

## Sample exercises on Centralized Authentication and SSO with Spring Boot 3 and Spring Cloud

## Exercise 1: Implementing Centralized Authentication with OAuth 2.1/OIDC

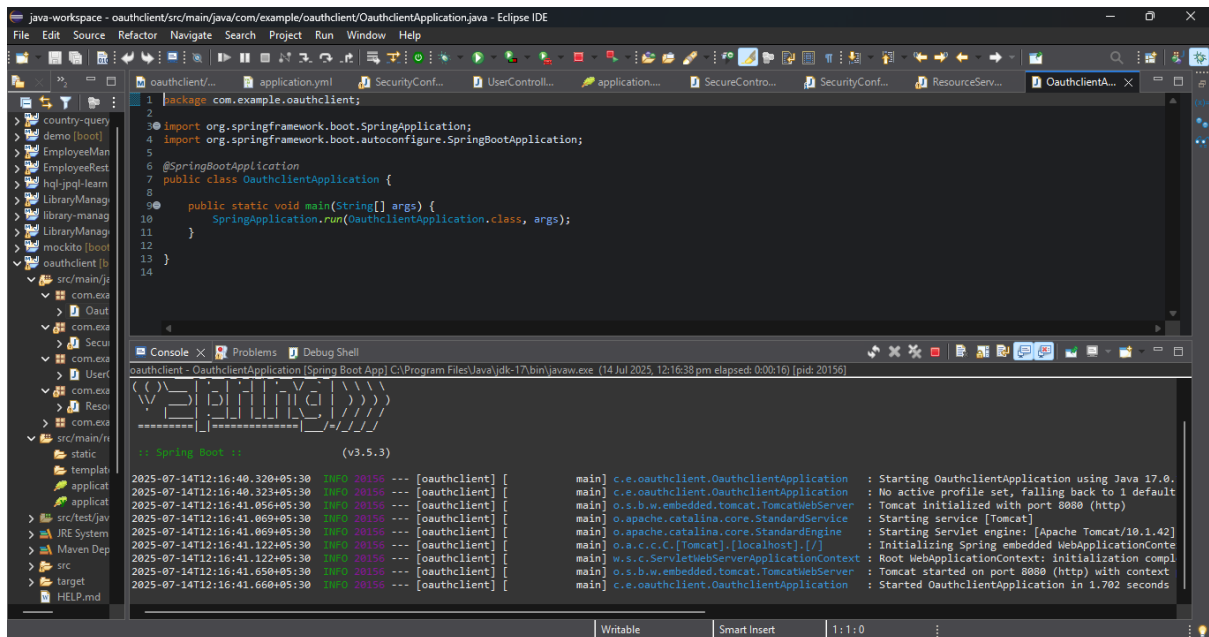
Output:

The screenshot shows an IDE (likely IntelliJ IDEA) with the following components:

- Main Editor:** Displays the `UserController.java` file. The code includes imports for `java.security.Principal` and `org.springframework.web.bind.annotation` annotations. It defines a `@RestController` with two `@GetMapping` endpoints: `/user` (returning a `Principal`) and `/home` (returning a "welcome to OAuth2 Login Example!" message).
- Left Sidebar:** Shows the project structure. The `src/main/java` folder is expanded, showing the `com.example.oauthclient` package.
- Bottom Console:** Displays the output of the application running on a Tomcat server. The output includes startup logs for the `OAuthClientApplication` and the message "Completed initialization in 2 ms".

## Exercise 2: Configuring Authorization Servers and Resource Servers

Output:



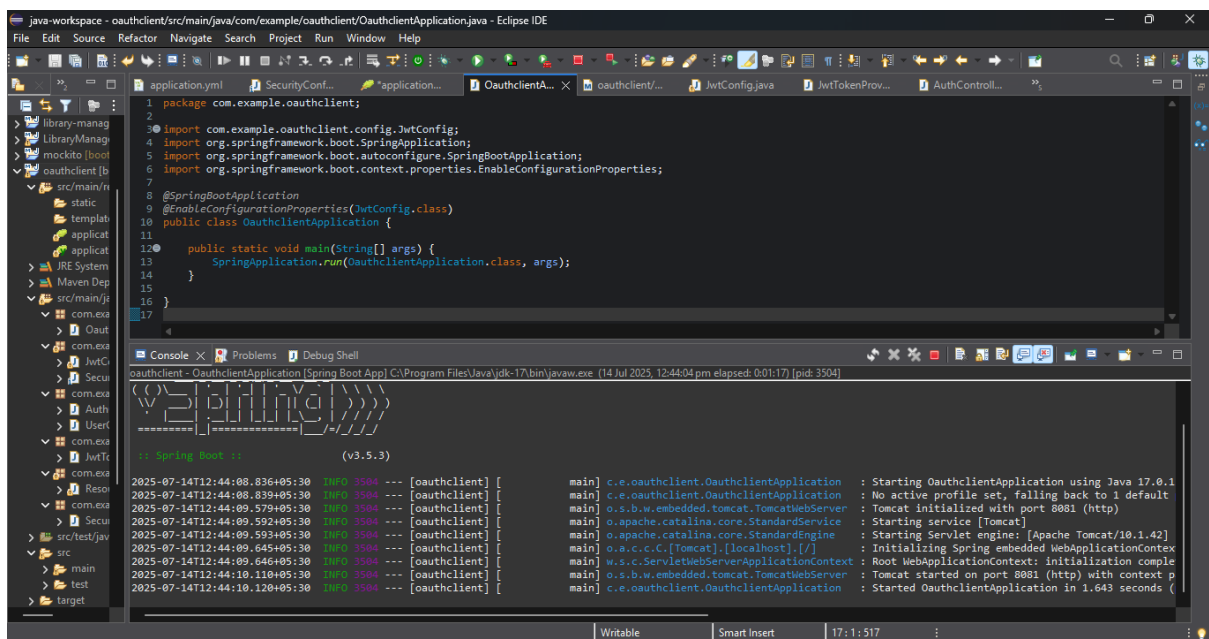
```
java-workspace - oauthclient/src/main/java/com/example/oauthclient/OauthclientApplication.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help

package com.example.oauthclient;
import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;
@SpringBootApplication
public class OauthclientApplication {
    public static void main(String[] args) {
        SpringApplication.run(OauthclientApplication.class, args);
    }
}
```

```
oAuthclient - OauthclientApplication [Spring Boot App] C:\Program Files\Java\jdk-17\bin\javaw.exe (14 Jul 2025, 12:16:38 pm elapsed: 0:00:16) [pid: 20156]
[INFO] 2025-07-14T12:16:40.320+05:30 [main] c.e.oauthclient.OauthclientApplication : Starting OauthclientApplication using Java 17.0.
[INFO] 2025-07-14T12:16:40.323+05:30 [main] c.e.oauthclient.OauthclientApplication : No active profile set, falling back to 1 default
[INFO] 2025-07-14T12:16:41.056+05:30 [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port 8080 (http)
[INFO] 2025-07-14T12:16:41.069+05:30 [main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
[INFO] 2025-07-14T12:16:41.069+05:30 [main] o.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/10.1.42]
[INFO] 2025-07-14T12:16:41.122+05:30 [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
[INFO] 2025-07-14T12:16:41.122+05:30 [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization compl
[INFO] 2025-07-14T12:16:41.650+05:30 [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port 8080 (http) with context
[INFO] 2025-07-14T12:16:41.660+05:30 [main] c.e.oauthclient.OauthclientApplication : Started OauthclientApplication in 1.702 seconds
```

## Exercise 3: Using JSON Web Tokens (JWT) for Secure Communication

Output:



```
java-workspace - oauthclient/src/main/java/com/example/oauthclient/OauthclientApplication.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help

package com.example.oauthclient;
import com.example.oauthclient.config.JwtConfig;
import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;
import org.springframework.boot.context.properties.EnableConfigurationProperties;
@SpringBootApplication
@EnableConfigurationProperties(JwtConfig.class)
public class OauthclientApplication {
    public static void main(String[] args) {
        SpringApplication.run(OauthclientApplication.class, args);
    }
}
```

```
oAuthclient - OauthclientApplication [Spring Boot App] C:\Program Files\Java\jdk-17\bin\javaw.exe (14 Jul 2025, 12:44:04 pm elapsed: 0:01:17) [pid: 3504]
[INFO] 2025-07-14T12:44:08.836+05:30 [main] c.e.oauthclient.OauthclientApplication : Starting OauthclientApplication using Java 17.0.1
[INFO] 2025-07-14T12:44:08.839+05:30 [main] c.e.oauthclient.OauthclientApplication : No active profile set, falling back to 1 default
[INFO] 2025-07-14T12:44:09.599+05:30 [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat initialized with port 8081 (http)
[INFO] 2025-07-14T12:44:09.592+05:30 [main] o.apache.catalina.core.StandardService : Starting service [Tomcat]
[INFO] 2025-07-14T12:44:09.593+05:30 [main] o.apache.catalina.core.StandardEngine : Starting Servlet engine: [Apache Tomcat/10.1.42]
[INFO] 2025-07-14T12:44:09.645+05:30 [main] o.a.c.c.C.[Tomcat].[localhost].[/] : Initializing Spring embedded WebApplicationContext
[INFO] 2025-07-14T12:44:09.646+05:30 [main] w.s.c.ServletWebServerApplicationContext : Root WebApplicationContext: initialization comple
[INFO] 2025-07-14T12:44:10.118+05:30 [main] o.s.b.w.embedded.tomcat.TomcatWebServer : Tomcat started on port 8081 (http) with context p
[INFO] 2025-07-14T12:44:10.120+05:30 [main] c.e.oauthclient.OauthclientApplication : Started OauthclientApplication in 1.643 seconds (
```