Spring Data JPA

- Table definition is defined using class
- Each field corresponds to a column in table
- *@Annotation* are used for configuring table and column features
- This class is called entity class; annotated by **@Entity**
- Getters and setters of the entity class should be called when reading or writing data in the table
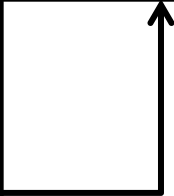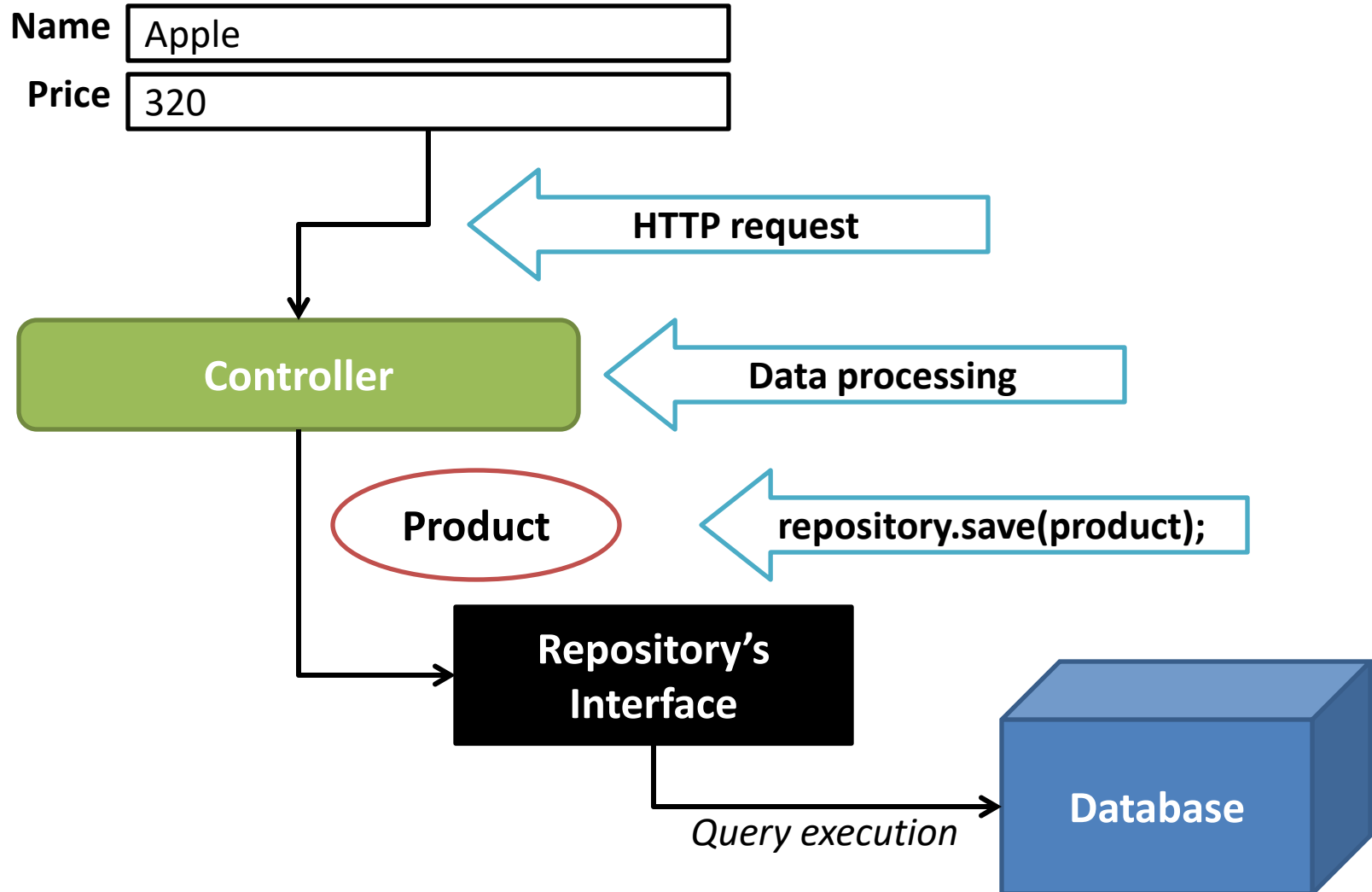
Entity class

```java
@Entity
public class Product {
  @Id
  private String name;
  private Double price;

  public int getId() {
    return id;
  }

  public void setName(String name) {
            this.name = name;
  }
  //getters & setters
}
```

```sql
CREATE TABLE product (
  name VARCHAR(255) PRIMARY KEY,
  price DECIMAL(20,2)
);
```

Hibernate generates and executes SQL statements

Data Insertion

Name Apple

Price 320

HTTP request

Controller

Data processing

Product

repository.save(product);

Repository's Interface

Query execution

Database

Repository

```java
@Entity
public class User {
  @Id
  private int id;
  private String username;
  private String password;
  private String email;
  …
}
```

An entity can be used for CRUD operations using its repository interface.

```java
User user = new User();
user.setName("John Doe");
user.setEmail("john@doe.com");

userRepository.save(user);
```
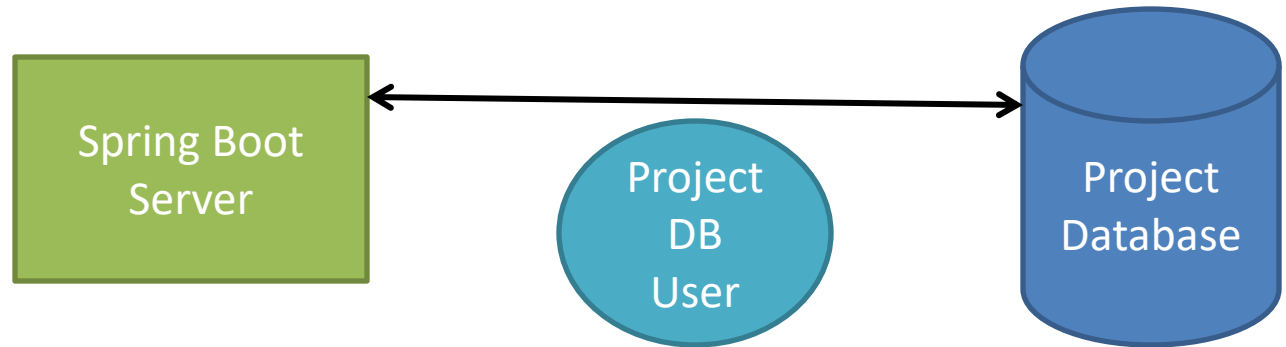
```java
@Autowired
private UserRepository userRepository;
```

```java
@Repository
public interface UserRepository extends JpaRepository<User, Integer> {
  …
}
```

Database Setup

- Database user
  - username
  - password
- Database
  - dbname

Add the following lines in the file *application.properties*:

```
spring.datasource.url=jdbc:postgresql://localhost:5432/dbname
spring.datasource.username=username
spring.datasource.password=password
spring.datasource.driver-class-name=org.postgresql.Driver

spring.jpa.hibernate.ddl-auto=update
```
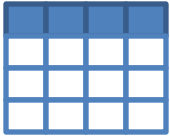
Alpha School System

Features including student and teachers' day to day academic activities

User Types

- **ADMIN**: authoritatively manages the entire system like user privileges, view & edit all kinds of data

- **STUDENT**: views academic progress like exam result and attendance

- **TEACHER**: makes entry of and view the students' academic data like marks and attendance

- **ACCOUNTANT**: manages collection of educational fees

User

- **id**
- firstName
- lastName
- username
- password   (hash of the password)
- email
- profilePicture
- gender
- type
- session
- …