

LABORATORIO N° 09

**Desarrollo de
aplicaciones Web:**
Aplicaciones web con
Spring Boot y MongoDB.



DOCENTE:
Coello Palomino, Ricardo

CURSO:
Desarrollo de aplicaciones Web
5 - C24 - Sección A B C D E

DESARROLLO DE APLICACIONES WEB AVANZADO: Aplicaciones web con Spring Starters y Actuators

I. Capacidades

- Implementar una aplicación JavaSpring Boot 2.1 Actuators y Starters

II. Seguridad

- En este laboratorio está prohibida la manipulación del hardware, conexiones eléctricas o de red. Así como la ingesta de alimentos y bebidas.
- Ubicar maletines y/o mochilas en lugar destinado para tal fin.
- Dejar la mesa de trabajo y la silla utilizada limpias y ordenadas.

III. Fundamento teórico

- Revise el material de la semana correspondiente antes del desarrollo del laboratorio.

IV. Normas empleadas

- *No aplica*

V. Recursos

- En este laboratorio, cada estudiante trabajará con una computadora con Windows 10.
- La instalación del software requerido se realizará en el equipo virtual.

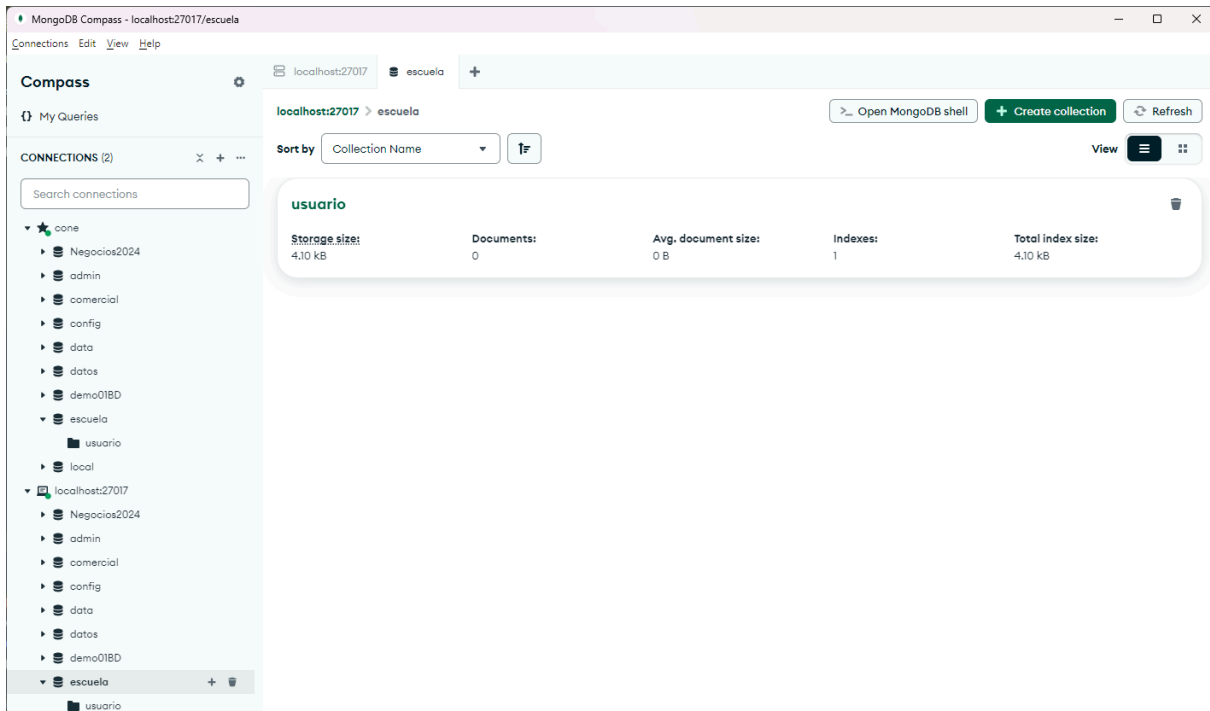
VI. Metodología para el desarrollo de la tarea

- El desarrollo del laboratorio es individual

VII. Procedimiento

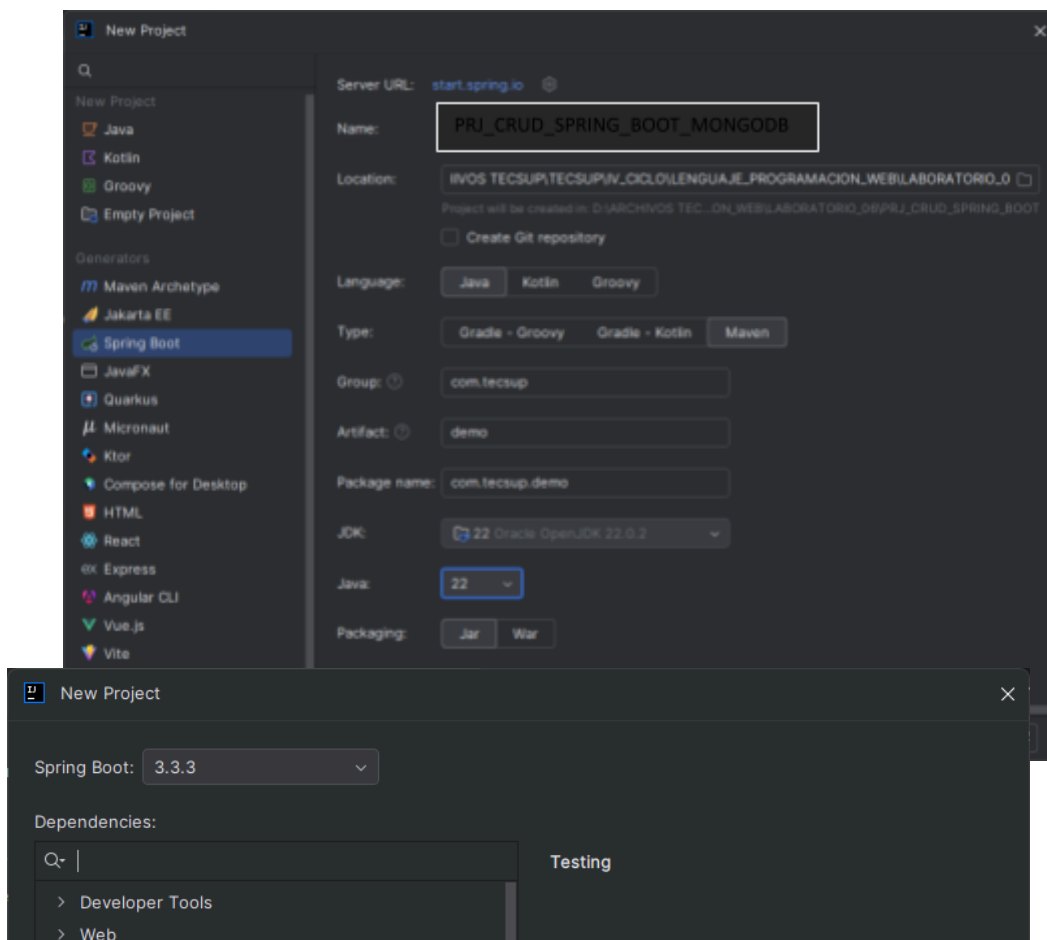
Base de Datos

- 1.- Abrir el programa MogoDB
- 2.- Crear la Base de Datos Escuela

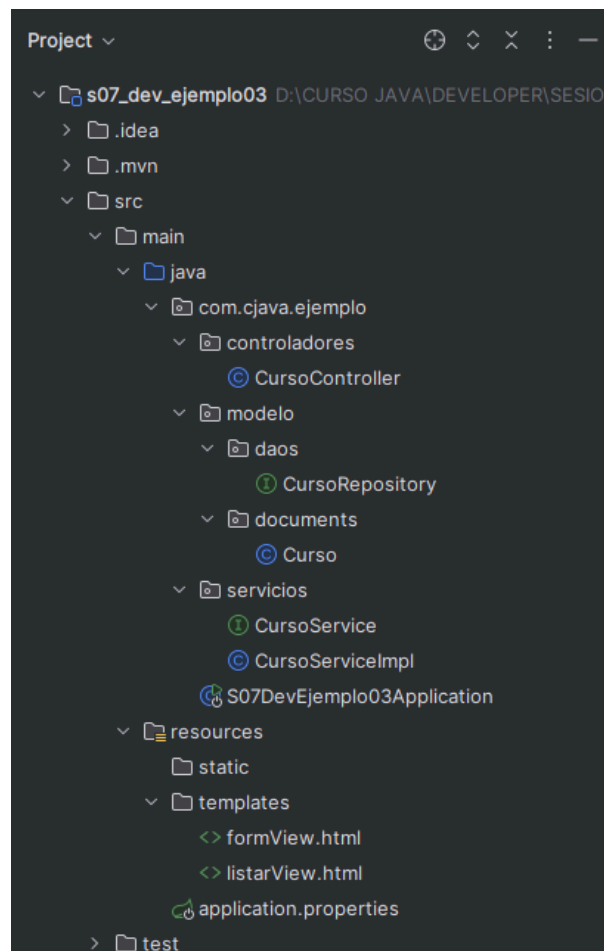


PROYECTO SPRING BOOT

- 3.- Crear el siguiente proyecto:



4.- Crear un Estructura de carpeta.



5.- Revisar el Archivo pom.xml

```

pom.xml (s07_dev_ejemplo03) x
1  <?xml version="1.0" encoding="UTF-8"?>
2  <project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
3      xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 https://maven.apache.org/xsd/maven-4.0.0.xsd">
4      <modelVersion>4.0.0</modelVersion>
5      <parent>
6          <groupId>org.springframework.boot</groupId>
7          <artifactId>spring-boot-starter-parent</artifactId>
8          <version>3.0.1</version>
9          <relativePath/> <!-- lookup parent from repository -->
10     </parent>
11     <groupId>com.cjava</groupId>
12     <artifactId>s07_dev_ejemplo03</artifactId>
13     <version>0.0.1-SNAPSHOT</version>
14     <name>s07_dev_ejemplo03</name>
15     <description>s07_dev_ejemplo03</description>
16     <properties>
17         <java.version>17</java.version>
18     </properties>
19     <dependencies>
20         <dependency>
21             <groupId>org.springframework.boot</groupId>
22             <artifactId>spring-boot-starter-data-mongodb</artifactId>
23         </dependency>
24         <dependency>
25             <groupId>org.springframework.boot</groupId>
26             <artifactId>spring-boot-starter-thymeleaf</artifactId>
27         </dependency>
28         <dependency>
29             <groupId>org.springframework.boot</groupId>
30             <artifactId>spring-boot-starter-web</artifactId>
31         </dependency>
32         <dependency>
33             <groupId>javax.validation</groupId>
34             <artifactId>validation-api</artifactId>
35             <version>2.0.1.Final</version>
36         </dependency>
37         <dependency>
38             <groupId>org.springframework.boot</groupId>
39             <artifactId>spring-boot-starter-test</artifactId>
40             <scope>test</scope>
41         </dependency>
42         <dependency>
43             <groupId>org.aspectj</groupId>
44             <artifactId>aspectjrt</artifactId>
45         </dependency>
46     </dependencies>
47
48     <build>
49         <plugins>
50             <plugin>
51                 <groupId>org.springframework.boot</groupId>
52                 <artifactId>spring-boot-maven-plugin</artifactId>
53             </plugin>
54             <plugin>
55                 <groupId>org.apache.maven.plugins</groupId>
56                 <artifactId>maven-compiler-plugin</artifactId>
57                 <configuration>
58                     <source>17</source>
59                     <target>17</target>
60                 </configuration>
61             </plugin>
62         </plugins>
63     </build>
64 </project>

```

6.- Configurar en la Application.properties

```
application.properties x
1 spring.data.mongodb.uri=mongodb://localhost:27017/escuela
2
3 server.port=8087
4
```

7.- Clase Curso

```
Curso.java x
1 package com.cjava.ejemplo.modelo.documents;
2 import org.springframework.data.annotation.Id;
3 import org.springframework.data.mongodb.core.mapping.Document;
4 @Document(collection = "cursos") 16 usages
5 public class Curso {
6     @Id
7     private String id;
8     private String nombre; 4 usages
9     private int creditos; 4 usages
10
11     public Curso() { 1 usage
12     }
13     public Curso(String id, String nombre, int creditos) { no usages
14         this.id = id;
15         this.nombre = nombre;
16         this.creditos = creditos;
17     }
18
19     public String getId() { return id; }
20
21     public void setId(String id) { this.id = id; }
22
23     public String getNombre() { return nombre; }
24
25     public void setNombre(String nombre) { this.nombre = nombre; }
26
27     public int getCreditos() { return creditos; }
28
29     public void setCreditos(int creditos) { this.creditos = creditos; }
30
31     @Override
32     public String toString() {
33         return "Curso{" +
34             "id=" + id +
35             ", nombre='" + nombre + '\'' +
36             ", creditos=" + creditos +
37             '}';
38     }
39 }
```

8.- Interfaz CursoRepository

```
CursoRepository.java x
1 package com.cjava.ejemplo.modelo.daos;
2
3 import com.cjava.ejemplo.modelo.documents.Curso;
4 import org.springframework.data.mongodb.repository.MongoRepository;
5
6 public interface CursoRepository extends MongoRepository<Curso, String> { 2 usages
7 }
8
```

9.- Clase CursoService

```
CursoService.java x
1 package com.cjava.ejemplo.servicios;
2
3 import com.cjava.ejemplo.modelo.documents.Curso;
4
5 import java.util.List;
6
7 public interface CursoService { 3 usages 1 implementation
8
9     public List<Curso> listar(); 2 usages 1 implementation
10
11     public void grabar(Curso curso); 1 usage 1 implementation
12
13     public Curso buscar(String id); 2 usages 1 implementation
14
15     public void eliminar(String id); 1 usage 1 implementation
16
17 }
```

10.- Clase CursoServiceImpl

```
CursoServiceImpl.java x
1 package com.cjava.ejemplo.servicios;
2
3 import com.cjava.ejemplo.modelo.documents.Curso;
4 import com.cjava.ejemplo.modelo.daos.CursoRepository;
5 import org.springframework.beans.factory.annotation.Autowired;
6 import org.springframework.stereotype.Service;
7 import org.springframework.transaction.annotation.Transactional;
8
9 import java.util.List;
10
11 @Service
12 public class CursoServiceImpl implements CursoService {
13
14     @Autowired
15     private CursoRepository dao;
16
17     @Override 1 usage
18     public void grabar(Curso curso) { dao.save(curso); }
19
20
21
22     @Override 1 usage
23     public void eliminar(String id) { dao.deleteById(id); }
24
25
26
27     @Override 2 usages
28     @Transactional(readOnly = true)
29     public Curso buscar(String id) { return dao.findById(id).orElse(other: null); }
30
31
32
33     @Override 2 usages
34     @Transactional(readOnly = true)
35     public List<Curso> listar() { return (List<Curso>)dao.findAll(); }
36
37
38 }
```

11.- Clase CursoController

```

CursoController.java
1  package com.cjava.ejemplo.controladores;
2
3  import com.cjava.ejemplo.modelo.entidades.Curso;
4  import com.cjava.ejemplo.servicios.CursoService;
5  import org.springframework.beans.factory.annotation.Autowired;
6  import org.springframework.stereotype.Controller;
7  import org.springframework.ui.Model;
8  import org.springframework.validation.BindingResult;
9  import org.springframework.web.bind.annotation.PathVariable;
10 import org.springframework.web.bind.annotation.RequestMapping;
11 import org.springframework.web.bind.annotation.RequestMethod;
12 import org.springframework.web.bind.annotation.SessionAttributes;
13 import org.springframework.web.bind.support.SessionStatus;
14
15 import javax.validation.Valid;
16 import java.util.Map;
17
18 @Controller
19 @SessionAttributes("curso")
20 public class CursoController {
21     @Autowired
22     private CursoService servicio;
23
24     @RequestMapping(value = @"/listar", method = RequestMethod.GET)
25     public String listar(Model model) {
26         model.addAttribute("titulo", "Listado de Cursos C-JAVA");
27         model.addAttribute("cursos", servicio.listar());
28         return "listarView";
29     }
30
31     @RequestMapping(value = @"/form")
32     public String crear(Map<String, Object> model) {
33         Curso curso = new Curso();
34         model.put("curso", curso);
35         model.put("titulo", "Formulario de Curso");
36         return "formView";
37     }
38
39     @RequestMapping(value = @"/form/{id}")
40     public String editar(@PathVariable(value = "id") Integer id, Map<String, Object> model) {
41
42         Curso curso = null;
43
44         if (id > 0) {
45             curso = servicio.buscar(id);
46         } else {
47             return "redirect:/listar";
48         }
49
50         model.put("curso", curso);
51         model.put("titulo", "Editar Curso");
52         return "formView";
53     }
54
55     @RequestMapping(value = @"/form", method = RequestMethod.POST)
56     public String guardar(@Valid Curso curso, BindingResult result, Model model, SessionStatus status) {
57         if (result.hasErrors()) {
58             model.addAttribute("titulo", "Formulario de Curso");
59             return "formView";
60         }
61         //System.out.println(curso);
62         servicio.grabar(curso);
63         status.setComplete();
64         return "redirect:/listar";
65     }
66
67     @RequestMapping(value = @"/eliminar/{id}")
68     public String eliminar(@PathVariable(value = "id") Integer id) {
69
70         if (id > 0) {
71             servicio.eliminar(id);
72         }
73         return "redirect:/listar";
74     }
75 }

```


12.- ListarView

```

<> EstarView.html x
1  <!DOCTYPE html>
2  <html xmlns:th="http://www.thymeleaf.org">
3
4  <head>
5      <title>Title</title>
6      <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.3/dist/css/bootstrap.min.css" rel="stylesheet">
7  </head>
8  <body>
9
10 <header>
11     <nav class="navbar navbar-expand-lg fixed-top" style="background-color: #1e7e34;">
12         <div class="container">
13             <a class="navbar-brand fs-3" href="#" style="color: white;">Spring Boot</a>
14             <button class="navbar-toggler" type="button" data-bs-toggle="collapse" data-bs-target="#navbarScroll"
15                 aria-controls="navbarScroll" aria-expanded="false" aria-label="Toggle navigation">
16                 <span class="navbar-toggler-icon"></span>
17             </button>
18             <div class="collapse navbar-collapse" id="navbarScroll">
19                 <ul class="navbar-nav mx-auto my-2 my-lg-0 navbar-nav-scroll" style="--bs-scroll-height: 100px;">
20                     <li class="nav-item">
21                         <a class="nav-link link-light" aria-current="page" th:href="@{/}">Inicio</a>
22                     </li>
23
24                     <li class="nav-item dropdown">
25                         <a class="nav-link link-light dropdown-toggle" href="#" role="button" data-bs-toggle="dropdown"
26                             aria-expanded="false">
27                             Gestión Cursos
28                         </a>
29                         <ul class="dropdown-menu">
30                             <li><a class="dropdown-item" th:href="@{/listar}">Cursos</a></li>
31                             <li><a class="dropdown-item" href="#">Credito</a></li>
32                         </ul>
33                     </li>
34
35                     <li class="nav-item dropdown">
36                         <a class="nav-link dropdown-toggle link-light" href="#" role="button" data-bs-toggle="dropdown"
37                             aria-expanded="false">
38                             Gestión Docente
39                         </a>
40                         <ul class="dropdown-menu">
41                             <li><a class="dropdown-item" th:href="@{/docente}">Docentes</a></li>
42                             <li><a class="dropdown-item" href="#">Especialidad</a></li>
43                         </ul>
44                     </li>
45
46                     <li class="nav-item dropdown">
47                         <a class="nav-link dropdown-toggle link-light" href="#" role="button" data-bs-toggle="dropdown"
48                             aria-expanded="false">
49                             Gestión Alumnos
50                         </a>
51                         <ul class="dropdown-menu">
52                             <li><a class="dropdown-item" href="#">Alumnos</a></li>
53                             <li><a class="dropdown-item" href="#">Apoderado</a></li>
54                         </ul>
55                     </li>
56                 </ul>
57
58                 <form class="d-flex" role="search">
59                     <input class="form-control me-2" type="search" placeholder="Buscar" aria-label="Search">
60                     <button class="btn btn-outline-light" type="submit">Búsqueda</button>
61                 </form>
62             </div>
63         </nav>
64     </header>
65
66     <div class="container" style="margin-top: 90px;">
67         <h1>Listado de Cursos</h1>
68
69         <div style="padding: 10px;">
70             <p><a th:href="@{/form}" class="btn btn-success btn-xs">crear curso</a></p>
71         </div>

```

```

73
74     <table class="table table-primary table-hover table-bordered">
75         <thead class="table-light">
76             <tr style="text-align: center;">
77                 <th>CODIGO</th>
78                 <th>NOMBRES</th>
79                 <th>CREDITOS</th>
80                 <th>EDITAR</th>
81                 <th>ELIMINAR</th>
82             </tr>
83         </thead>
84         <tbody style="text-align: center;">
85             <tr th:each="curso: ${cursos}">
86                 <td th:text="${curso.id}"></td>
87                 <td th:text="${curso.nombre}"></td>
88                 <td th:text="${curso.creditos}"></td>
89
90                 <td><a class="btn btn-primary btn-xs" th:href="@{/form/} + ${curso.id}" th:text="editar"></a></td>
91                 <td><a class="btn btn-danger btn-xs" th:href="@{/eliminar/} + ${curso.id}" th:text="eliminar"
92                     onclick="return confirm('Estás seguro que quieres eliminar?');"></a></td>
93             </tr>
94         </tbody>
95     </table>
96 </div>
97
98 <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.3.3/dist/js/bootstrap.bundle.min.js" ></script>
99
100 </body>
101 </html>

```

13.- formView

```

<> formView.html x
1 <!DOCTYPE html>
2 <html xmlns:th="http://www.thymeleaf.org">
3
4 <head>
5     <title>Title</title>
6     <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.3/dist/css/bootstrap.min.css" rel="stylesheet">
7 </head>
8 <body>
9
10 <header>
11     <nav class="navbar navbar-expand-lg fixed-top" style="background-color: #1e7e34;">
12         <div class="container">
13             <a class="navbar-brand fs-3" href="#" style="color: white;">Spring Boot</a>
14             <button class="navbar-toggler" type="button" data-bs-toggle="collapse" data-bs-target="#navbarScroll"
15                 aria-controls="navbarScroll" aria-expanded="false" aria-label="Toggle navigation">
16                 <span class="navbar-toggler-icon"></span>
17             </button>
18             <div class="collapse navbar-collapse" id="navbarScroll">
19                 <ul class="navbar-nav mx-auto my-2 my-lg-0 navbar-nav-scroll" style="--bs-scroll-height: 100px;">
20                     <li class="nav-item">
21                         <a class="nav-link link-light" aria-current="page" th:href="@{/}">Inicio</a>
22                     </li>
23
24                     <li class="nav-item dropdown">
25                         <a class="nav-link link-light dropdown-toggle" href="#" role="button" data-bs-toggle="dropdown"
26                             aria-expanded="false">
27                             Gestión Cursos
28                         </a>
29                         <ul class="dropdown-menu">
30                             <li><a class="dropdown-item" th:href="@{/listar}">Cursos</a></li>
31                             <li><a class="dropdown-item" href="#">Credito</a></li>
32                         </ul>
33                     </li>

```

```

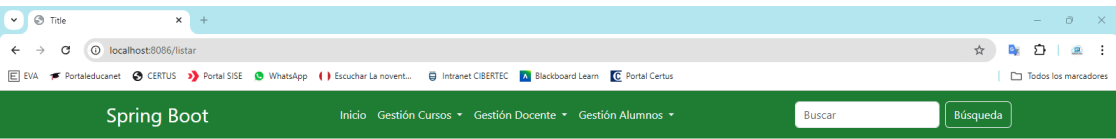
34
35     <li class="nav-item dropdown">
36         <a class="nav-link dropdown-toggle link-light" href="#" role="button" data-bs-toggle="dropdown"
37             aria-expanded="false">
38             Gestión Docente
39         </a>
40         <ul class="dropdown-menu">
41             <li><a class="dropdown-item" th:href="@{/docente}">Docentes</a></li>
42             <li><a class="dropdown-item" href="#">Especialidad</a></li>
43         </ul>
44     </li>
45
46     <li class="nav-item dropdown">
47         <a class="nav-link dropdown-toggle link-light" href="#" role="button" data-bs-toggle="dropdown"
48             aria-expanded="false">
49             Gestión Alumnos
50         </a>
51         <ul class="dropdown-menu">
52             <li><a class="dropdown-item" href="#">Alumnos</a></li>
53             <li><a class="dropdown-item" href="#">Apoderado</a></li>
54         </ul>
55     </li>
56 </ul>
57
58 <form class="d-flex" role="search">
59     <input class="form-control me-2" type="search" placeholder="Buscar" aria-label="Search">
60     <button class="btn btn-outline-light" type="submit">Búsqueda</button>
61 </form>
62 </div>
63 </div>
64 </nav>
65 </header>
66 <div class="container" style="margin-top:90px;" >
67     <h1>
68         Cursos
69     </h1>
70     <div th:object="@{curso}" th:remove="tag">
71         <ul th:if="@{#fields.hasErrors('*')}" class="alert alert-danger">
72             <li th:each="err: @{#fields.errors('*')}" th:text="@{err}"></li>
73         </ul>
74     </div>
75     <form th:action="@{/form}" th:object="@{curso}" method="post">
76         <div class="form-group row">
77             <label class="col-sm-2 col-form-label">Nombre</label>
78             <div class="col-sm-6">
79                 <input type="text" th:field="*{nombre}" class="form-control"
80                     th:errorclass="form-control alert-danger" /> <small
81                     class="form-text text-danger"
82                     th:if="@{#fields.hasErrors('nombre')}" th:errors="@{nombre}"></small>
83             </div>
84         </div>
85         <div class="form-group row">
86             <label class="col-sm-2 col-form-label">Creditos</label>
87             <div class="col-sm-6">
88                 <input type="text" th:field="*{creditos}" class="form-control"
89                     th:errorclass="form-control alert-danger" /> <small
90                     class="form-text text-danger"
91                     th:if="@{#fields.hasErrors('creditos')}" th:errors="@{creditos}"></small>
92             </div>
93         </div>
94
95         <div class="form-group row">
96             <div class="col-sm-6">
97                 <input type="submit" value="Crear Curso" class="btn btn-primary" />
98             </div>
99         </div>
100
101     </form>
102 </div>
103
104 <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.3.3/dist/js/bootstrap.bundle.min.js"></script>
105
106 </body>
107 </html>

```

14.- Ejecutar la aplicación

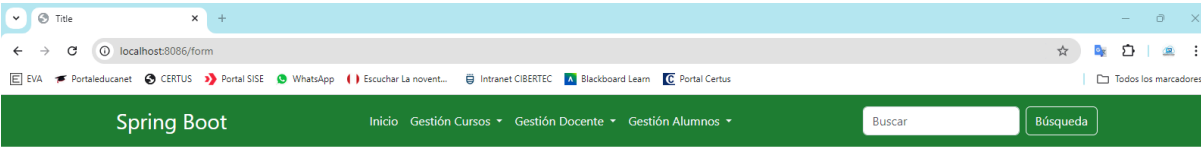
```
Run S07DevEjemplo03Application
[INFO] 17544 --- [main] c.e.ejemplo.S07DevEjemplo03Application : Starting S07DevEjemplo03Application using Java 17.0.12 with PID 17544 (0
[INFO] 17544 --- [main] c.e.ejemplo.S07DevEjemplo03Application : No active profile set, falling back to 1 default profile: "default"
[INFO] 17544 --- [main] s.d.r.c.RepositoryConfigurationDelegate : Bootstrapping Spring Data MongoDB repositories in DEFAULT mode.
[INFO] 17544 --- [main] s.d.r.c.RepositoryConfigurationDelegate : Finished Spring Data repository scanning in 52 ms. Found 1 MongoDB repos
[INFO] 17544 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 8087 (http)
[INFO] 17544 --- [main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
[INFO] 17544 --- [main] o.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/10.1.4]
[INFO] 17544 --- [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
[INFO] 17544 --- [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization completed in 2283 ms
[INFO] 17544 --- [main] org.mongodb.driver.client : MongoClient with metadata {"driver": {"name": "mongo-java-driver|sync|sp
[INFO] 17544 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 8087 (http) with context path ''
[INFO] 17544 --- [main] c.e.ejemplo.S07DevEjemplo03Application : Started S07DevEjemplo03Application in 3.773 seconds (process running for
[INFO] 17544 --- [localhost:27017] org.mongodb.driver.cluster : Monitor thread successfully connected to server with description Server0
```

15.- Insertar un registro



Listado de Cursos

| CODIGO | NOMBRES | CREDITOS | EDITAR | ELIMINAR |
|--------|------------|----------|-------------------------|---------------------------|
| 1 | Programmer | 5 | <button>editar</button> | <button>eliminar</button> |
| 2 | Developer | 5 | <button>editar</button> | <button>eliminar</button> |
| 3 | Expert | 5 | <button>editar</button> | <button>eliminar</button> |

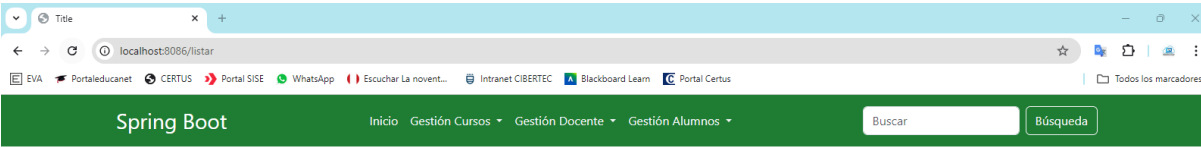


Cursos

Nombre: DEMO

Creditos: 0

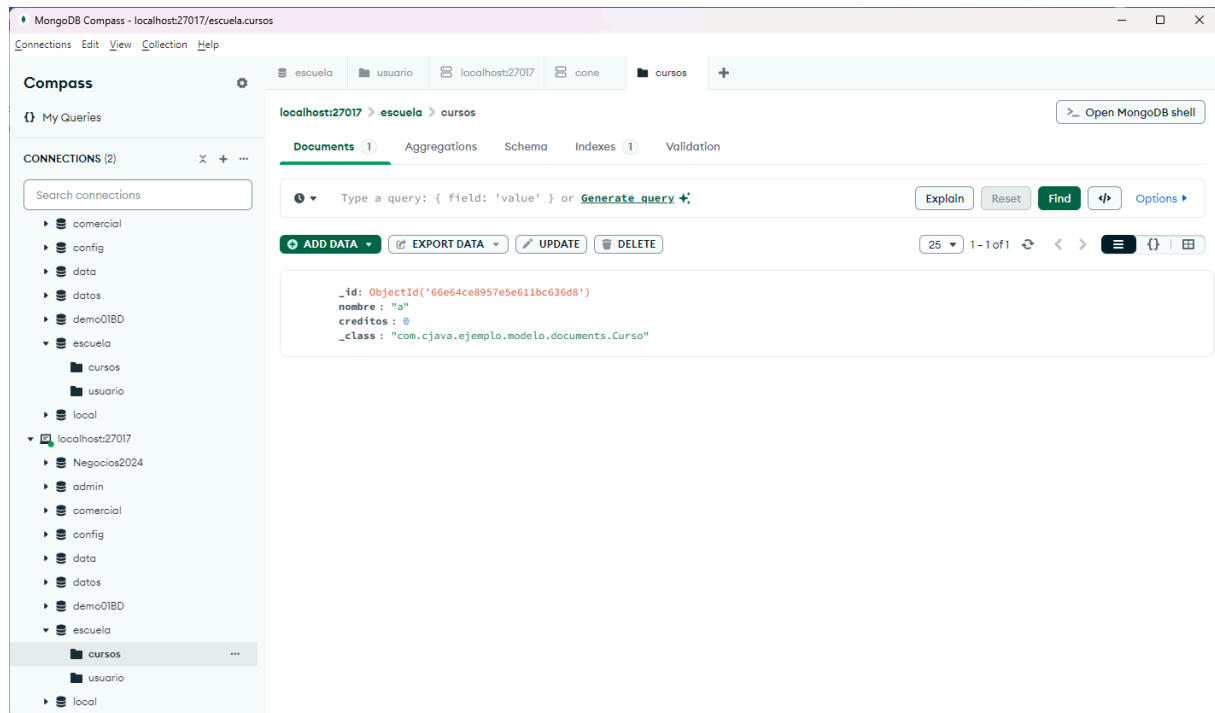
Crear Curso



Listado de Cursos

| CODIGO | NOMBRES | CREDITOS | EDITAR | ELIMINAR |
|--------|--------------|----------|-------------------------|---------------------------|
| 1 | Programmer | 5 | <button>editar</button> | <button>eliminar</button> |
| 2 | Developer | 5 | <button>editar</button> | <button>eliminar</button> |
| 3 | Expert | 5 | <button>editar</button> | <button>eliminar</button> |
| 5 | DEMOSTRACION | 0 | <button>editar</button> | <button>eliminar</button> |

16.- Revisar la Base de Datos



Ejercicios de aplicación

El proyecto de la evaluación 02, realizarlo con MongoDB.

Conclusiones:

Indicar 5 conclusiones que llegó después de los temas tratados de manera práctica en este laboratorio.
