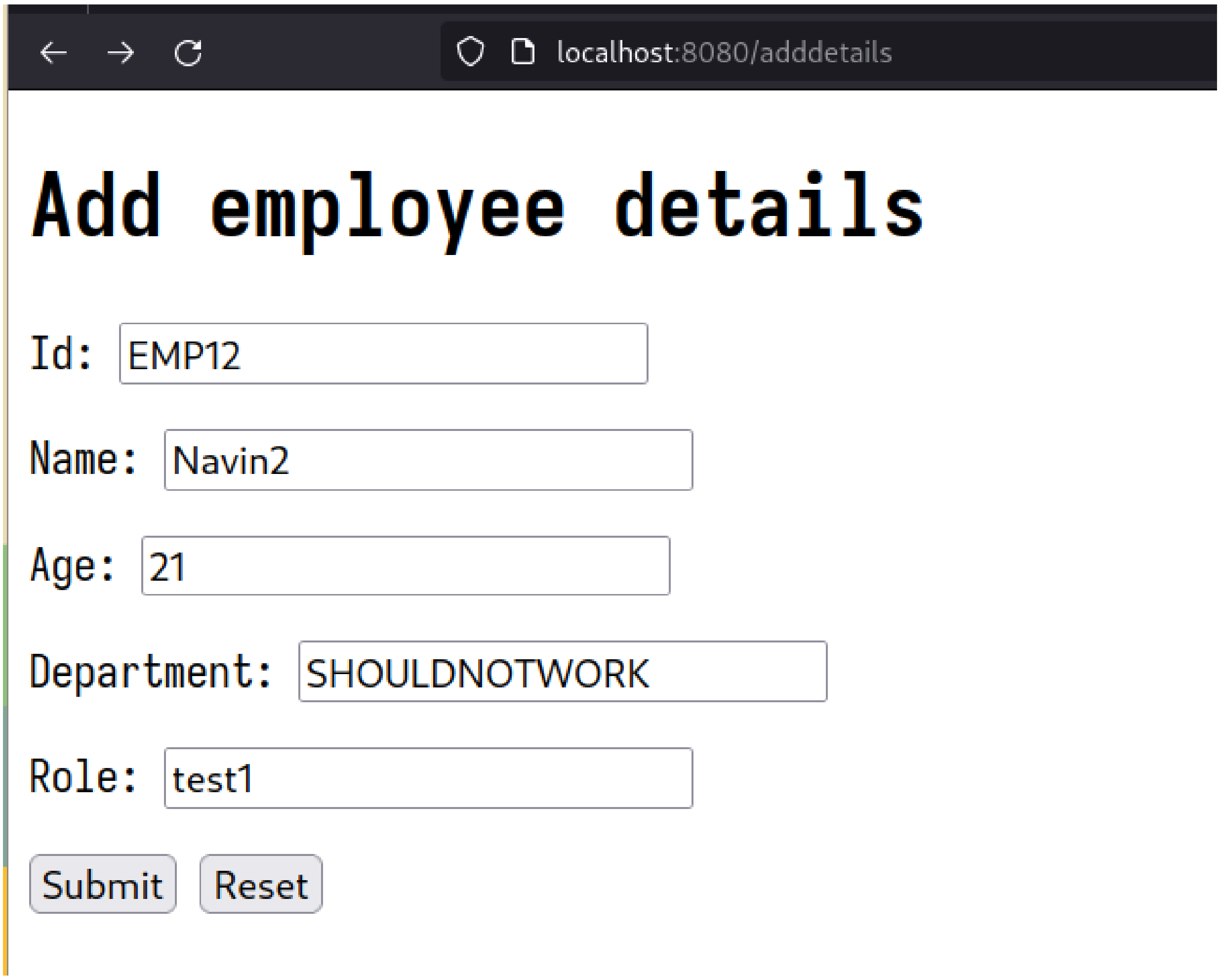
ID: EMP12

Name: Navin

Age: 21

Department: TESTING

Role: test1



Add employee details

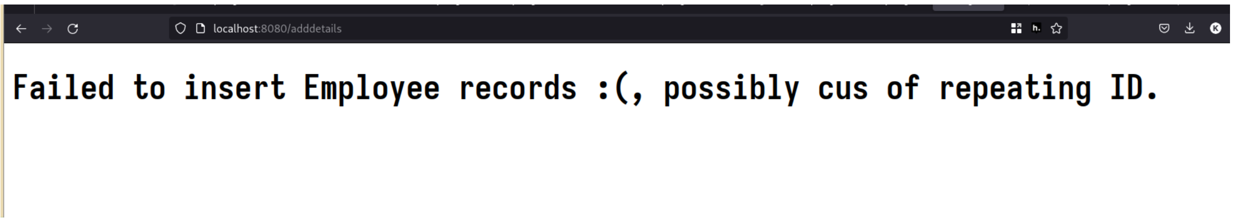
Id: EMP12

Name: Navin2

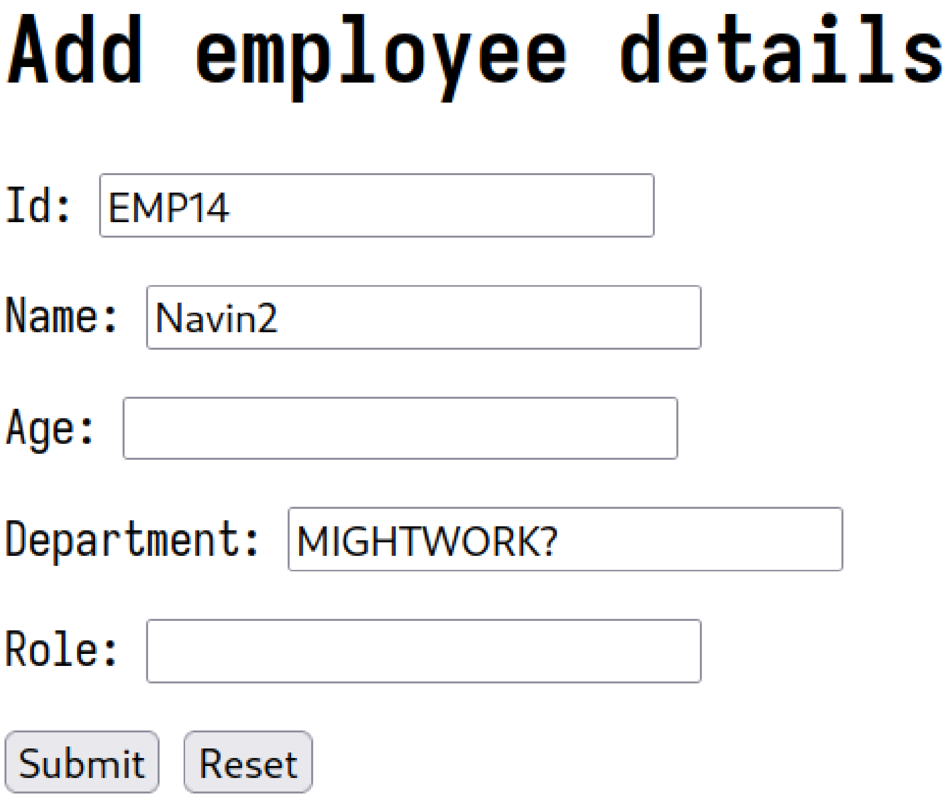
Age: 21

Department: SHOULDNOTWORK

Role: test1



Failed to insert Employee records :(, possibly cus of repeating ID.



Add employee details

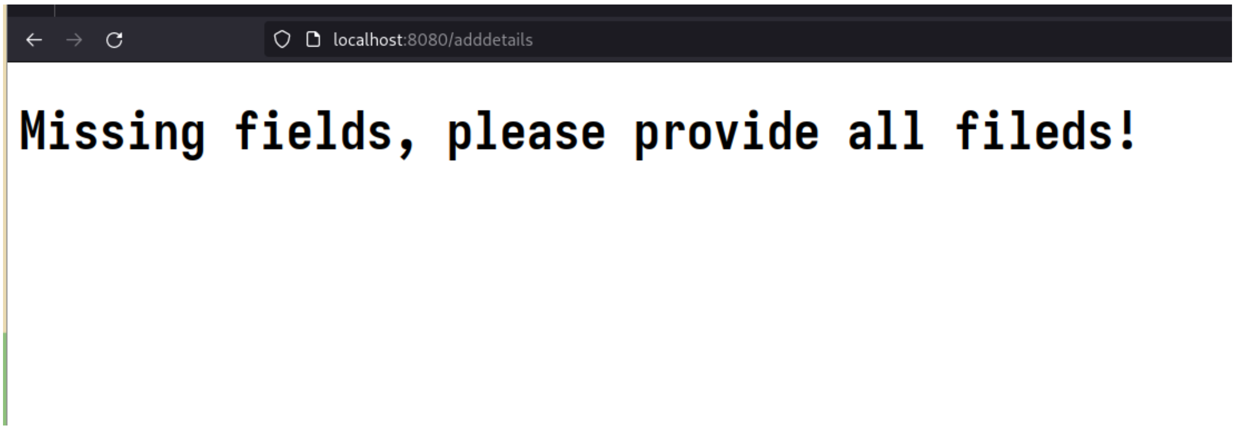
Id: EMP14

Name: Navin2

Age:

Department: MIGHTWORK?

Role:



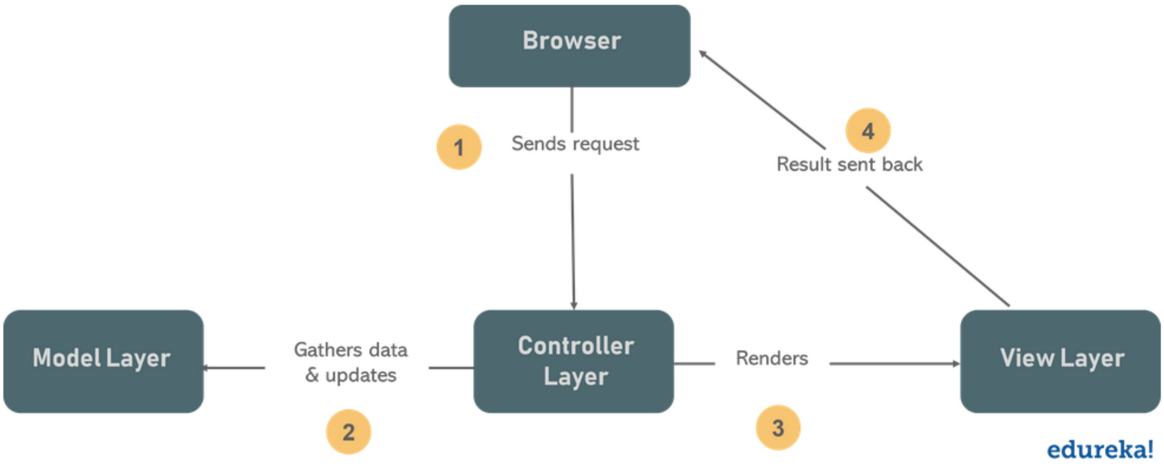
Missing fields, please provide all fileds!

MVC Pattern

About MVC pattern

- MVC is an architechtural pattern, a pattern that seperated application interface and application logic.
- It does so my have 3 componenets to the program, the `model`, `view` and `controller`.

- It does something like so :



- But in the above executed program, the interface is the STDOUT and STDOUT.

Advantages of MVC :

- Helps greately withh `scalability`.
- Helps with coding in a multi developer environment.
- Greately increases reusability of the code!
- MVC being a widely used pattern, implementing such a pattens makes it easier for new programmers to maintain and develop on top of existing code.

Feature of Spring MVC :

- Allows to plugins to make view creation very easy, as in the above example, we are using something called `thymeleaf`. That finds the object strcutre and maps form fields almost with no additional work!
- The way the framwork usage is designed, you can keep the object in context the same but altering the views, this leads to very powerfull usage of the library.

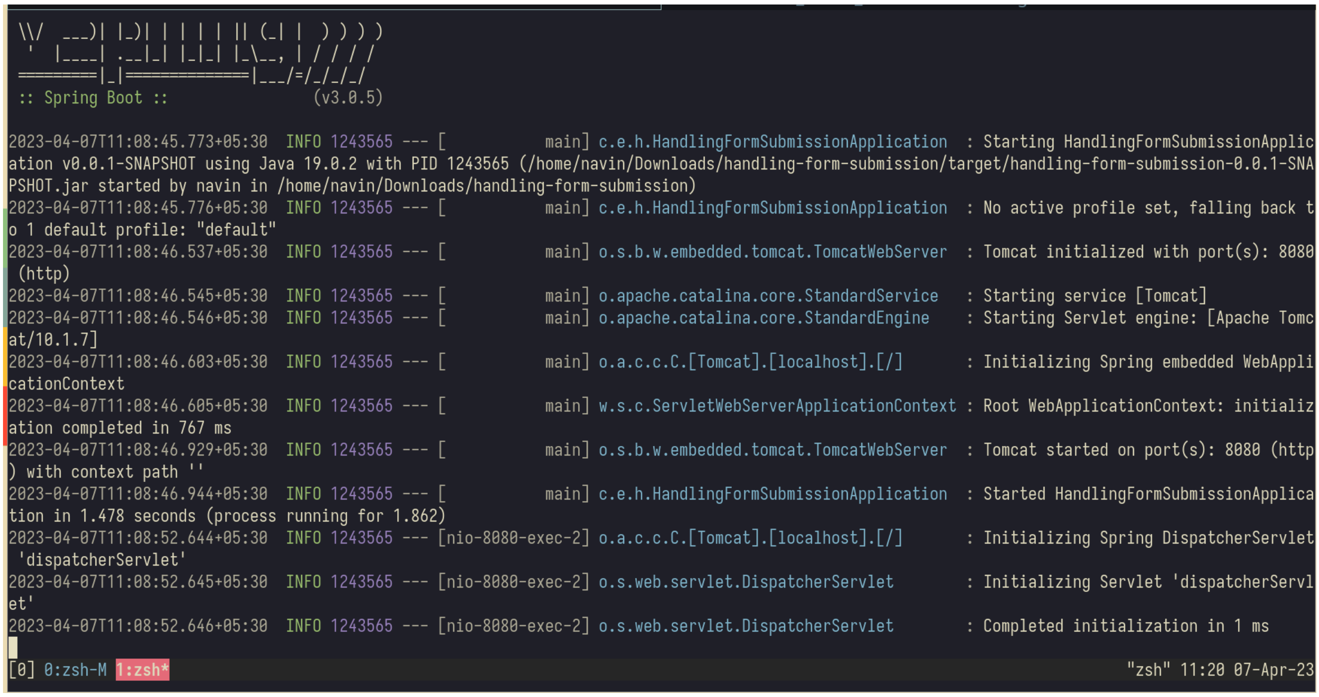
Problem statement :

- To record and display Employee records.

Code :

> Pasted in above sections

Running applications :



```
 \\/  ___)| |_)| | | | | || (_| |  ) ) ) )
  '  |____| .__|_| |_|_| |_\__, | / / / /
 =========|_|==============|___/=/_/_/_/
 :: Spring Boot ::                (v3.0.5)

2023-04-07T11:08:45.773+05:30  INFO 1243565 --- [           main] c.e.h.HandlingFormSubmissionApplication  : Starting HandlingFormSubmissionApplic
ation v0.0.1-SNAPSHOT using Java 19.0.2 with PID 1243565 (/home/navin/Downloads/handling-form-submission/target/handling-form-submission-0.0.1-SNA
PSHOT.jar started by navin in /home/navin/Downloads/handling-form-submission)
2023-04-07T11:08:45.776+05:30  INFO 1243565 --- [           main] c.e.h.HandlingFormSubmissionApplication  : No active profile set, falling back t
o 1 default profile: "default"
2023-04-07T11:08:46.537+05:30  INFO 1243565 --- [           main] o.s.b.w.embedded.tomcat.TomcatWebServer  : Tomcat initialized with port(s): 8080
 (http)
2023-04-07T11:08:46.545+05:30  INFO 1243565 --- [           main] o.apache.catalina.core.StandardService   : Starting service [Tomcat]
2023-04-07T11:08:46.546+05:30  INFO 1243565 --- [           main] o.apache.catalina.core.StandardEngine    : Starting Servlet engine: [Apache Tomc
at/10.1.7]
2023-04-07T11:08:46.603+05:30  INFO 1243565 --- [           main] o.a.c.c.C.[Tomcat].[localhost].[/]       : Initializing Spring embedded WebAppli
cationContext
2023-04-07T11:08:46.605+05:30  INFO 1243565 --- [           main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initializ
ation completed in 767 ms
2023-04-07T11:08:46.929+05:30  INFO 1243565 --- [           main] o.s.b.w.embedded.tomcat.TomcatWebServer  : Tomcat started on port(s): 8080 (http
) with context path ''
2023-04-07T11:08:46.944+05:30  INFO 1243565 --- [           main] c.e.h.HandlingFormSubmissionApplication  : Started HandlingFormSubmissionApplica
tion in 1.478 seconds (process running for 1.862)
2023-04-07T11:08:52.644+05:30  INFO 1243565 --- [nio-8080-exec-2] o.a.c.c.C.[Tomcat].[localhost].[/]       : Initializing Spring DispatcherServlet
 'dispatcherServlet'
2023-04-07T11:08:52.645+05:30  INFO 1243565 --- [nio-8080-exec-2] o.s.web.servlet.DispatcherServlet        : Initializing Servlet 'dispatcherServl
et'
2023-04-07T11:08:52.646+05:30  INFO 1243565 --- [nio-8080-exec-2] o.s.web.servlet.DispatcherServlet        : Completed initialization in 1 ms

[0] 0:zsh-M 1:zsh*                                                                                                         "zsh" 11:20 07-Apr-23
```

UI Screenshots :

> Provided in above sections

Screenshot of database

- In the above code, I'm using an in memory `HashMap` as the database.