

7)

Aim:

Basic Spring Boot Application with Spring Data JPA

Description:

In this experiment, we will create a Spring Boot application that connects to a MySQL database and uses Spring Data JPA to perform basic database operations. The application will allow inserting and retrieving student records through a RESTful API.

- **Student.java** – The entity class representing students.
- **StudentRepository.java** – The JPA repository interface for database operations.
- **StudentController.java** – REST controller for handling HTTP requests.
- **StudentApplication.java** – Main application class for bootstrapping the application.
- **application.properties** – Configuration file for database and server.
- **pom.xml** – Maven configuration file for dependencies.

Program:

StudentApplication.java

```
package com.example;
import org.springframework.boot.CommandLineRunner;
import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;
import org.springframework.context.annotation.Bean;
@SpringBootApplication
public class StudentApplication {
    public static void main(String[] args) {
        SpringApplication.run(StudentApplication.class, args);
    }
    @Bean
    CommandLineRunner initDatabase(StudentRepository repo) {
        return args -> {
            repo.save(new Student(1, "Shaharsha"));
            repo.save(new Student(2, "Rechal"));
            repo.save(new Student(3, "Nany"));
            System.out.println("Students inserted!");
        };
    }
}
```

Student.java

```
package com.example;
import jakarta.persistence.Entity;
import jakarta.persistence.Id;
@Entity
public class Student {
    @Id
    private int sno;
    private String sname;

    public Student() {}
    public Student(int sno, String sname) {
        this.sno = sno;
        this.sname = sname;
    }

    public int getSno() { return sno; }
    public void setSno(int sno) { this.sno = sno; }
    public String getSname() { return sname; }
    public void setSname(String sname) { this.sname = sname; }

}
```

application.properties

```
spring.application.name=Student
server.port= 9640
spring.datasource.url=jdbc:mysql://localhost:3306/mca
spring.datasource.username=root
spring.datasource.password= Hema@123
spring.jpa.hibernate.ddl-auto=create-drop
spring.jpa.show-sql=true
```

StudentController.java

```
package com.example;
import java.util.List;
import org.springframework.web.bind.annotation.GetMapping;
import org.springframework.web.bind.annotation.PostMapping;
import org.springframework.web.bind.annotation.RequestBody;
import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RestController;

@RestController
@RequestMapping("/students")
public class StudentController {
    private final StudentRepository repo;

    public StudentController(StudentRepository repo) {
        this.repo = repo;
    }

    @PostMapping
    public Student addStudent(@RequestBody Student student) {
        return repo.save(student);
    }

    @GetMapping
    public List<Student> getAllStudents() {
        return repo.findAll();
    }
}
```

StudentRepository.java (Interface)

```
package com.example;
import org.springframework.data.jpa.repository.JpaRepository;
public interface StudentRepository extends JpaRepository<Student, Integer> { }
```

pom.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
  https://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>
  <parent>
    <groupId>org.springframework.boot</groupId>
    <artifactId>spring-boot-starter-parent</artifactId>
    <version>3.5.4</version>
    <relativePath/> <!-- lookup parent from repository -->
  </parent>
  <groupId>com</groupId>
  <artifactId>StudentApplication</artifactId>
  <version>0.0.1-SNAPSHOT</version>
  <name>Student</name>
  <description>Demo project for Spring Boot</description>
  <url/>

  <licenses>
    <license/>
  </licenses>
  <developers>
    <developer/>
  </developers>

  <scm>
    <connection/>
    <developerConnection/>
    <tag/>
    <url/>
  </scm>

  <properties>
    <java.version>21</java.version>
  </properties>
  <dependencies>
    <dependency>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-starter-data-jdbc</artifactId>
```

```
</dependency>

<dependency>
    <groupId>org.springframework.boot</groupId>
    <artifactId>spring-boot-starter-web</artifactId>
</dependency>

<dependency>
    <groupId>com.mysql</groupId>
    <artifactId>mysql-connector-j</artifactId>
    <scope>runtime</scope>
</dependency>

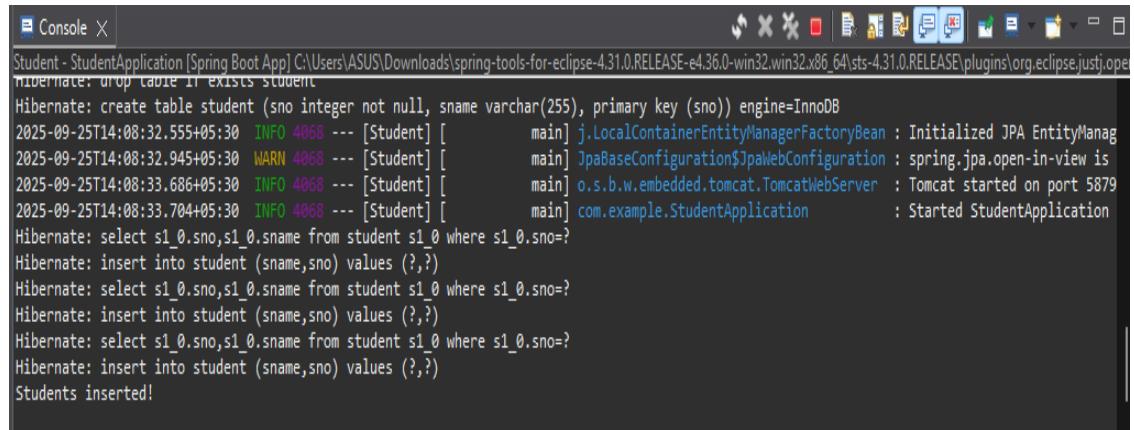
<dependency>
    <groupId>org.springframework.boot</groupId>
    <artifactId>spring-boot-starter-test</artifactId>
    <scope>test</scope>
</dependency>
<!-- https://mvnrepository.com/artifact/org.springframework.boot/spring-boot-
starter-data-jpa --&gt;
&lt;dependency&gt;
    &lt;groupId&gt;org.springframework.boot&lt;/groupId&gt;
    &lt;artifactId&gt;spring-boot-starter-data-jpa&lt;/artifactId&gt;
    &lt;version&gt;3.5.2&lt;/version&gt;
&lt;/dependency&gt;

&lt;/dependencies&gt;

&lt;build&gt;
    &lt;plugins&gt;
        &lt;plugin&gt;
            &lt;groupId&gt;org.springframework.boot&lt;/groupId&gt;
            &lt;artifactId&gt;spring-boot-maven-plugin&lt;/artifactId&gt;
        &lt;/plugin&gt;
    &lt;/plugins&gt;
&lt;/build&gt;

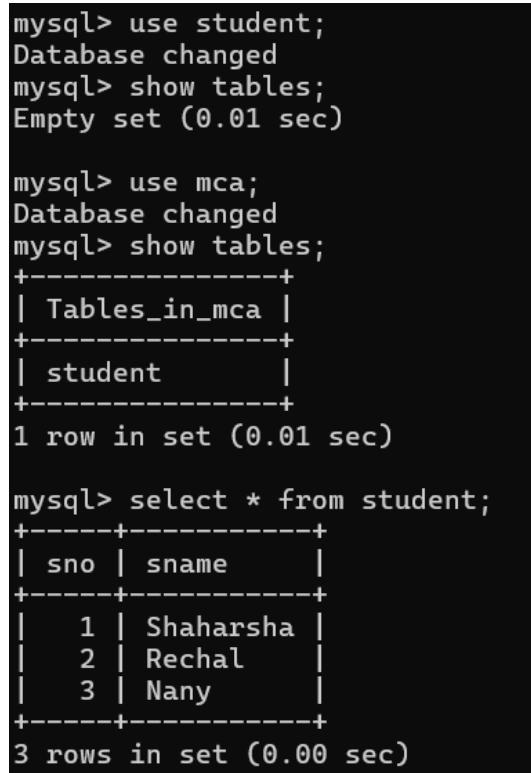
&lt;/project&gt;</pre>
```

Output:



The screenshot shows a terminal window titled "Console X" with the following log output:

```
Student - StudentApplication [Spring Boot App] C:\Users\ASUS\Downloads\spring-tools-for-eclipse-4.31.0.RELEASE-e4.36.0-win32.x86_64\sts-4.31.0.RELEASE\plugins\org.eclipse.jst.j2ee.core\src\nature\drop cause it exists student
Hibernate: create table student (sno integer not null, sname varchar(255), primary key (sno)) engine=InnoDB
2025-09-25T14:08:32.555+05:30 INFO 4068 --- [Student] [main] j.LocalContainerEntityManagerFactoryBean : Initialized JPA EntityManagerFactory for persistence unit 'student'
2025-09-25T14:08:32.945+05:30 WARN 4068 --- [Student] [main] JpaBaseConfiguration$JpaWebConfiguration : spring.jpa.open-in-view is enabled via configuration, which has been deprecated.
2025-09-25T14:08:33.686+05:30 INFO 4068 --- [Student] [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port 5879
2025-09-25T14:08:33.704+05:30 INFO 4068 --- [Student] [main] com.example.StudentApplication : Started StudentApplication
Hibernate: select s1_0.sno,s1_0.sname from student s1_0 where s1_0.sno=?
Hibernate: insert into student (sname,sno) values (?,?)
Hibernate: select s1_0.sno,s1_0.sname from student s1_0 where s1_0.sno=?
Hibernate: insert into student (sname,sno) values (?,?)
Hibernate: select s1_0.sno,s1_0.sname from student s1_0 where s1_0.sno=?
Hibernate: insert into student (sname,sno) values (?,?)
Hibernate: select s1_0.sno,s1_0.sname from student s1_0 where s1_0.sno=?
Hibernate: insert into student (sname,sno) values (?,?)
Students inserted!
```



The screenshot shows a MySQL terminal window with the following commands and results:

```
mysql> use student;
Database changed
mysql> show tables;
Empty set (0.01 sec)

mysql> use mca;
Database changed
mysql> show tables;
+-----+
| Tables_in_mca |
+-----+
| student        |
+-----+
1 row in set (0.01 sec)

mysql> select * from student;
+----+----+
| sno | sname   |
+----+----+
|  1 | Shaharsha |
|  2 | Rechal    |
|  3 | Nany      |
+----+----+
3 rows in set (0.00 sec)
```

8)

Aim:

Pagination and Sorting in Spring Data JPA

Description:

In this experiment, we will create a Spring Boot application that demonstrates how to paginate and sort database records using Spring Data JPA. We will use a Book entity with sample data, a JPA repository interface for database operations, and a REST controller to handle requests. Pagination parameters (page, size) and sorting parameters (sortBy, direction) will be passed via URL query parameters to retrieve data in a paginated and sorted manner.

Program:

application.properties

```
spring.application.name=Book
spring.datasource.url=jdbc:mysql://localhost:3306/new
spring.datasource.username=root
spring.datasource.password=Hema@123

spring.jpa.hibernate.ddl-auto=create-drop
spring.jpa.show-sql=true
server.port=8844
```

BookApplication.java

```
package com.example.demo;

import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication
public class BookApplication {

    public static void main(String[] args) {
        SpringApplication.run(BookApplication.class, args);
    }
}
```

Book.java

```
package com.example.demo;

import jakarta.persistence.Entity;
import jakarta.persistence.GeneratedValue;
import jakarta.persistence.GenerationType;
import jakarta.persistence.Id;

@Entity
public class Book {
    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    private long id;
    private String title;
    private String author;

    public Book() {}

    public Book(String title, String author) {
        this.title = title;
        this.author = author;
    }

    @Override
    public String toString() {
        return "Book{id=" + id + ", title='" + title + "', author='" + author + "'}";
    }

    // getters and setters
    public Long getId() { return id; }
    public void setId(Long id) { this.id = id; }

    public String getTitle() { return title; }
    public void setTitle(String title) { this.title = title; }

    public String getAuthor() { return author; }
    public void setAuthor(String author) { this.author = author; }

}
```

BookRepository (Interface)

```
package com.example.demo;  
import org.springframework.data.jpa.repository.JpaRepository;  
public interface BookRepository extends JpaRepository<Book, Long> {  
}
```

BookController.java

```
package com.example.demo;  
import org.springframework.beans.factory.annotation.Autowired;  
import org.springframework.data.domain.Page;  
import org.springframework.data.domain.PageRequest;  
import org.springframework.data.domain.Pageable;  
import org.springframework.data.domain.Sort;  
import org.springframework.web.bind.annotation.*;  
@RestController  
@RequestMapping("/books")  
public class BookController {  
    @Autowired  
    private BookRepository bookRepository;  
    @GetMapping("/init")  
    public String initData() {  
        if (bookRepository.count() == 0) {  
            bookRepository.save(new Book("Spring Boot Basics", "John"));  
            bookRepository.save(new Book("Java Programming", "Alice"));  
            bookRepository.save(new Book("Hibernate in Action", "Bob"));  
            bookRepository.save(new Book("Microservices Guide", "Carol"));  
            bookRepository.save(new Book("Data Structures", "Davidraj"));  
        }  
        return "Sample books added!";  
    }  
    @GetMapping  
    public Page<Book> getBooks(  
        @RequestParam(defaultValue = "0") int page,  
        @RequestParam(defaultValue = "3") int size,  
        @RequestParam(defaultValue = "title") String sortBy,  
        @RequestParam(defaultValue = "asc") String direction  
    ) {  
        Sort sort = direction.equalsIgnoreCase("asc") ?  
            Sort.by(sortBy).ascending() :  
            Sort.by(sortBy).descending();  
        Pageable pageable = PageRequest.of(page, size, sort);  
        return bookRepository.findAll(pageable);  
    }  
}
```

pom.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
        https://maven.apache.org/xsd/maven-4.0.0.xsd">

    <modelVersion>4.0.0</modelVersion>

    <parent>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-parent</artifactId>
        <version>3.5.6</version>
        <relativePath/> <!-- lookup parent from repository -->
    </parent>

    <groupId>com</groupId>
    <artifactId>PaginationandSortingApplication</artifactId>
    <version>0.0.1-SNAPSHOT</version>
    <name>Book</name>
    <description>Demo project for Spring Boot</description>

    <licenses>
        <license/>
    </licenses>

    <developers>
        <developer/>
    </developers>

    <scm>
        <connection/>
        <developerConnection/>
        <tag/>
        <url/>
    </scm>

    <properties>
        <java.version>21</java.version>
    </properties>
```

```
<dependencies>
    <dependency>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-data-jdbc</artifactId>
    </dependency>

    <dependency>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-web</artifactId>
    </dependency>

    <dependency>
        <groupId>com.mysql</groupId>
        <artifactId>mysql-connector-j</artifactId>
        <scope>runtime</scope>
    </dependency>

    <dependency>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-test</artifactId>
        <scope>test</scope>
    </dependency>

    <dependency>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-data-jpa</artifactId>
    </dependency>
</dependencies>

<build>
    <plugins>
        <plugin>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-maven-plugin</artifactId>
        </plugin>
    </plugins>
</build>

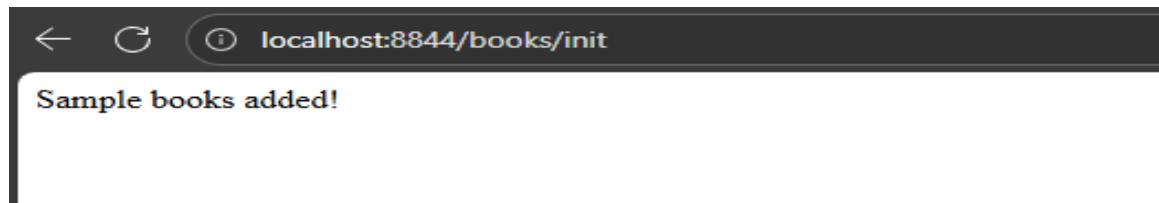
</project>
```

Output:

```
Console X
Book - BookApplication [Spring Boot App] C:\Users\ASUS\Downloads\spring-tools-for-eclipse-4.31.0.RELEASE-e4.36.0-win32.win32.x86_64\sts-4.31.0.R
Database driver: undefined/unknown
Database version: 8.0.42
Autocommit mode: undefined/unknown
Isolation level: undefined/unknown
Minimum pool size: undefined/unknown
Maximum pool size: undefined/unknown
2025-09-25T14:24:32.652+05:30 INFO 2684 --- [Book] [main] o.h.e.t.j.p.i.JtaPlatformInitiator : 
Hibernate: drop table if exists book
Hibernate: create table book (id bigint not null auto_increment, author varchar(255), title varchar(255), primary
2025-09-25T14:24:33.299+05:30 INFO 2684 --- [Book] [main] j.LocalContainerEntityManagerFactoryBean : 
2025-09-25T14:24:33.558+05:30 WARN 2684 --- [Book] [main] JpaBaseConfiguration$JpaWebConfiguration : 
2025-09-25T14:24:34.170+05:30 INFO 2684 --- [Book] [main] o.s.b.w.embedded.tomcat.TomcatWebServer : 
2025-09-25T14:24:34.181+05:30 INFO 2684 --- [Book] [main] com.example.demo.BookApplication : 
```

```
mysql> use new;
Database changed
mysql> show tables;
+-----+
| Tables_in_new |
+-----+
| book          |
+-----+
1 row in set (0.10 sec)

mysql> select * from book;
Empty set (0.06 sec)
```



```
Console X
Book - BookApplication [Spring Boot App] C:\Users\ASUS\Downloads\spring-tools-for-eclipse-4.31.0.RELEASE-e4.36.0-win32.win32.x86_64\sts-4.31
2025-09-25T14:24:33.299+05:30 INFO 2684 --- [Book] [main] j.LocalContainerEntityManagerFactoryBean : 
2025-09-25T14:24:33.558+05:30 WARN 2684 --- [Book] [main] JpaBaseConfiguration$JpaWebConfiguration : 
2025-09-25T14:24:34.170+05:30 INFO 2684 --- [Book] [main] o.s.b.w.embedded.tomcat.TomcatWebServer : 
2025-09-25T14:24:34.181+05:30 INFO 2684 --- [Book] [main] com.example.demo.BookApplication : 
2025-09-25T14:26:09.914+05:30 INFO 2684 --- [Book] [nio-8844-exec-2] o.a.c.c.C.[Tomcat].[localhost].[/] : 
2025-09-25T14:26:09.935+05:30 INFO 2684 --- [Book] [nio-8844-exec-2] o.s.web.servlet.DispatcherServlet : 
2025-09-25T14:26:10.088+05:30 INFO 2684 --- [Book] [nio-8844-exec-2] o.s.web.servlet.DispatcherServlet : 
Hibernate: select count(*) from book b1_0
Hibernate: insert into book (author,title) values (?,?)
```

```

mysql> use new;
Database changed
mysql> select * from book;
Empty set (0.94 sec)

mysql> select * from book;
+----+-----+-----+
| id | author | title |
+----+-----+-----+
| 1  | John   | Spring Boot Basics |
| 2  | Alice   | Java Programming |
| 3  | Bob     | Hibernate in Action |
| 4  | Carol   | Microservices Guide |
| 5  | Davidraj | Data Structures |
+----+-----+-----+
5 rows in set (0.07 sec)

```

<localhost:8844/books?page=0&size=3&sortBy=title&direction=asc>

Pretty-print □

```
{"content":[{"id":5,"title":"Data Structures","author":"Davidraj"}, {"id":3,"title":"Hibernate in Action","author":"Bob"}, {"id":2,"title":"Java Programming","author":"Alice"}], "pageable": {"pageNumber":0, "pageSize":3, "sort": {"empty":false, "sorted":true, "unsorted":false}, "offset":0, "paged":true, "unpaged":false}, "last":false, "totalElements":5, "totalPages":2, "size":3, "number":0, "sort": {"empty":false, "sorted":true, "unsorted":false}, "first":true, "numberOfElements":3, "empty":false}
```

<localhost:8844/books?page=1&size=2&sortBy=author&direction=desc>

Pretty-print □

```
{"content":[{"id":4,"title":"Microservices Guide","author":"Carol"}, {"id":3,"title":"Hibernate in Action","author":"Bob"}], "pageable": {"pageNumber":1, "pageSize":2, "sort": {"empty":false, "sorted":true, "unsorted":false}, "offset":2, "paged":true, "unpaged":false}, "last":false, "totalElements":5, "totalPages":3, "size":2, "number":1, "sort": {"empty":false, "sorted":true, "unsorted":false}, "first":false, "numberOfElements":2, "empty":false}
```

Console X

Book - BookApplication [Spring Boot App] C:\Users\ASUS\Downloads\spring-tools-for-eclipse-4.31.0.RELEASE-e4.36.0-win32.win32.x86_64\sts-4.31.0.RELEASE\plugins\org.eclips

```
Hibernate: insert into book (author,title) values (?,?)
Hibernate: insert into book (author,title) values (?,?)
Hibernate: insert into book (author,title) values (?,?)
Hibernate: select b1_0.id,b1_0.author,b1_0.title from book b1_0 order by b1_0.title limit ?,?
Hibernate: select count(b1_0.id) from book b1_0
2025-09-25T14:27:38.039+05:30  WARN 2684 --- [Book] [nio-8844-exec-5] ration$PageModule$WarningLoggingModifier : Serializing Page
For a stable JSON structure, please use Spring Data's PagedModel (globally via @EnableSpringDataWebSupport(pageSerializati
or Spring HATEOAS and Spring Data's PagedResourcesAssembler as documented in https://docs.spring.io/spring-data/commons/re
```

```
Hibernate: select b1_0.id,b1_0.author,b1_0.title from book b1_0 order by b1_0.title limit ?,?
Hibernate: select count(b1_0.id) from book b1_0
Hibernate: select b1_0.id,b1_0.author,b1_0.title from book b1_0 order by b1_0.author desc limit ?,?
Hibernate: select count(b1_0.id) from book b1_0
```

9)

Aim:

Implementing AOP for Logging with Spring Data JPA

Description:

In this experiment, we create a Spring Boot application to manage products. The application includes:

- **Entity** – Product with id, name, and price.
- **Repository** – ProductRepository for database operations.
- **Service** – ProductService to handle business logic.
- **Controller** – ProductController for REST APIs.
- **Aspect** – LoggingAspect to log method calls in ProductService.
- **Database** – H2 in-memory DB or MySQL.
- **Dependency Management** – Managed via Maven (pom.xml).

This demonstrates the use of **Spring Data JPA**, **Spring AOP**, and **RESTful API development**.

Program:

ProductRepository.java (Interface)

```
package com.example.demo;  
  
import org.springframework.data.jpa.repository.JpaRepository;  
  
public interface ProductRepository extends JpaRepository<Product, Long> {  
}
```

ProductService.java

```
package com.example.demo;  
import org.springframework.stereotype.Service;  
import java.util.List;  
  
@Service  
public class ProductService {  
    private final ProductRepository repo;  
    public ProductService(ProductRepository repo) {  
        this.repo = repo;  
    }  
    public Product saveProduct(Product product) {  
        return repo.save(product);  
    }  
    public List<Product> getAllProducts() {  
        return repo.findAll();  
    }  
}
```

application.properties

```
spring.application.name=Product  
spring.datasource.url=jdbc:mysql://localhost:3306/mca  
spring.datasource.username=root  
spring.datasource.password=Hema@123  
spring.jpa.hibernate.ddl-auto=create-drop  
spring.jpa.show-sql=true  
server.port=8889
```

Product.java

```
package com.example.demo;

import jakarta.persistence.Entity;
import jakarta.persistence.GeneratedValue;
import jakarta.persistence.GenerationType;
import jakarta.persistence.Id;

@Entity
public class Product {

    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    private long id;

    private String name;
    private double price;

    public Product() {}

    public Product(String name, double price) {
        this.name = name;
        this.price = price;
    }

    // getters & setters

    public Long getId() { return id; }

    public void setId(Long id) { this.id = id; }

    public String getName() { return name; }

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

    public double getPrice() { return price; }

    public void setPrice(double price) { this.price = price; }
}
```

ProductController.java

```
package com.example.demo;

import org.springframework.web.bind.annotation.*;
import java.util.List;

@RestController
@RequestMapping("/products")
public class ProductController {

    private final ProductService service;

    public ProductController(ProductService service) {
        this.service = service;
    }

    @PostMapping("/add")
    public Product addProduct(@RequestBody Product product) {
        return service.saveProduct(product);
    }

    @GetMapping("/all")
    public List<Product> getAllProducts() {
        return service.getAllProducts();
    }
}
```

LoggingAspect.java

```
package com.example.demo;

import org.aspectj.lang.JoinPoint;
import org.aspectj.lang.annotation.Aspect;
import org.aspectj.lang.annotation.Before;
import org.springframework.stereotype.Component;

@Aspect
@Component
public class LoggingAspect {

    // Logs before executing any ProductService method
    @Before("execution(* com.example.demo.ProductService.*(..))")
    public void logBefore(JoinPoint joinPoint) {
        System.out.println(">>> Entering method: " + joinPoint.getSignature().getName());
    }
}
```

main.java

```
package com.example.demo;

import org.springframework.boot.CommandLineRunner;
import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;
import org.springframework.context.annotation.Bean;

@SpringBootApplication
public class ProductApplication {

    public static void main(String[] args) {
        SpringApplication.run(ProductApplication.class, args);
    }

    @Bean
    CommandLineRunner runner(ProductRepository repo) {
        return args -> {
            repo.save(new Product("Laptop", 55000));
            repo.save(new Product("Mobile", 20000));
            repo.save(new Product("Tablet", 30000));
            repo.save(new Product("Mouse", 35000));
        };
    }
}
```

pom.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
  https://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>
  <parent>
    <groupId>org.springframework.boot</groupId>
    <artifactId>spring-boot-starter-parent</artifactId>
    <version>3.5.4</version>
    <relativePath/> <!-- lookup parent from repository -->
  </parent>
  <groupId>com</groupId>
  <artifactId>productApplication</artifactId>
  <version>0.0.1-SNAPSHOT</version>
  <name>product</name>
  <description>Demo project for Spring Boot</description>
  <url/>
  <licenses>
    <license/>
  </licenses>
  <developers>
    <developer/>
  </developers>
  <scm>
    <connection/>
    <developerConnection/>
    <tag/>
    <url/>
  </scm>
  <properties>
    <java.version>21</java.version>
  </properties>
  <dependencies>
    <dependency>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-starter-data-jdbc</artifactId>
    </dependency>
    <dependency>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-starter-web</artifactId>
```

```

        </dependency>
        <dependency>
            <groupId>com.mysql</groupId>
            <artifactId>mysql-connector-j</artifactId>
            <scope>runtime</scope>
        </dependency>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-test</artifactId>
            <scope>test</scope>
        </dependency>
        <!-- Spring AOP -->
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-aop</artifactId>
        </dependency>
        <!-- Lombok (optional, just to reduce boilerplate) -->
        <dependency>
            <groupId>org.projectlombok</groupId>
            <artifactId>lombok</artifactId>
            <optional>true</optional>
        </dependency>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-data-jpa</artifactId>
        </dependency>
        <!-- H2 Database (in-memory, no need for MySQL setup) -->
        <dependency>
            <groupId>com.h2database</groupId>
            <artifactId>h2</artifactId>
            <scope>runtime</scope>
        </dependency>
        </dependencies>
        <build>
            <plugins>
                <plugin>
                    <groupId>org.springframework.boot</groupId>
                    <artifactId>spring-boot-maven-plugin</artifactId>
                </plugin>
            </plugins>
        </build>
    </project>

```

Output:

```
Console X
product - ProductApplication [Spring Boot App] C:\Users\ASUS\Downloads\spring-tools-for-eclipse-4.31.0.RELEASE-e4.36.0-win32.win32.x86_64\sts-4.31.0.RELEASE
    Minimum pool size: undefined/unknown
    Maximum pool size: undefined/unknown
2025-09-25T14:43:50.417+05:30 INFO 19336 --- [product] [           main] o.h.e.t.j.p.i.JtaPlatformInitiator      : H
Hibernate: drop table if exists product
Hibernate: create table product (price float(53) not null, id bigint not null auto_increment, name varchar(255), primary key (id))
2025-09-25T14:43:51.147+05:30 INFO 19336 --- [product] [           main] j.LocalContainerEntityManagerFactoryBean : In
2025-09-25T14:43:51.460+05:30 WARN 19336 --- [product] [           main] JpaBaseConfiguration$JpaWebConfiguration : sp
2025-09-25T14:43:52.069+05:30 INFO 19336 --- [product] [           main] o.s.b.w.embedded.tomcat.TomcatWebServer : To
2025-09-25T14:43:52.081+05:30 INFO 19336 --- [product] [           main] com.example.demo.ProductApplication : St
Hibernate: insert into product (name,price) values (?,?)
```

```
mysql> use mca;
Database changed
mysql> show tables;
+-----+
| Tables_in_mca |
+-----+
| product      |
| student      |
+-----+
2 rows in set (0.15 sec)

mysql> select * from product;
+-----+
| price | id | name   |
+-----+
| 55000 | 1  | Laptop |
| 20000 | 2  | Mobile |
| 30000 | 3  | Tablet |
| 35000 | 4  | Mouse  |
+-----+
4 rows in set (0.03 sec)
```

```
[{"id":1,"name":"Laptop","price":55000}, {"id":2,"name":"Mobile","price":20000}, {"id":3,"name":"Tablet","price":30000}, {"id":4,"name":"Mouse","price":35000}]
```

```
Console X
product - ProductApplication [Spring Boot App] C:\Users\ASUS\Downloads\spring-tools-for-eclipse-4.31.0.RELEASE-e4.36.0-
2025-09-25T14:43:51.147+05:30 INFO 19336 --- [product] [           main] j.LocalContainerEntityManagerFactoryBea
2025-09-25T14:43:51.460+05:30 WARN 19336 --- [product] [           main] JpaBaseConfiguration$JpaWebConfiguratio
2025-09-25T14:43:52.069+05:30 INFO 19336 --- [product] [           main] o.s.b.w.embedded.tomcat.TomcatWebSe
2025-09-25T14:43:52.081+05:30 INFO 19336 --- [product] [           main] com.example.demo.ProductApplication : St
Hibernate: insert into product (name,price) values (?,?)
2025-09-25T14:46:42.037+05:30 INFO 19336 --- [product] [nio-8889-exec-1] o.a.c.c.C.[Tomcat].[localhost].
2025-09-25T14:46:42.053+05:30 INFO 19336 --- [product] [nio-8889-exec-1] o.s.web.servlet.DispatcherServlet : 
2025-09-25T14:46:42.137+05:30 INFO 19336 --- [product] [nio-8889-exec-1] o.s.web.servlet.DispatcherServlet : 
>>> Entering method: getAllProducts
Hibernate: select p1_0.id,p1_0.name,p1_0.price from product p1_0
```