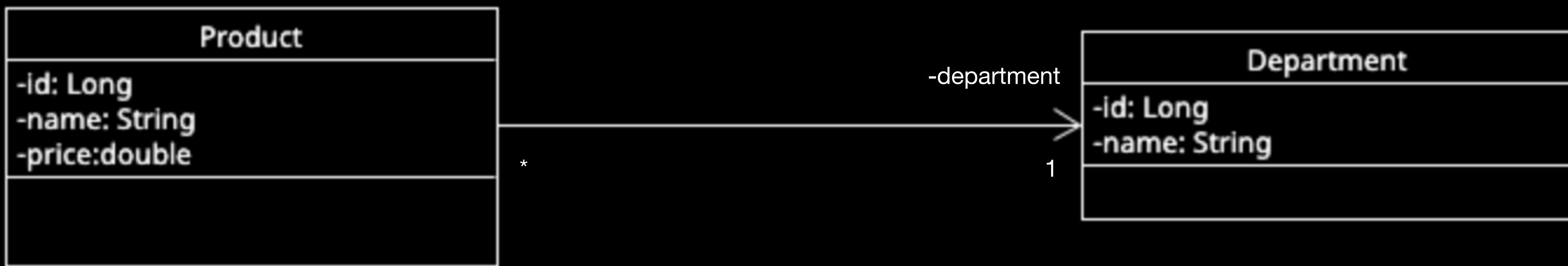


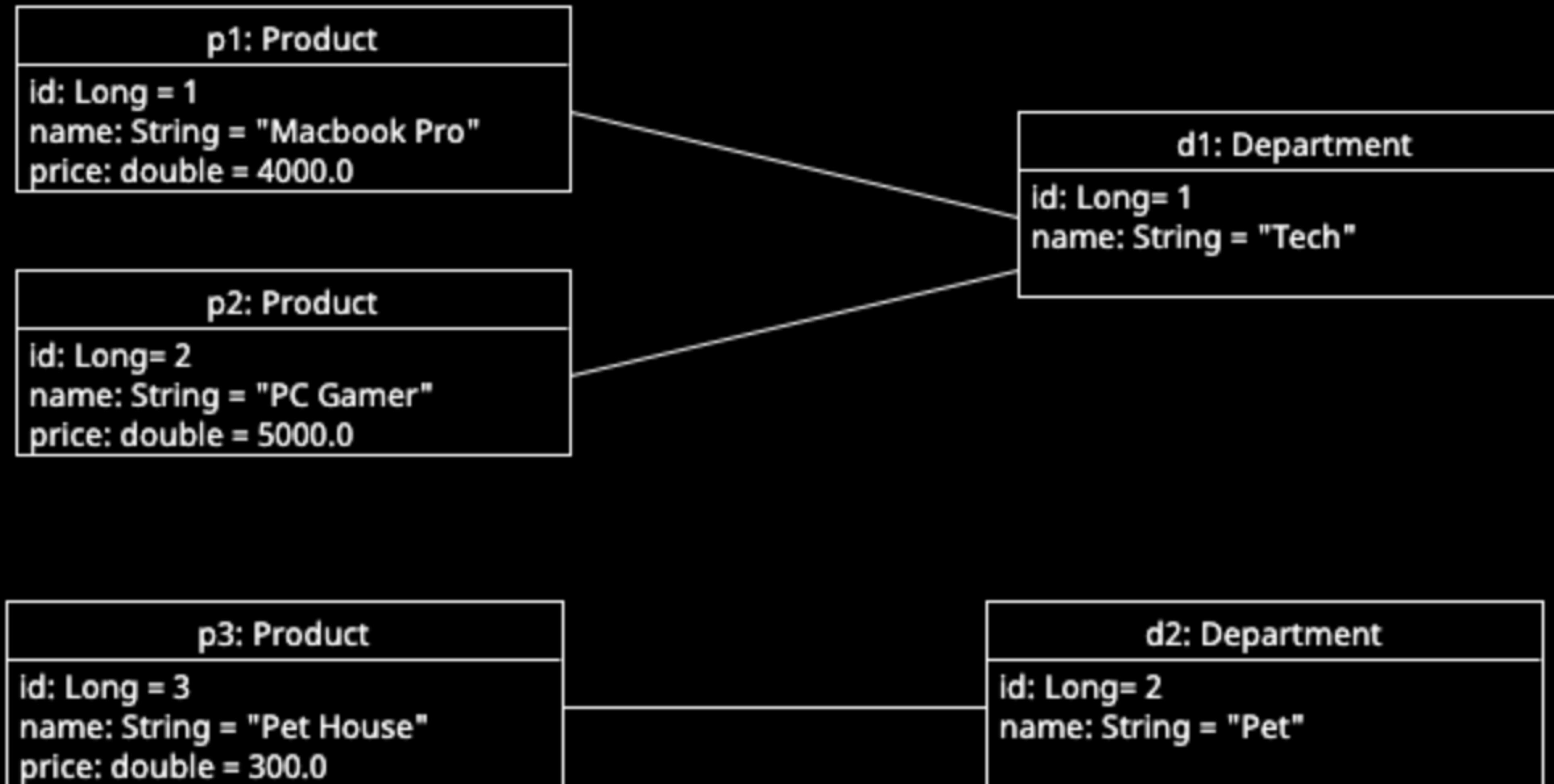
# API Rest Java e Spring Boot

## Estudo de caso

# Diagrama de Classes



# Diagrama de Objetos



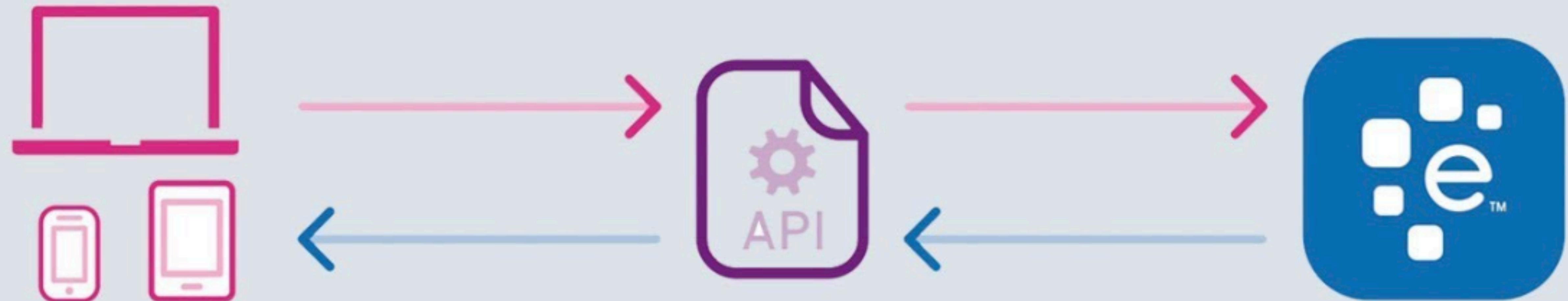
```
[  
  {  
    "id" : 1,  
    "name": "Macbook Pro",  
    "price" : 4000.0,  
    "department": {  
      "id": 1,  
      "name": "Tech"  
    }  
  },  
  {  
    "id" : 2,  
    "name": "PC Gamer",  
    "price" : 5000.0,  
    "department": {  
      "id": 1,  
      "name": "Tech"  
    }  
  ...  
]
```

# API com Java e Spring Boot

## Exemplo prático

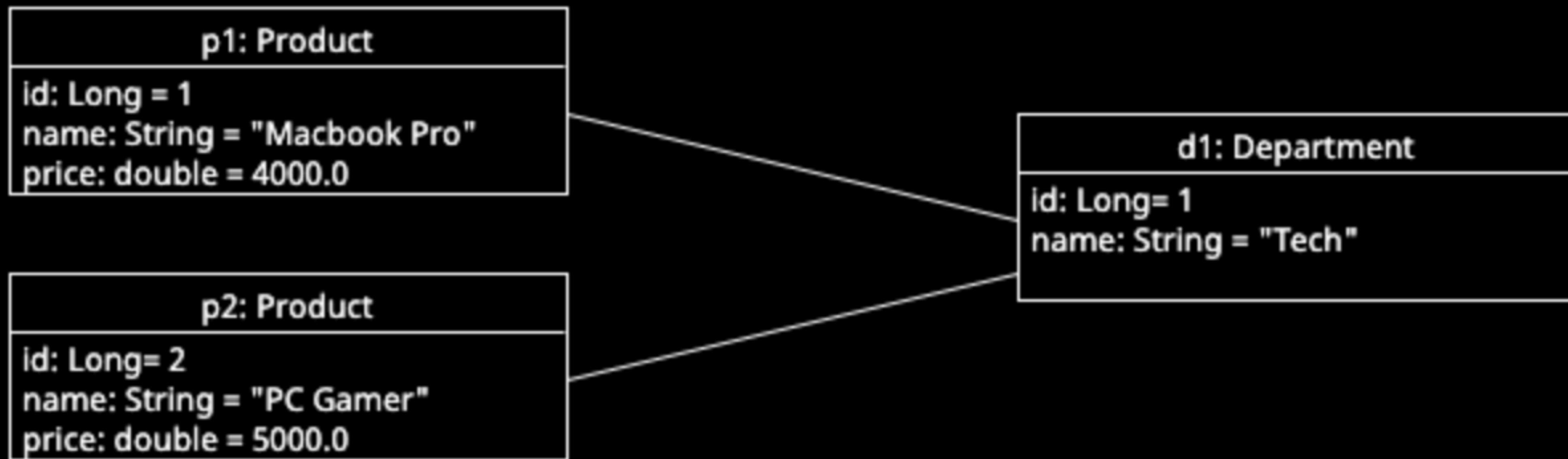
# O que é uma API?

“*Application Programming Interface* (Interface de Programação de Aplicação). Conjunto de padrões de programação que permite a construção de aplicativos e a sua utilização de maneira não tão evidente para os usuários”



# API com Java e Spring Boot

- Fazer uma API Rest que disponibilize o endpoint `/products` por meio do qual pode-se obter uma lista de produtos com suas respectivas categorias. O modelo de domínio, e um exemplo, são mostrados a seguir. Os produtos podem ser instanciados “hard code”, conforme exemplo:



# API com Java e Spring Boot

- Fazer uma API Rest que disponibilize o endpoint **/products** por meio do qual pode-se obter uma lista de produtos com suas respectivas categorias. O modelo de domínio, e um exemplo, são mostrados a seguir. Os produtos podem ser instanciados “hard code”, conforme exemplo:



# Resultado esperado

- GET /products

```
[  
  {  
    "id" : 1,  
    "name": "Macbook Pro",  
    "price" : 4000.0,  
    "department": {  
      "id": 1,  
      "name": "Tech"  
    }  
  },  
  {  
    "id" : 2,  
    "name": "PC Gamer",  
    "price" : 5000.0,  
    "department": {  
      "id": 1,  
      "name": "Tech"  
    },  
    {  
      "id" : 3,  
      "name": "Pet House",  
      "price" : 300.0,  
      "department": {  
        "id": 2,  
        "name": "Pet"  
      }  
    }  
]
```

O que precisamos fazer para criar uma  
aplicação web que disponibiliza uma API Rest?

**APP Spring Boot Java**  
**Multi threading**  
**Mapeamento de URL**  
**Serialização JSON**

**Web Server**

# O que é Spring Boot?

**"O Java Spring é um framework para criar aplicativos independentes de nível de produção que são executados na Java Virtual Machine (JVM)"**

"O Java Spring Boot (Spring Boot) é uma ferramenta que facilita e agiliza o desenvolvimento de aplicativos web e de micro serviços com Spring Framework por meio de três principais recursos:

- 1 - Auto configuração
- 2 - Uma abordagem opinativa à configuração
- 3 - A capacidade de criar aplicativos independentes

**“Esses recursos trabalham juntos para oferecer uma ferramenta que permite configurar um aplicativo baseado em Spring com poucos requisitos de instalação e configuração”**



# spring® initializr

**Project** Gradle - Groovy Gradle - Kotlin**Language** Java Kotlin Maven Groovy**Spring Boot** 3.2.0 (SNAPSHOT)  3.2.0 (M3)  3.1.5 (SNAPSHOT) 3.1.4  3.0.12 (SNAPSHOT)  3.0.11 2.7.17 (SNAPSHOT)  2.7.16**Project Metadata**

Group com.example

Artifact demo1

Name demo1

Description Demo project for Spring Boot

Package name com.example.demo1

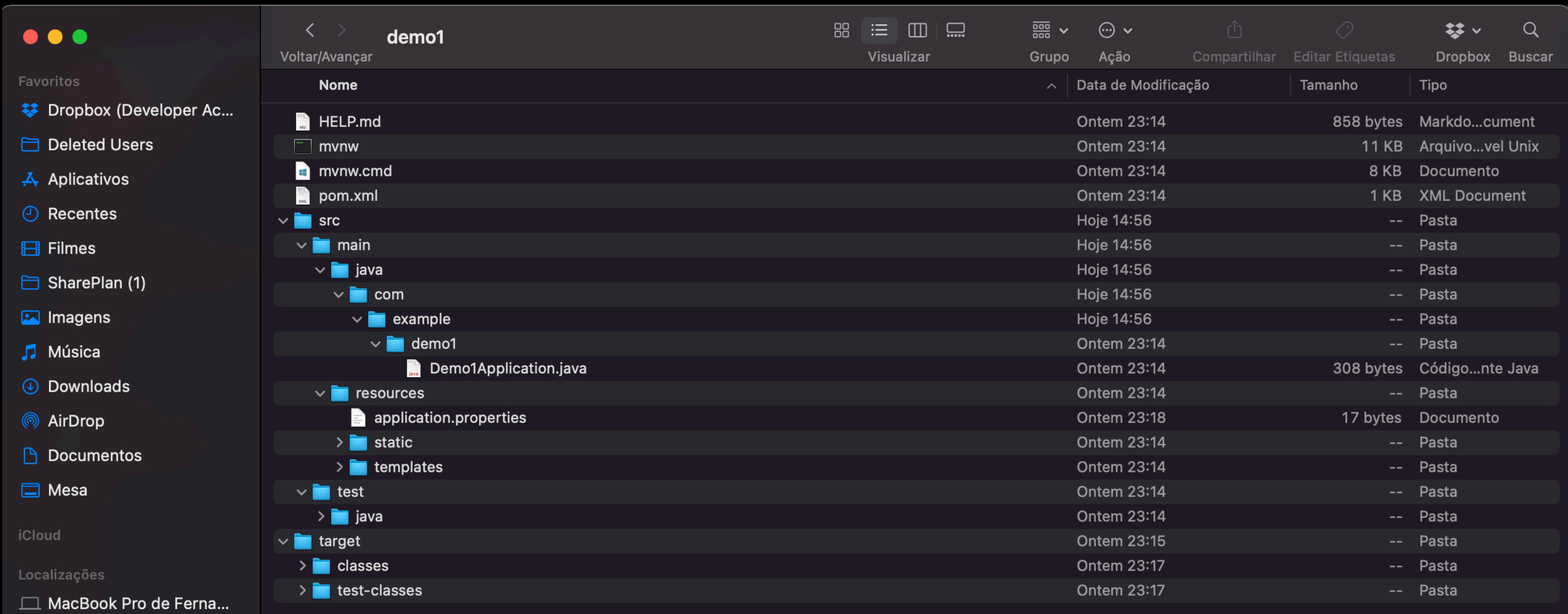
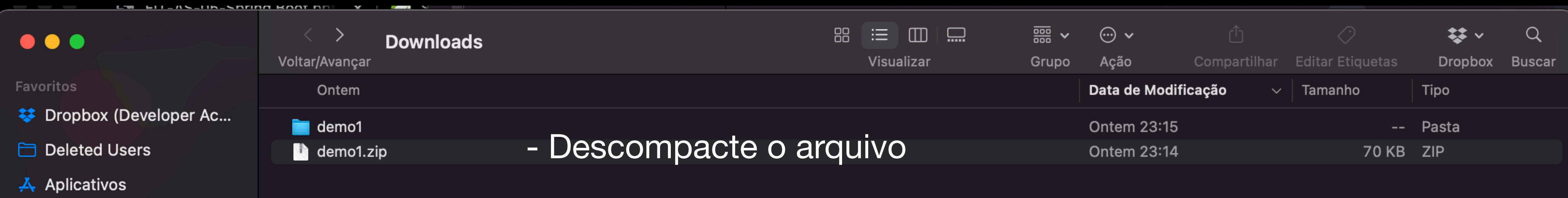
**Dependencies****ADD DEPENDENCIES...** ⌘ + B**Spring Web** WEB

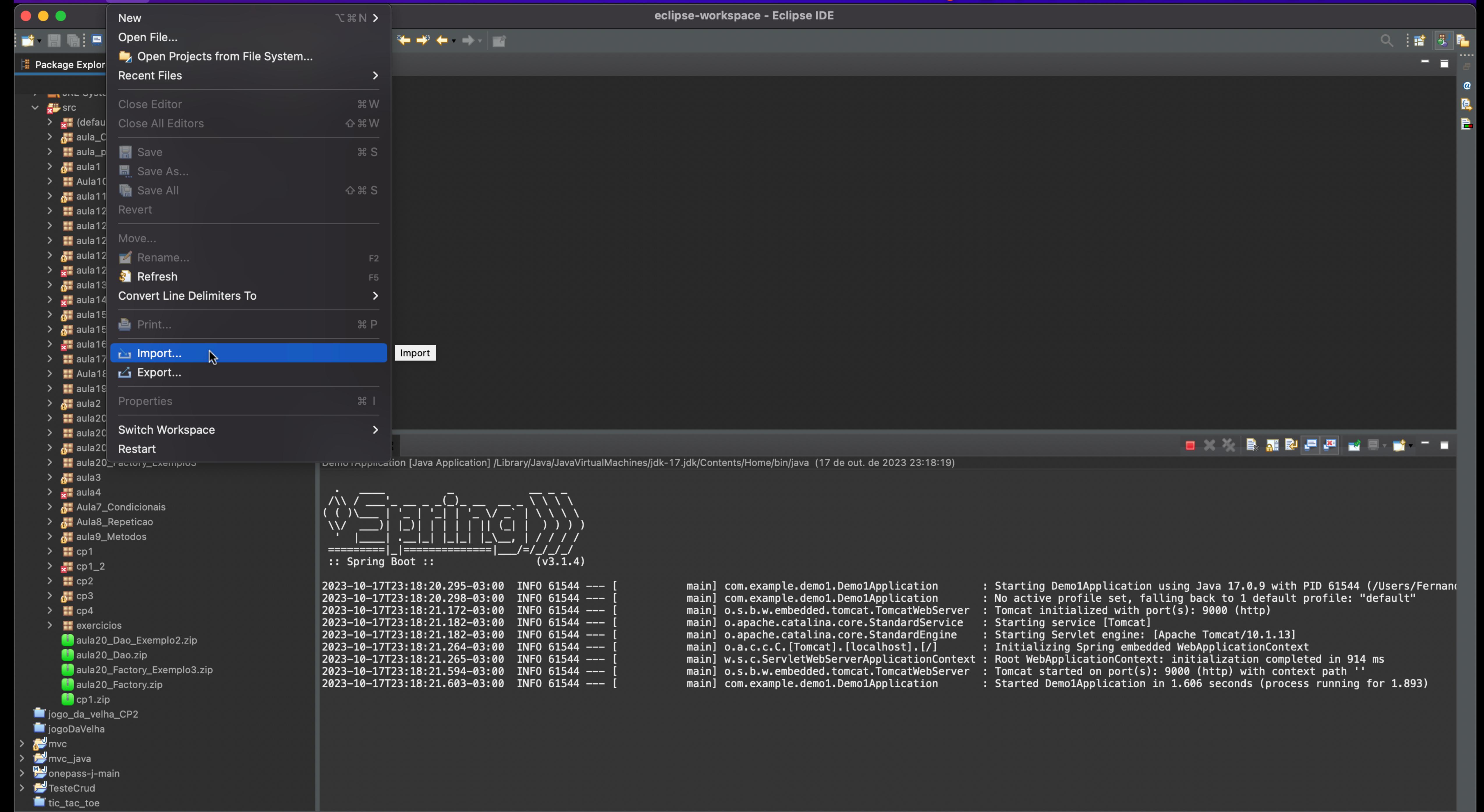
Build web, including RESTful, applications using Spring MVC. Uses Apache Tomcat as the default embedded container.

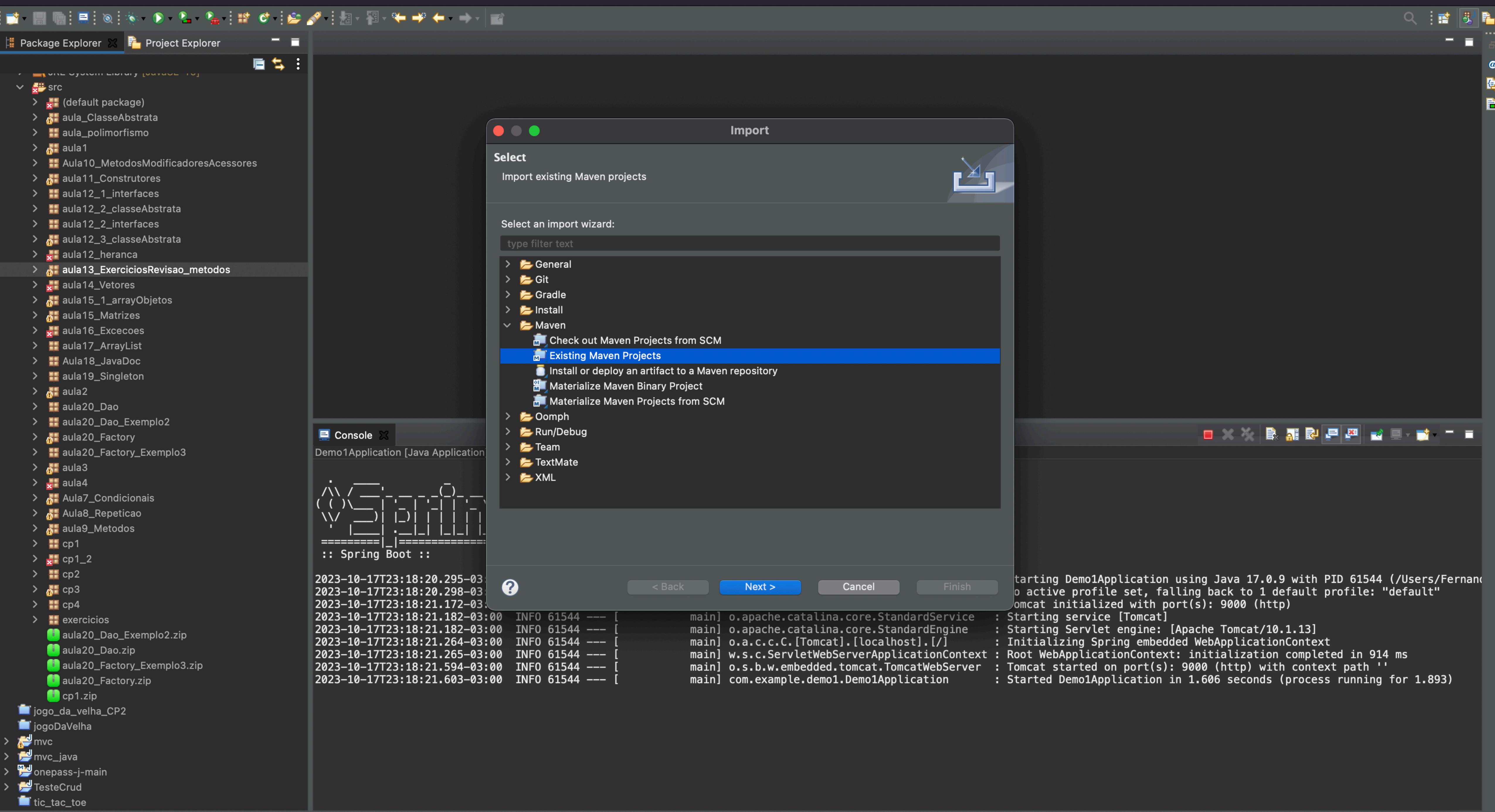
**GENERATE** ⌘ + ↩**EXPLORE** CTRL + SPACE**SHARE...**

# O que é Maven?

**“Apache Maven é uma ferramenta de gerenciamento de projetos usada para gerenciar projetos que são desenvolvidos usando linguagem JVM como Java, Scala, Groovy... Tendo como principais tarefas de uma ferramenta de gerenciamento de projetos, construir o código fonte e testá-lo”**







Package Explorer X Project Explorer

Import Maven Projects

Maven Projects

Select Maven projects

Root Directory: /Users/Fernando 1/Downloads/demo1

Projects:

- /pom.xml com.example:demo1:0.0.1-SNAPSHOT:jar

Select All Deselect All Select Tree Deselect Tree Refresh

Add project(s) to working set demo1 Advanced

Console X Demo1Application [Java Application]

```

    \_ \_ \_ \_ \_ \_ \_ \_ \_ \_
    ( ) ( ) ( ) ( ) ( ) ( )
    \_ \_ \_ \_ \_ \_ \_ \_ \_ \_
    :: Spring Boot ::

2023-10-17T23:18:20.295-03
2023-10-17T23:18:20.298-03
2023-10-17T23:18:21.172-03
2023-10-17T23:18:21.182-03
2023-10-17T23:18:21.182-03
2023-10-17T23:18:21.264-03
2023-10-17T23:18:21.265-03
2023-10-17T23:18:21.594-03:00 INFO 61544 --- [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 9000 (http) with context path ''
2023-10-17T23:18:21.603-03:00 INFO 61544 --- [main] com.example.demo1.Demo1Application : Started Demo1Application in 1.606 seconds (process running for 1.893)

```

< Back Next > Cancel Finish

SRV System Library [Apache Tomcat 10.1.13]

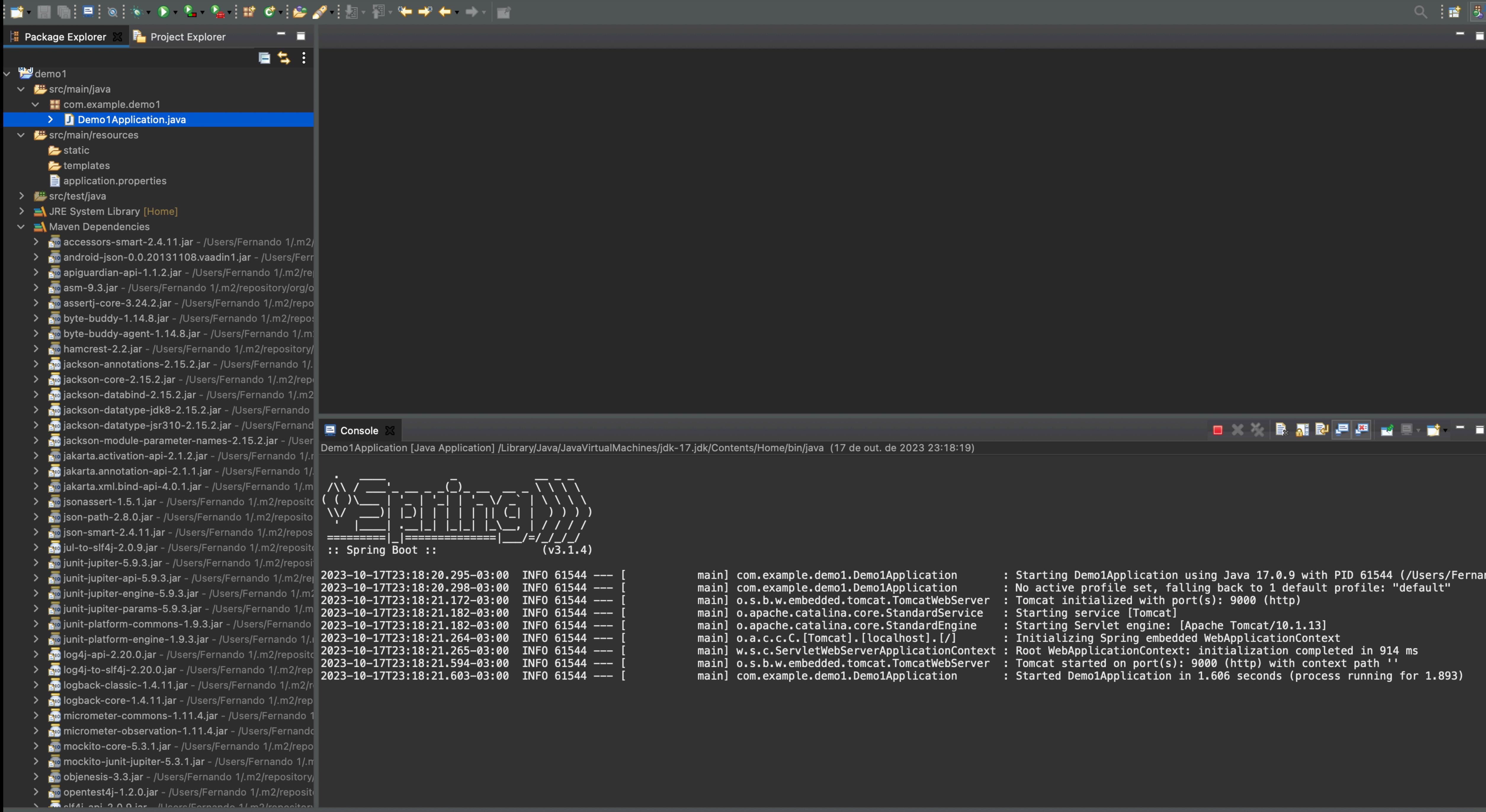
application using Java 17.0.9 with PID 61544 (/Users/Fernando 1/Downloads/demo1) set, falling back to 1 default profile: "default" with port(s): 9000 (http)

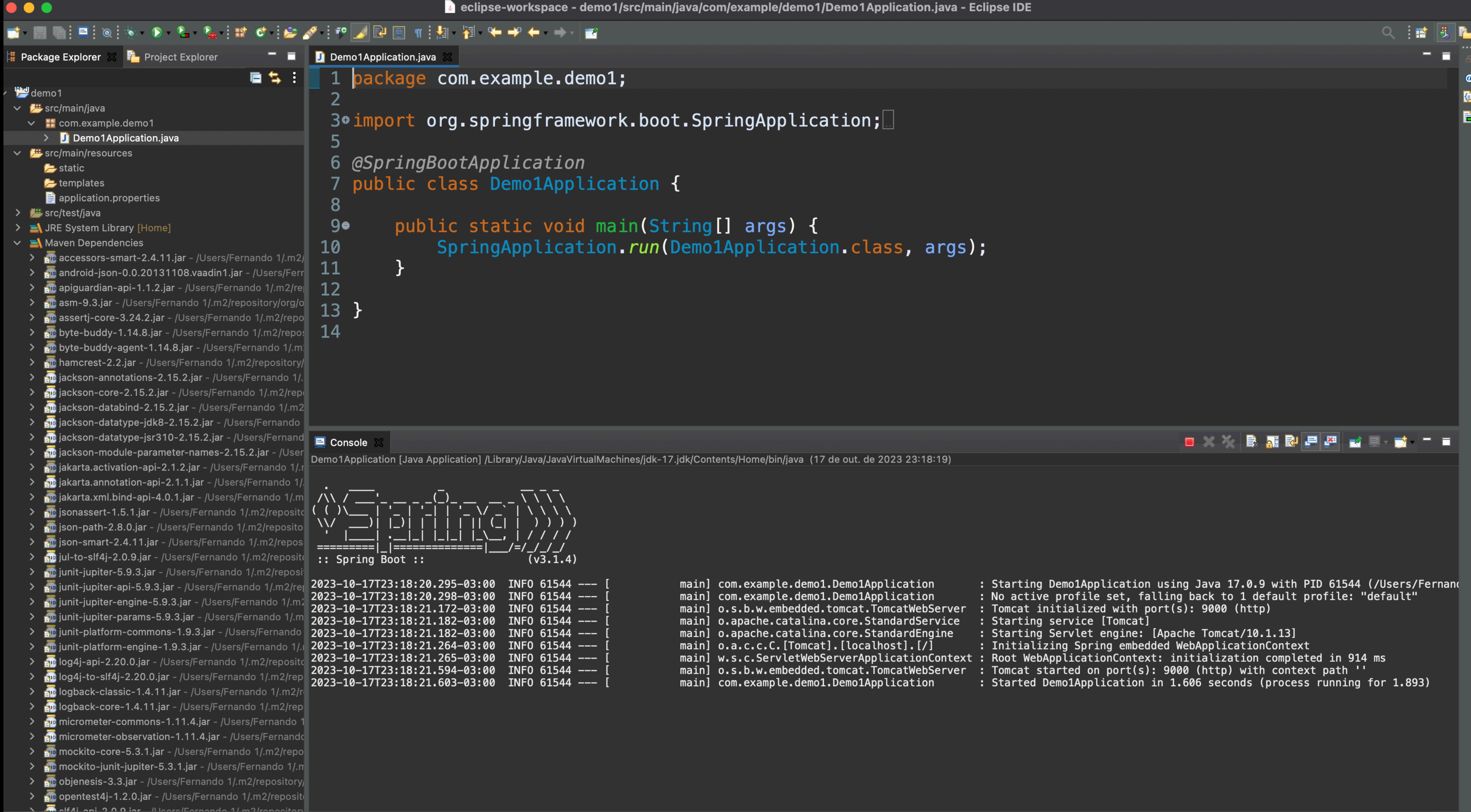
Tomcat

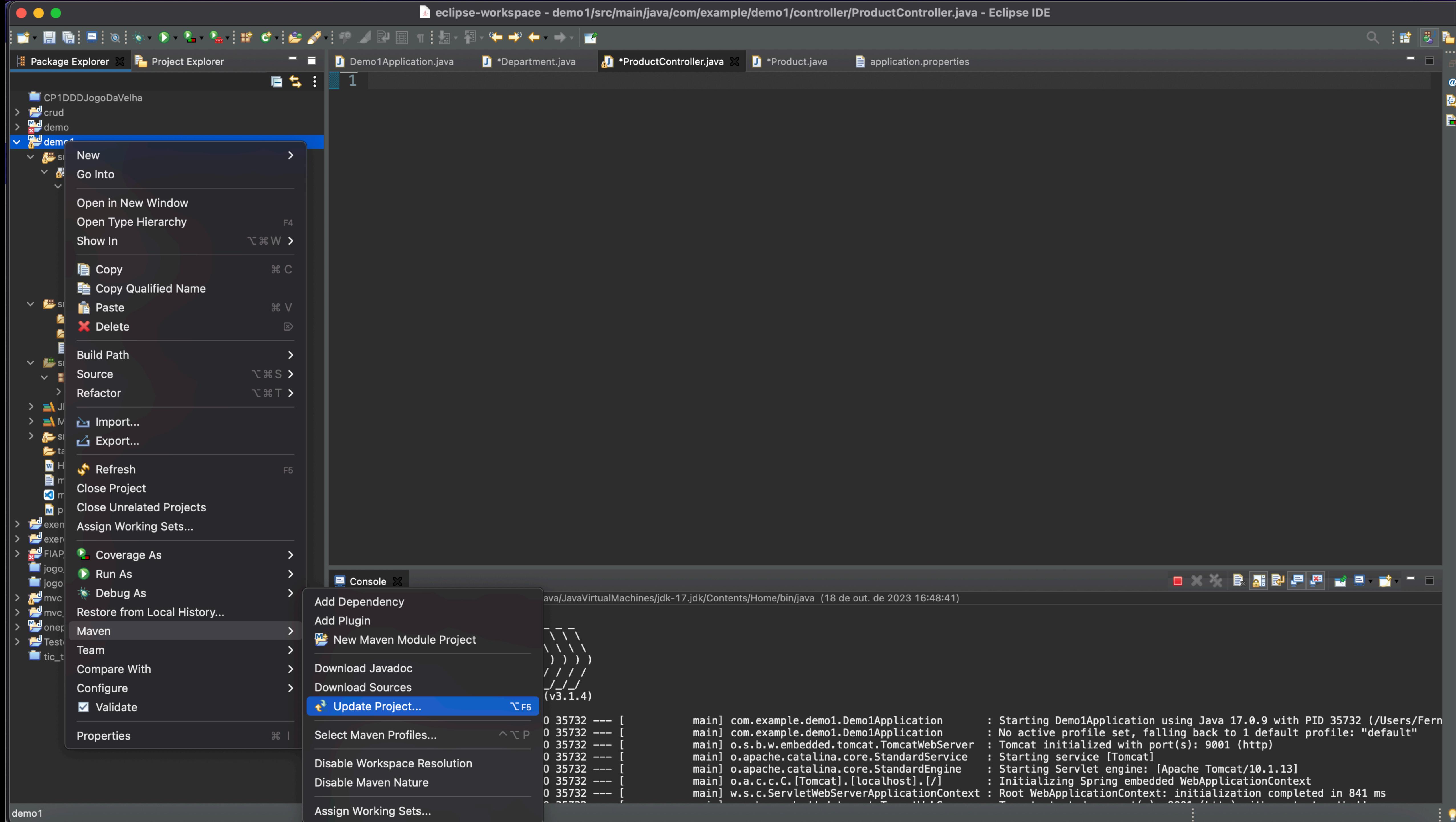
engine: [Apache Tomcat/10.1.13]

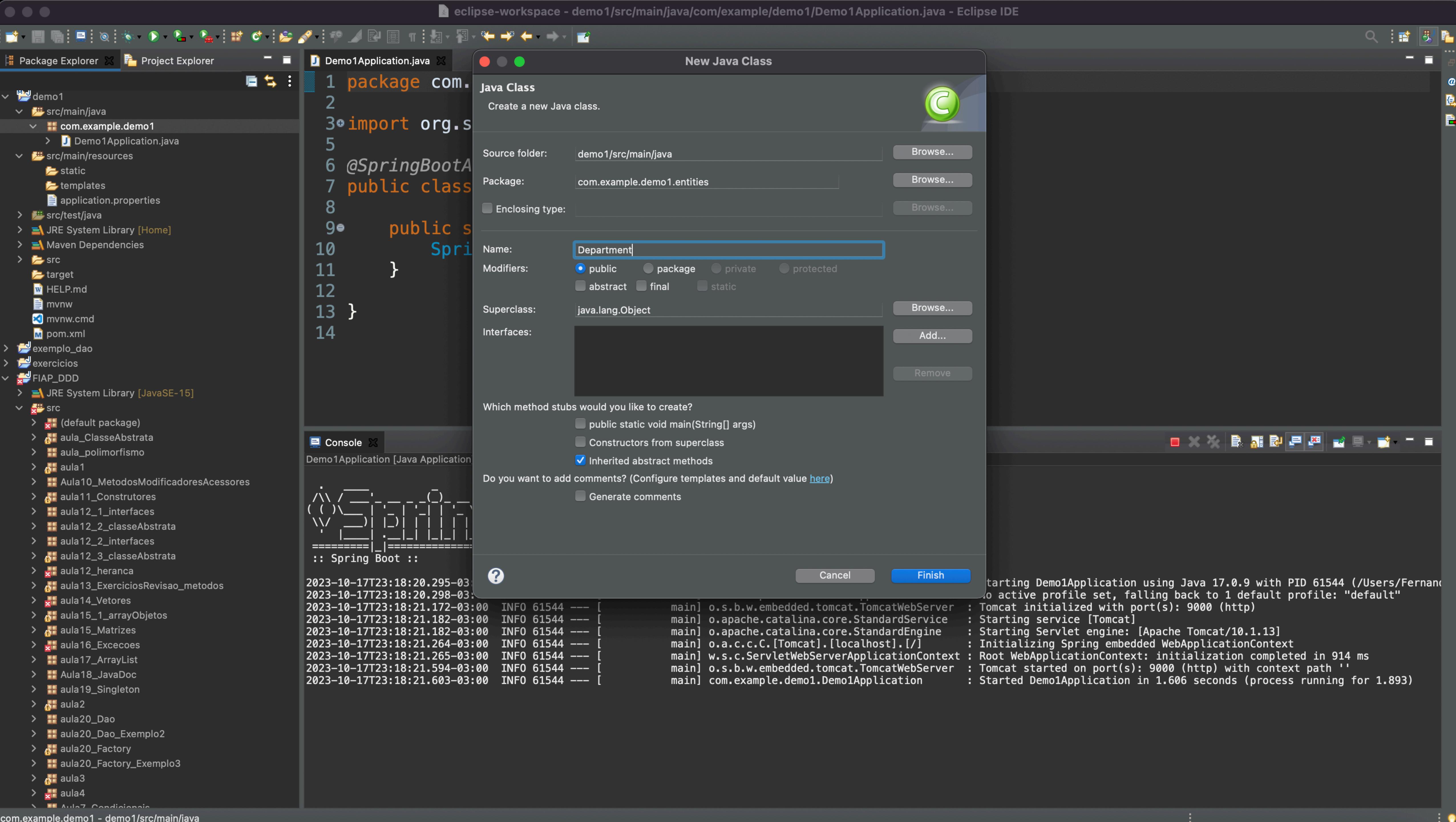
g embedded WebApplicationContext

nContext: initialization completed in 914 ms









eclipse-workspace - demo1/src/main/java/com/example/demo1/entities/Department.java - Eclipse IDE

Package Explorer Project Explorer Demo1Application.java Department.java

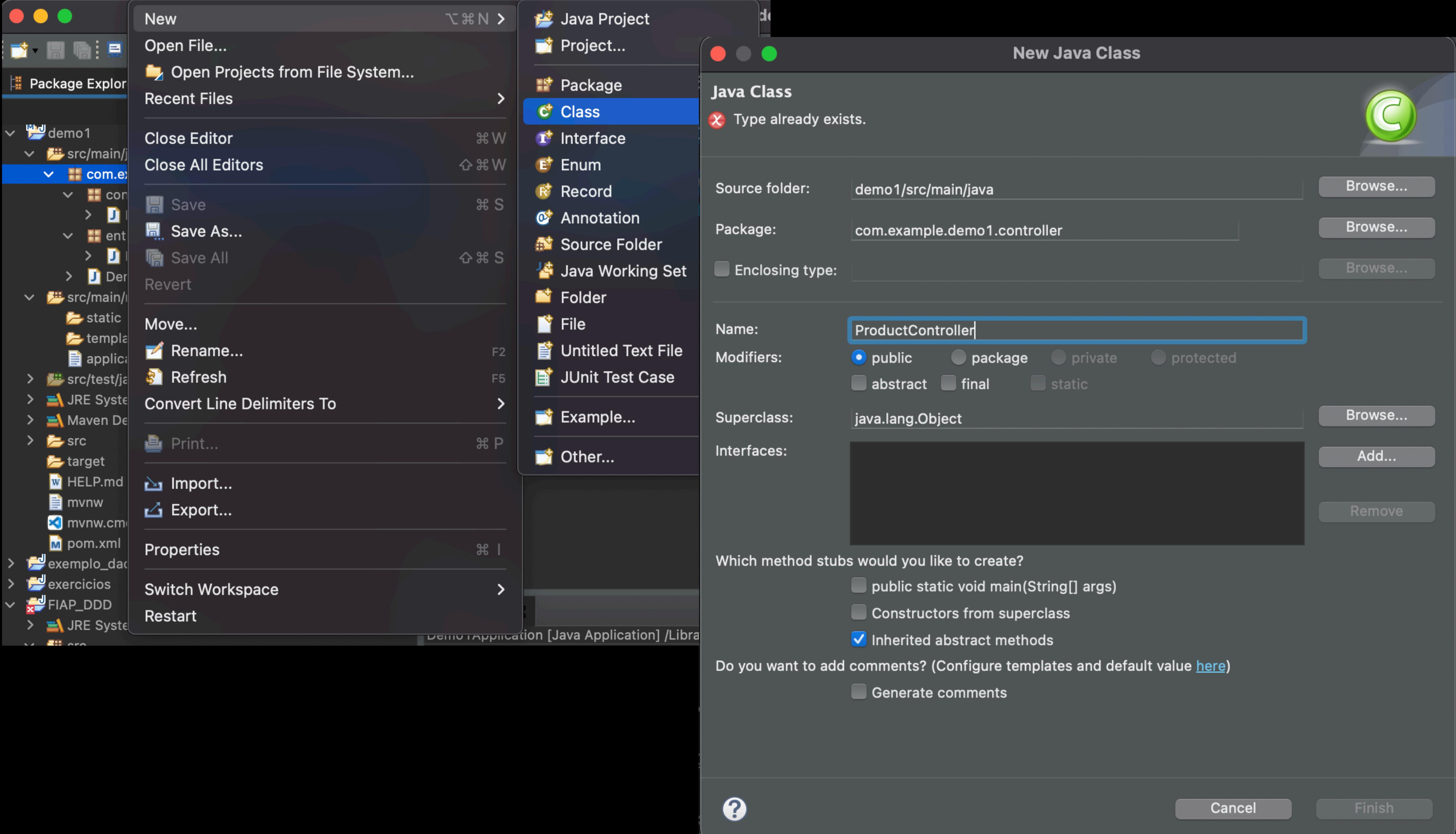
```
1 package com.example.demo1.entities;
2
3 public class Department {
4
5 }
6
```

Console

```
Demo1Application [Java Application] /Library/Java/JavaVirtualMachines/jdk-17.jdk/Contents/Home/bin/java (17 de out. de 2023 23:18:19)

          _/\_ 
         (( )\_) 
        / \ \_) 
       |   | \_) 
      / \ \_) 
     |   | \_) 
    / \ \_) 
   |   | \_) 
  / \ \_) 
 :: Spring Boot ::   (v3.1.4)
```

```
2023-10-17T23:18:20.295-03:00 INFO 61544 --- [           main] com.example.demo1.Demo1Application      : Starting Demo1Application using Java 17.0.9 with PID 61544 (/Users/Fernando/Downloads/Demo1Application.jar)
2023-10-17T23:18:20.298-03:00 INFO 61544 --- [           main] com.example.demo1.Demo1Application      : No active profile set, falling back to 1 default profile: "default"
2023-10-17T23:18:21.172-03:00 INFO 61544 --- [           main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 9000 (http)
2023-10-17T23:18:21.182-03:00 INFO 61544 --- [           main] o.apache.catalina.core.StandardService   : Starting service [Tomcat]
2023-10-17T23:18:21.182-03:00 INFO 61544 --- [           main] o.apache.catalina.core.StandardEngine    : Starting Servlet engine: [Apache Tomcat/10.1.13]
2023-10-17T23:18:21.264-03:00 INFO 61544 --- [           main] o.a.c.c.C.[Tomcat].[localhost].[]       : Initializing Spring embedded WebApplicationContext
2023-10-17T23:18:21.265-03:00 INFO 61544 --- [           main] w.s.c.ServletWebServerApplicationContext  : Root WebApplicationContext: initialization completed in 914 ms
2023-10-17T23:18:21.594-03:00 INFO 61544 --- [           main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 9000 (http) with context path ''
2023-10-17T23:18:21.603-03:00 INFO 61544 --- [           main] com.example.demo1.Demo1Application      : Started Demo1Application in 1.606 seconds (process running for 1.893)
```



eclipse-workspace - demo1/src/main/java/com/example/demo1/controller/ProductController.java - Eclipse IDE

Package Explorer Project Explorer Demo1Application.java Department.java ProductController.java

```
1 package com.example.demo1.controller;
2
3 import org.springframework.web.bind.annotation.GetMapping;
4 import org.springframework.web.bind.annotation.RequestMapping;
5 import org.springframework.web.bind.annotation.RestController;
6
7 import com.example.demo1.entities.Department;
8
9 @RestController
10 @RequestMapping(value = "/products")
11 public class ProductController {
12
13     @GetMapping
14     public Department getObjects() {
15         Department d1 = new Department();
16         d1.setId(1L);
17         d1.setName("Tech");
18         return d1;
19     }
20 }
```

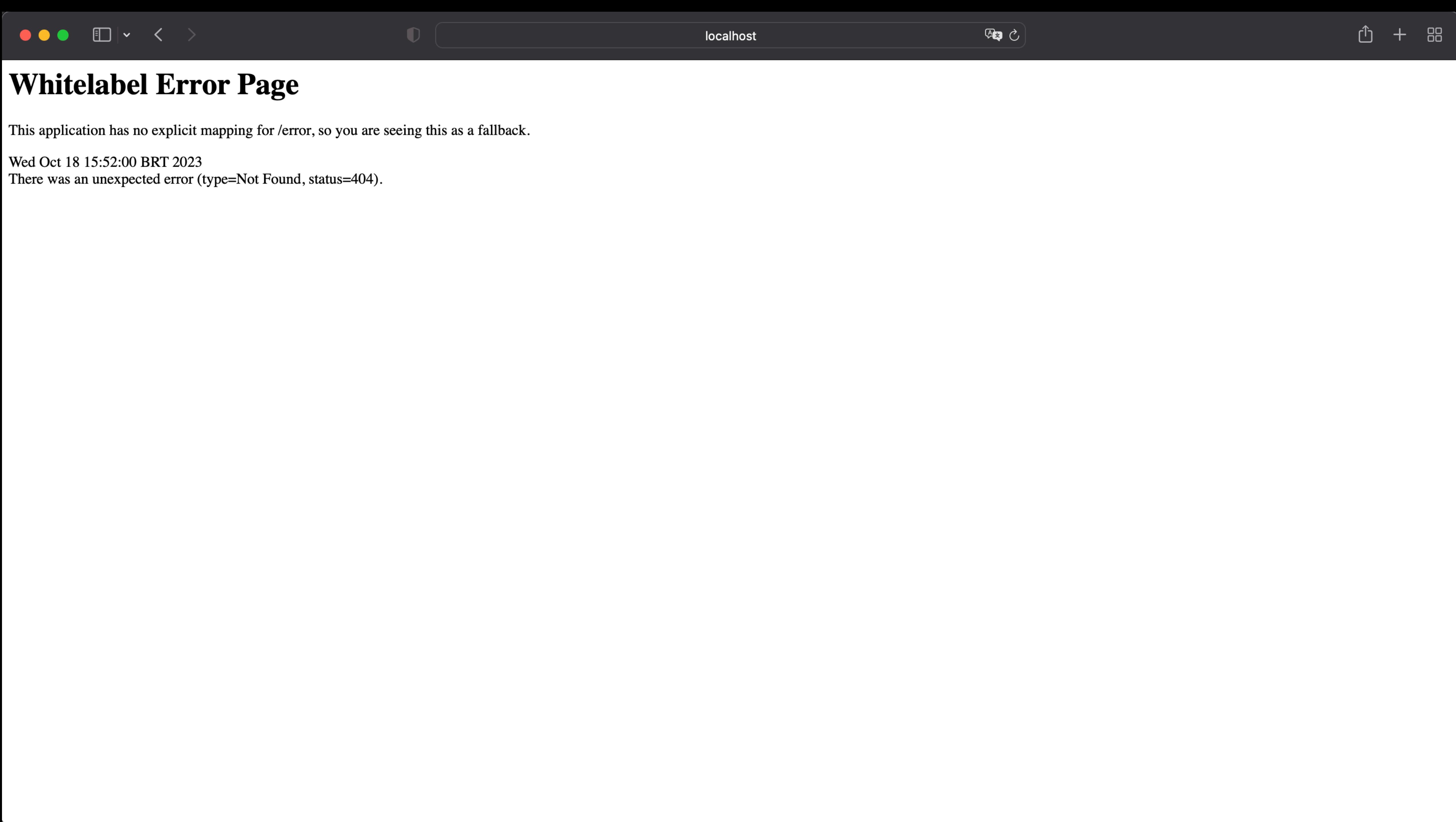
Console Demo1Application [Java Application] /Library/Java/JavaVirtualMachines/jdk-17.jdk/Contents/Home/bin/java (17 de out. de 2023 23:18:19)

```
:
:: Spring Boot :: (v3.1.4)

2023-10-17T23:18:20.295-03:00  INFO 61544 --- [           main] com.example.demo1.Demo1Application      : Starting Demo1Application using Java 17.0.9 with PID 61544 (/Users/Fernando/NetBeansProjects/dem... : No active profile set, falling back to 1 default profile: "default"
: Tomcat initialized with port(s): 9000 (http)
: Starting service [Tomcat]
: Starting Servlet engine: [Apache Tomcat/10.1.13]
: Initializing Spring embedded WebApplicationContext
: Root WebApplicationContext: initialization completed in 914 ms
: Tomcat started on port(s): 9000 (http) with context path ''
: Started Demo1Application in 1.606 seconds (process running for 1.893)
```

New Go Into Open in New Window Open Type Hierarchy Show In Copy Copy Qualified Name Paste Delete Build Path Source Refactor Import... Export... Refresh Close Project Close Unrelated Projects Assign Working Sets... Coverage As Run As Debug As Restore from Local History... Maven New Maven Module Project Add Dependency Add Plugin Download Javadoc Download Sources Update Project... Select Maven Profiles... Disable Workspace Resolution Disable Maven Nature Assign Working Sets...

<http://localhost:8080>



# Whitelabel Error Page

This application has no explicit mapping for /error, so you are seeing this as a fallback.

Wed Oct 18 15:52:00 BRT 2023

There was an unexpected error (type=Not Found, status=404).

Package Explorer   Project Explorer   Demo1Application.java   Department.java   ProductController.java

```

1 package com.example.demo1.controller;
2
3 import org.springframework.web.bind.annotation.RestController;
4
5 @RestController
6 public class ProductController {
7
8 }
9

```

Console

```

Demo1Application [Java Application] /Library/Java/JavaVirtualMachines/jdk-17.jdk/Contents/Home/bin/java (17 de out. de 2023 23:18:19)

.
.
.
=====
:: Spring Boot :: (v3.1.4)

2023-10-17T23:18:20.295-03:00 INFO 61544 --- [           main] com.example.demo1.Demo1Application      : Starting Demo1Application using Java 17.0.9 with PID 61544 (/Users/Fernando/NetBeansProjects/Demo1/target/dependency)
2023-10-17T23:18:20.298-03:00 INFO 61544 --- [           main] com.example.demo1.Demo1Application      : No active profile set, falling back to 1 default profile: "default"
2023-10-17T23:18:21.172-03:00 INFO 61544 --- [           main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port(s): 9000 (http)
2023-10-17T23:18:21.182-03:00 INFO 61544 --- [           main] o.apache.catalina.core.StandardService   : Starting service [Tomcat]
2023-10-17T23:18:21.182-03:00 INFO 61544 --- [           main] o.apache.catalina.core.StandardEngine    : Starting Servlet engine: [Apache Tomcat/10.1.13]
2023-10-17T23:18:21.264-03:00 INFO 61544 --- [           main] o.a.c.c.C.[Tomcat].[localhost].[/]       : Initializing Spring embedded WebApplicationContext
2023-10-17T23:18:21.265-03:00 INFO 61544 --- [           main] w.s.c.ServletWebServerApplicationContext  : Root WebApplicationContext: initialization completed in 914 ms
2023-10-17T23:18:21.594-03:00 INFO 61544 --- [           main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port(s): 9000 (http) with context path ''
2023-10-17T23:18:21.603-03:00 INFO 61544 --- [           main] com.example.demo1.Demo1Application      : Started Demo1Application in 1.606 seconds (process running for 1.893)

```

eclipse-workspace - demo1/src/main/java/com/example/demo1/entities/Product.java - Eclipse IDE

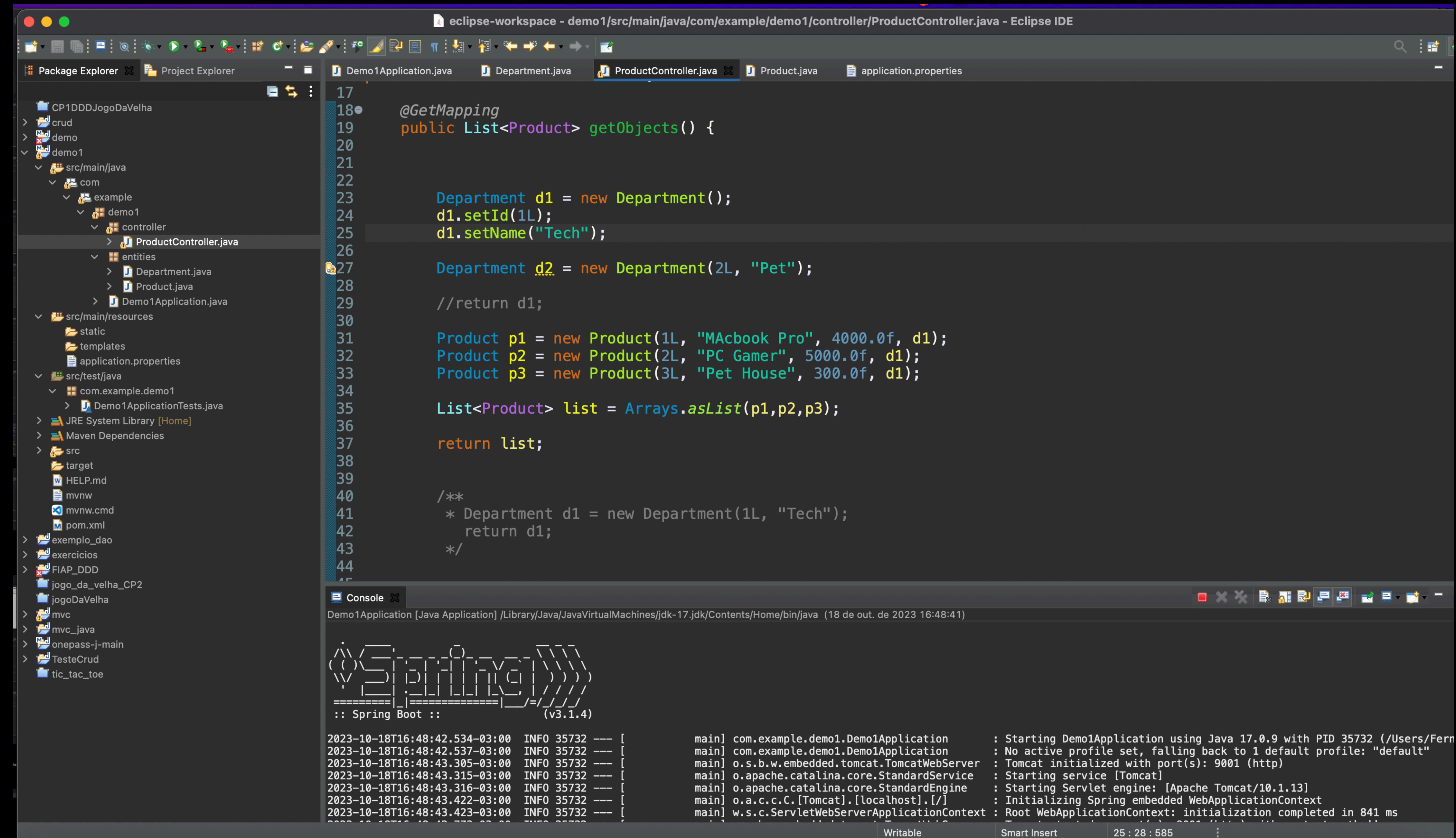
Package Explorer Project Explorer Demo1Application.java Department.java ProductController.java Product.java

```
1 package com.example.demo1.entities;
2
3 public class Product {
4
5     private Long id;
6     private String name;
7     private Department departament;
8
9
10    public Product() {
11
12    }
13
14    /**
15     * @param id
16     * @param name
17     * @param departament
18     */
19    public Product(Long id, String name, Department departament) {
20        this.id = id;
21        this.name = name;
22        this.departament = departament;
23    }
24
25    /**
26     * @return the id
27     */
28    public Long getId() {
29        return id;
30    }
31
32    /**
33     * @param id the id to set
34     */
35    public void setId(Long id) {
36        this.id = id;
37    }
38
39    /**
40     * @return the name
41     */
42    public String getName() {
43        return name;
44    }
45
46    public void setName(String name) {
47        this.name = name;
48    }
49
50    public Department getDepartament() {
51        return departament;
52    }
53
54    public void setDepartament(Department departament) {
55        this.departament = departament;
56    }
57}
```

Console

Demo1Application [Java Application] /Library/Java/JavaVirtualMachines/jdk-17.jdk/Contents/Home/bin/java (18 de out. de 2023 16:13:12)

Alternando o controller para retornar uma  
lista de Products



Execute a aplicação

File Edit View Insert Run Tools Window Help

Package Explorer Project Explorer Demo1Application.java Department.java ProductController.java Product.java application.properties

```

1 package com.example.demo1;
2
3+import org.springframework.boot.SpringApplication;...
4
5 @SpringBootApplication
6 public class Demo1Application {
7
8     public static void main(String[] args) {
9         SpringApplication.run(Demo1Application.class, args);
10    }
11 }
```

New >

Open F3

Open With F4

Show In

Copy⌘ C

Copy Qualified Name

Paste⌘ V

Delete ⌘ X

Build Path >

Source ⌘ S >

Refactor ⌘ T >

Import...

Export...

References >

Declarations >

Refresh F5

Assign Working Sets...

Coverage As

Run As >

1 Java Application ⌘ X J

Debug As >

Run Configurations...

Restore from Local History...

Team

Compare With

Replace With

Validate

Properties ⌘ P

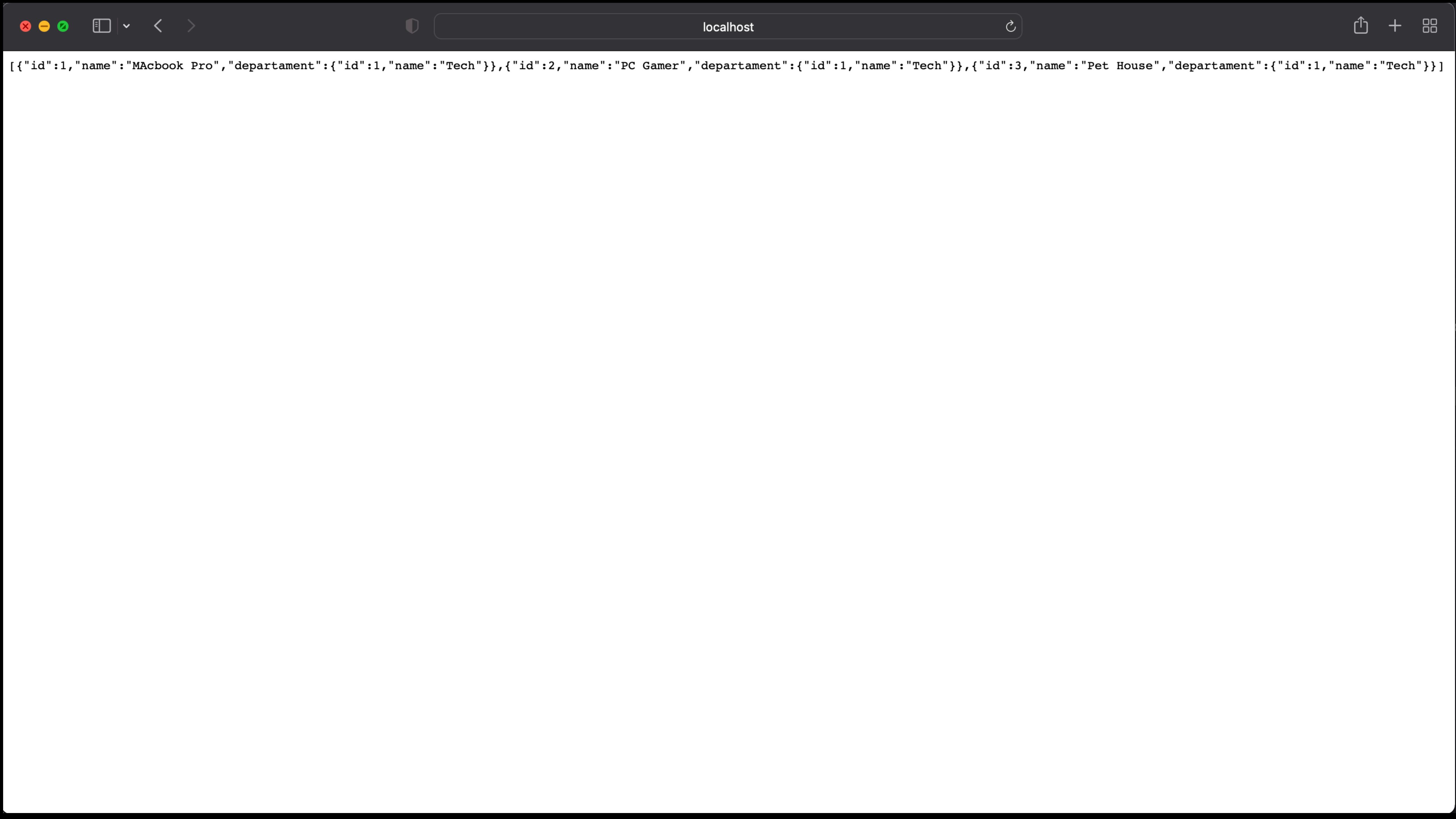
14:1:308

Java Application /Library/Java/JavaVirtualMachines/jdk-17.jdk/Contents/Home/bin/java (18 de out. de 2023 16:48:41)

```

14:48:42.534-03:00 INFO 35732 --- [           main] com.example.demo1.Demo1Application   : Starting Demo1Application using Java 17.0.9 with PID 35732 (/Users/Fern
14:48:42.537-03:00 INFO 35732 --- [           main] com.example.demo1.Demo1Application   : No active profile set, falling back to 1 default profile: "default"
14:48:43.305-03:00 INFO 35732 --- [           main] o.s.b.w.embedded.tomcat.TomcatWebServer: Tomcat initialized with port(s): 9001 (http)
14:48:43.315-03:00 INFO 35732 --- [           main] o.apache.catalina.core.StandardService: Starting service [Tomcat]
14:48:43.316-03:00 INFO 35732 --- [           main] o.apache.catalina.core.StandardEngine: Starting Servlet engine: [Apache Tomcat/10.1.13]
14:48:43.422-03:00 INFO 35732 --- [           main] o.a.c.c.C.[Tomcat].[localhost].[/]: Initializing Spring embedded WebApplicationContext
14:48:43.423-03:00 INFO 35732 --- [           main] w.s.c.ServletWebServerApplicationContext: Root WebApplicationContext: initialization completed in 841 ms

```



# Postman

# Postman

Ferramenta utilizada para testar, documentar e colaborar em APIs. Possui uma interface gráfica amigável que permite enviar solicitações HTTP para APIs e receber as respostas correspondentes

**POSTMAN**

Normal Basic Auth Digest Auth OAuth 1.0 No environment

http://localhost:9001/products GET URL params Headers (0)

History Collections GET http://localhost:9001/products X

Send Preview Add to collection

Body Cookies (undefined) Headers (5) STATUS 200 TIME 3561 ms

Pretty Raw Preview JSON XML

```
1 [  
2   {  
3     "id": 1,  
4     "name": "MACbook Pro",  
5     "departament": {  
6       "id": 1,  
7       "name": "Tech"  
8     }  
9   },  
10  {  
11    "id": 2,  
12    "name": "PC Gamer",  
13    "departament": {  
14      "id": 1,  
15      "name": "Tech"  
16    }  
17  },  
18  {  
19    "id": 3,  
20    "name": "Pet House",  
21    "departament": {  
22      "id": 1,  
23      "name": "Tech"  
24    }  
25  }  
26 ]
```