

Exercise 1: Mocking a Service Dependency in a Controller Test

UserControllerTest.java

```
import com.example.*;
import org.junit.jupiter.api.BeforeEach;
import org.junit.jupiter.api.Test;
import org.mockito.InjectMocks;
import org.mockito.Mock;
import org.mockito.MockitoAnnotations;
import org.springframework.http.ResponseEntity;
import static org.junit.jupiter.api.Assertions.assertEquals;
import static org.mockito.Mockito.*;

public class UserControllerTest {

    @Mock
    private UserService userService;

    @InjectMocks
    private UserController userController;

    @BeforeEach
    void setUp() {
        MockitoAnnotations.openMocks(this); // Initializes @Mock and @InjectMocks
    }

    @Test
    void testGetUser_ReturnsUser() {
        // Arrange
        Long userId = 1L;
        User mockUser = new User();
        mockUser.setId(userId);
        mockUser.setName("Sid");

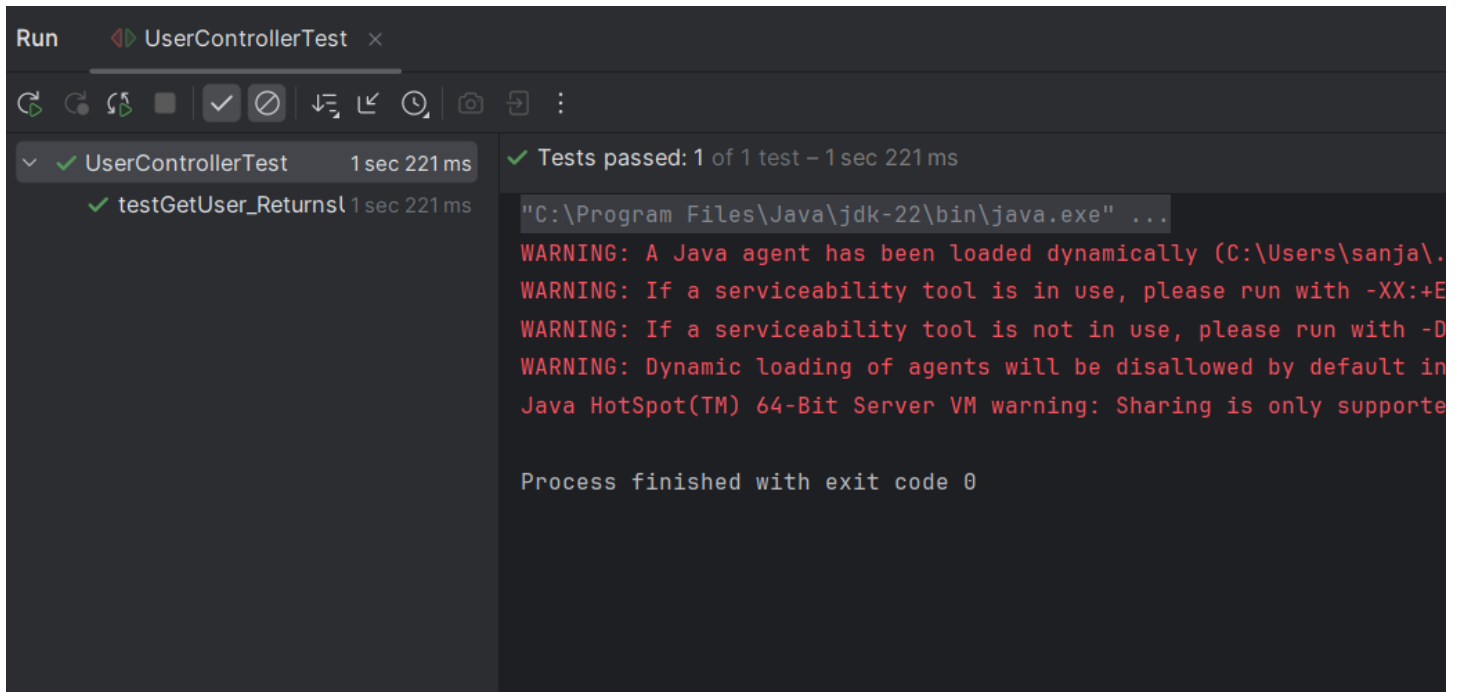
        when(userService.getUserById(userId)).thenReturn(mockUser);

        // Act
        ResponseEntity<User> response = userController.getUser(userId);

        // Assert
        assertEquals(200, response.getStatusCodeValue());
        assertEquals("Sid", response.getBody().getName());
        assertEquals(userId, response.getBody().getId());

        verify(userService, times(1)).getUserById(userId);
    }
}
```

Output:



The screenshot shows the 'Run' window of an IDE. The title bar indicates the test is 'UserControllerTest'. The toolbar contains icons for running, debugging, and other actions. The test results list shows 'UserControllerTest' with a duration of '1 sec 221 ms' and a green checkmark. Below it, the specific test 'testGetUser_Returns' is also marked as passed. The output pane on the right shows the command 'C:\Program Files\Java\jdk-22\bin\java.exe' and several red warning messages from the Java HotSpot(TM) 64-Bit Server VM regarding dynamic loading of agents. The final output line states 'Process finished with exit code 0'.

```
Run  UserControllerTest  x

[Icons: Run, Debug, Test, etc.]

✓ UserControllerTest  1 sec 221 ms
  ✓ testGetUser_Returns 1 sec 221 ms

✓ Tests passed: 1 of 1 test – 1 sec 221 ms

"C:\Program Files\Java\jdk-22\bin\java.exe" ...
WARNING: A Java agent has been loaded dynamically (C:\Users\sanja\...
WARNING: If a serviceability tool is in use, please run with -XX:+E
WARNING: If a serviceability tool is not in use, please run with -D
WARNING: Dynamic loading of agents will be disallowed by default in
Java HotSpot(TM) 64-Bit Server VM warning: Sharing is only supporte

Process finished with exit code 0
```

Exercise 2: Mocking a Repository in a Service Test

User.java

```
package com.example;

import jakarta.persistence.Entity;
import jakarta.persistence.Id;

@Entity
public class User {
    @Id
    private Long id;
    private String name;
    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;
    }
}
```

UserService.java

```
package com.example;

import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.stereotype.Service;

@Service
public class UserService {

    @Autowired
    private UserRepository userRepository;

    public User getUserById(Long id) {
        return userRepository.findById(id).orElse(null);
    }
}
```

UserRepository.java

```
package com.example;

import org.springframework.data.jpa.repository.JpaRepository;

public interface UserRepository extends JpaRepository<User, Long> {
    User findByName(String name);
}
```

UserServiceTest.java

```
import com.example.*;

import org.junit.jupiter.api.BeforeEach;
import org.junit.jupiter.api.Test;
import org.mockito.InjectMocks;
import org.mockito.Mock;

import static org.mockito.Mockito.when;
import static org.junit.jupiter.api.Assertions.*;

import org.mockito.MockitoAnnotations;

import java.util.Optional;

public class UserServiceTest {

    @Mock
    private UserRepository userRepository;

    @InjectMocks
    private UserService userService;

    @BeforeEach
    void setup() {
        MockitoAnnotations.openMocks(this); // Initialize mocks
    }

    @Test
    void testGetUserById_found() {
        User user = new User();
        user.setId(1L);
        user.setName("ram");

        when(userRepository.findById(1L)).thenReturn(Optional.of(user));
    }
}
```

```

        User result = userService.getUserById(1L);
        assertNotNull(result);
        assertEquals("ram", result.getName());
    }

    @Test
    void testGetUserById_notFound() {
        when(userRepository.findById(2L)).thenReturn(Optional.empty());

        User result = userService.getUserById(2L);
        assertNull(result);
    }
}

```

Output:

The screenshot shows the Run window of an IDE. The top bar indicates the test class is `UserServiceTest`. Below the toolbar, a list of test results is shown:

- ✓ `UserServiceTest` 1 sec 347 ms
- ✓ `testGetUserById_not` 1 sec 342 ms
- ✓ `testGetUserById_found()` 5 ms

On the right, the test output is displayed:

```

"C:\Program Files\Java\jdk-22\bin\java.exe" ...
WARNING: A Java agent has been loaded dynamically (C:\Users\sanja\.m2\rep
WARNING: If a serviceability tool is in use, please run with -XX:+Enabled
WARNING: If a serviceability tool is not in use, please run with -Djdk.in
WARNING: Dynamic loading of agents will be disallowed by default in a fut
Java HotSpot(TM) 64-Bit Server VM warning: Sharing is only supported for

```

At the bottom, it states: `Process finished with exit code 0`

Exercise 3: Mocking a Service Dependency in an Integration Test

UserIntegrationTest.java

```
import com.example.*;

import org.junit.jupiter.api.Test;
import org.mockito.Mockito;

import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.boot.test.autoconfigure.web.servlet.AutoConfigureMockMvc;
import org.springframework.boot.test.mock.mockito.MockBean;
import org.springframework.boot.test.context.SpringBootTest;

import org.springframework.http.MediaType;
import org.springframework.test.web.servlet.MockMvc;

import static org.mockito.Mockito.when;
import static org.springframework.test.web.servlet.request.MockMvcRequestBuilders.get;
import static org.springframework.test.web.servlet.result.MockMvcResultMatchers.*;

@SpringBootTest(classes = Slf4jApplication.class)
@AutoConfigureMockMvc
public class UserIntegrationTest {

    @Autowired
    private MockMvc mockMvc;

    @MockBean
    private UserService userService;

    @Test
    void testGetUserById() throws Exception {
        User user = new User();
        user.setId(1L);
        user.setName("Sid");

        when(userService.getUserById(1L)).thenReturn(user);

        mockMvc.perform(get("/users/1")
                        .contentType(MediaType.APPLICATION_JSON))
                .andExpect(status().isOk())
                .andExpect(jsonPath("$.id").value(1L))
                .andExpect(jsonPath("$.name").value("Sid"));
    }
}
```

Output:

```
Run UserIntegrationTest x
21:44:04.104 [main] DEBUG o.s.b.t.c.SpringBootTestContextBootstrapper - Neither @Context
21:44:04.107 [main] DEBUG o.s.t.c.s.AbstractContextLoader - Could not detect default re
21:44:04.120 [main] DEBUG o.s.b.t.c.SpringBootTestContextBootstrapper - Using ContextCu
21:44:04.156 [main] DEBUG o.s.b.t.c.SpringBootTestContextBootstrapper - Using ContextCu
21:44:04.304 [main] DEBUG o.s.t.c.u.TestContextSpringFactoriesUtils - Skipping candidat
21:44:04.316 [main] DEBUG o.s.b.t.c.SpringBootTestContextBootstrapper - Using TestExecu
21:44:04.318 [main] DEBUG o.s.t.c.s.DirtiesContextBeforeModesTestExecutionListener - Be

.   ____          _ _   ____
/\ \ / ___'_  _  _ _ _  _  _  _ / _  \
( ( ) \___| '_|'_| _ |_/_/_\ / _  \
\ \ / ____|_|_|_| _||_|_|_|_|_|_|_|)
'  |____| .__|_|_|_| _||_|_|_|_|_|_|_|
=====|_|=====|___/_/_/_/_/_/_/
:: Spring Boot ::                (v3.2.5)

21:44:04.739 [main] INFO    UserIntegrationTest - Starting UserIntegrationTest using Java
21:44:04.740 [main] DEBUG   UserIntegrationTest - Running with Spring Boot v3.2.5, Spring
21:44:04.741 [main] INFO    UserIntegrationTest - No active profile set, falling back to
```