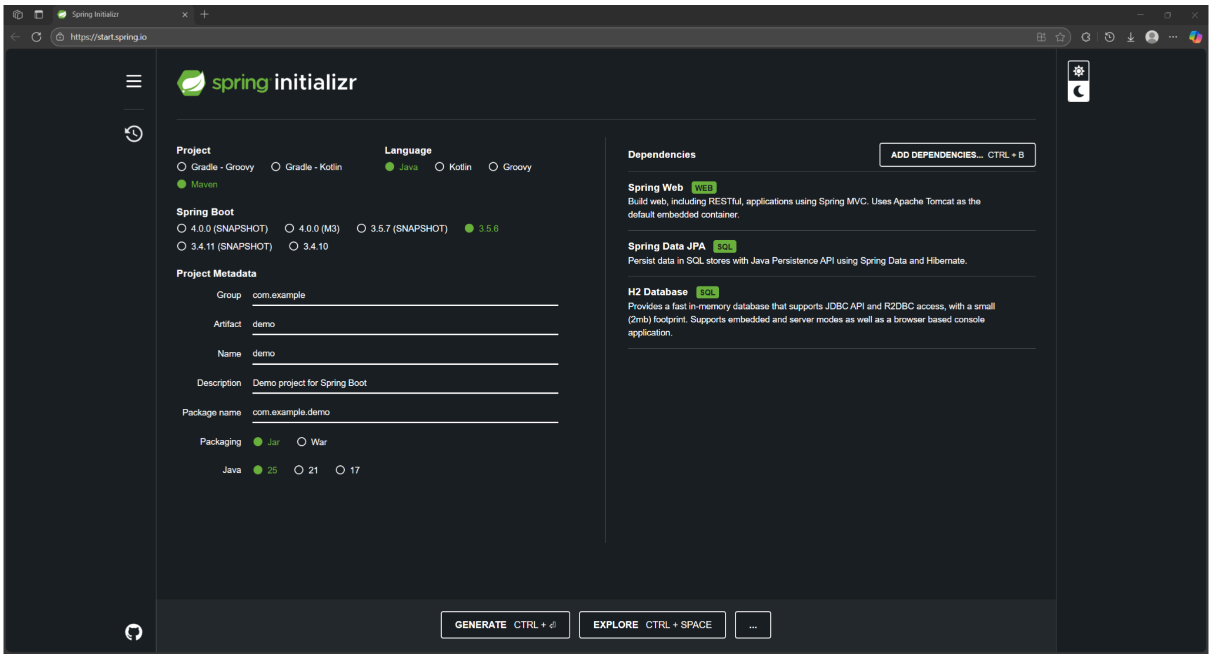
Баранов Д.А. ИВТ 2.1

1. Создание проекта с помощью Spring Initializr

1.



spring initializr

Project
Gradle - Groovy / Gradle - Kotlin / [✓ Maven]

Language
[✓ Java] / Kotlin / Groovy

Spring Boot
4.0.0 (SNAPSHOT) / 4.0.0 (M3) / 3.5.7 (SNAPSHOT) / [✓ 3.5.6] / 3.4.11 (SNAPSHOT) / 3.4.10

Project Metadata

Group	com.example
Artifact	demo
Name	demo
Description	Demo project for Spring Boot
Package name	com.example.demo
Packaging	[✓ Jar] / War
Java	[✓ 25] / 21 / 17

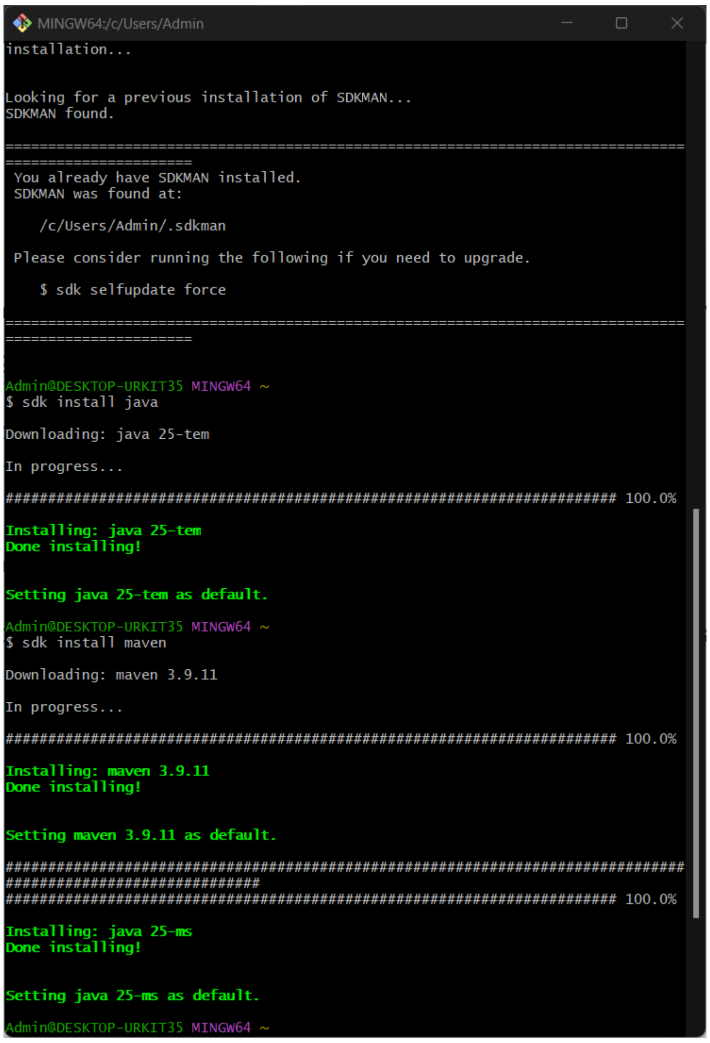
Dependencies

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

Spring Data JPA SQL
Persist data in SQL stores with Java Persistence API using Spring Data and Hibernate.

H2 Database SQL
Provides a fast in-memory database that supports JDBC API and R2DBC access, with a small (2mb) footprint. Supports embedded and server modes as well as a browser based console application.

2.



```
installation...


Looking for a previous installation of SDKMAN...
SDKMAN found.

================================================================================
=====================
 You already have SDKMAN installed.
 SDKMAN was found at:

    /c/Users/Admin/.sdkman

 Please consider running the following if you need to upgrade.

    $ sdk selfupdate force

================================================================================
=====================


Admin@DESKTOP-URKIT35 MINGW64 ~
$ sdk install java

Downloading: java 25-tem

In progress...

########################################################################## 100.0%

Installing: java 25-tem
Done installing!


Setting java 25-tem as default.

Admin@DESKTOP-URKIT35 MINGW64 ~
$ sdk install maven

Downloading: maven 3.9.11

In progress...

########################################################################## 100.0%

Installing: maven 3.9.11
Done installing!


Setting maven 3.9.11 as default.

################################################################################
###########################
########################################################################## 100.0%

Installing: java 25-ms
Done installing!


Setting java 25-ms as default.

Admin@DESKTOP-URKIT35 MINGW64 ~
```

3.

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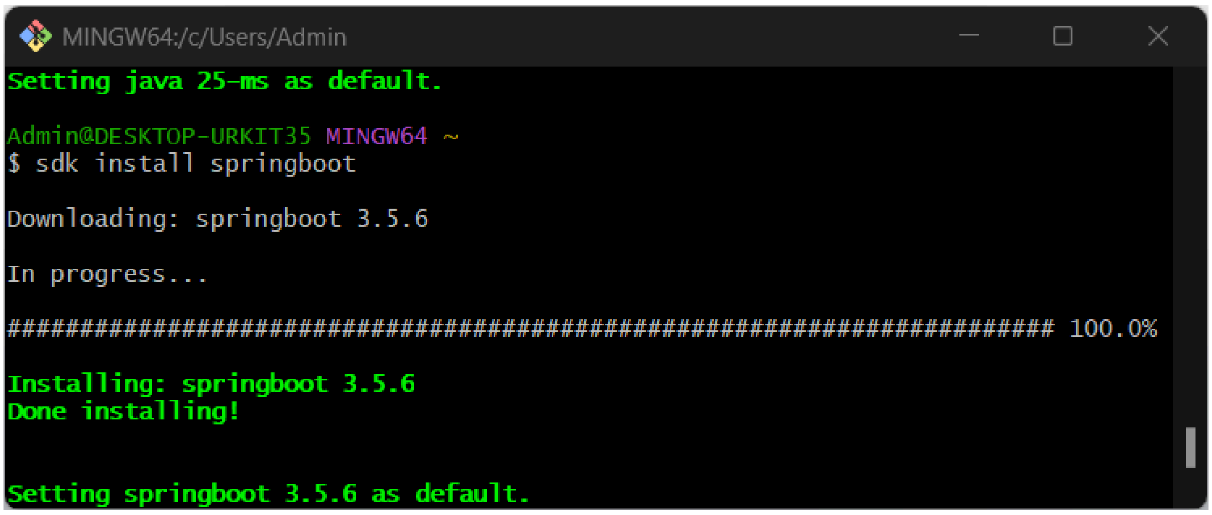
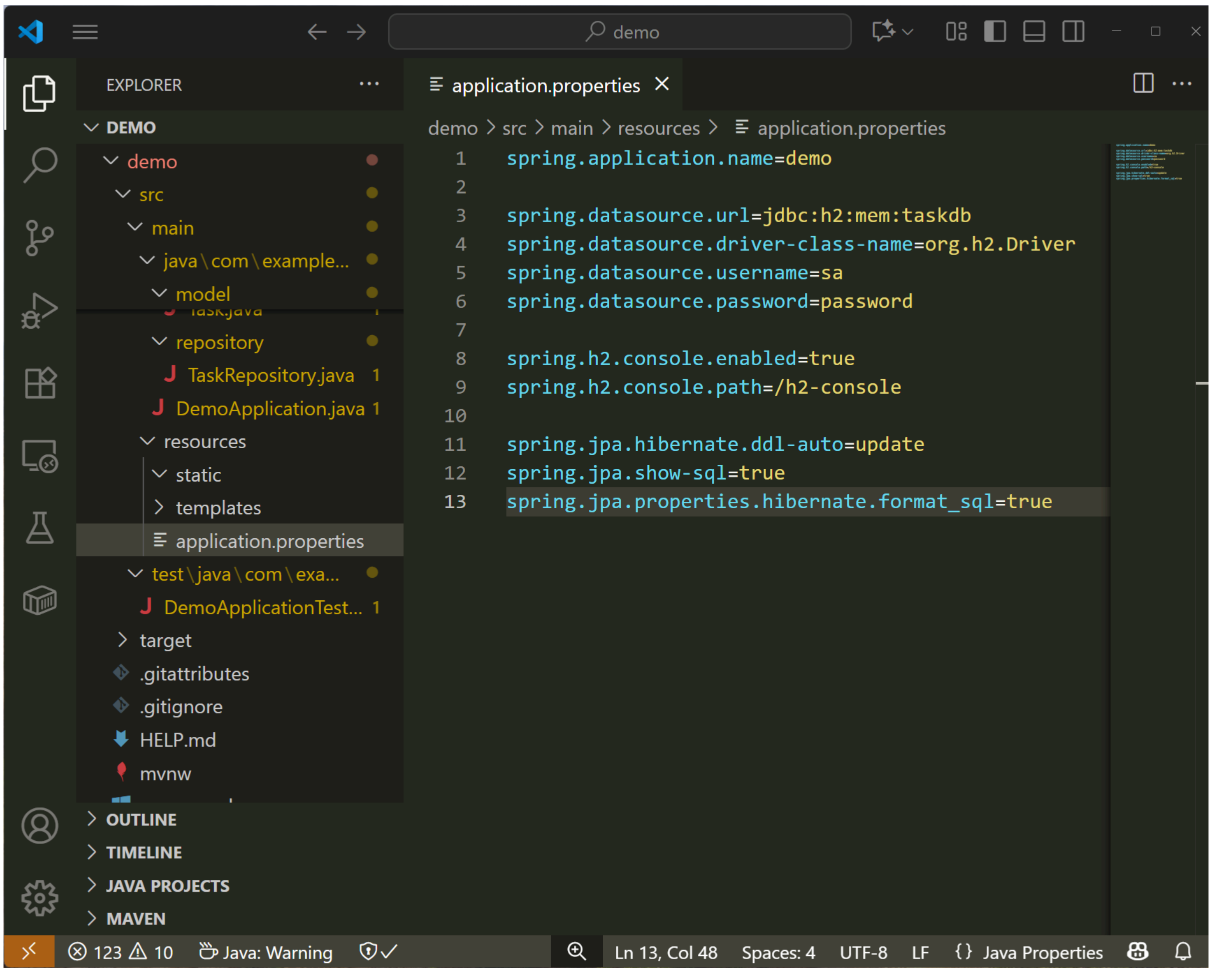


```
MINGW64:/c/Users/Admin
Setting java 25-ms as default.

Admin@DESKTOP-URKIT35 MINGW64 ~
$ sdk install springboot

Downloading: springboot 3.5.6

In progress...

######################################################################### 100.0%

Installing: springboot 3.5.6
Done installing!

Setting springboot 3.5.6 as default.
```

2. Настройка базы данных



```
spring.application.name=demo

spring.datasource.url=jdbc:h2:mem:taskdb
spring.datasource.driver-class-name=org.h2.Driver
spring.datasource.username=sa
spring.datasource.password=password

spring.h2.console.enabled=true
spring.h2.console.path=/h2-console

spring.jpa.hibernate.ddl-auto=update
spring.jpa.show-sql=true
spring.jpa.properties.hibernate.format_sql=true
```

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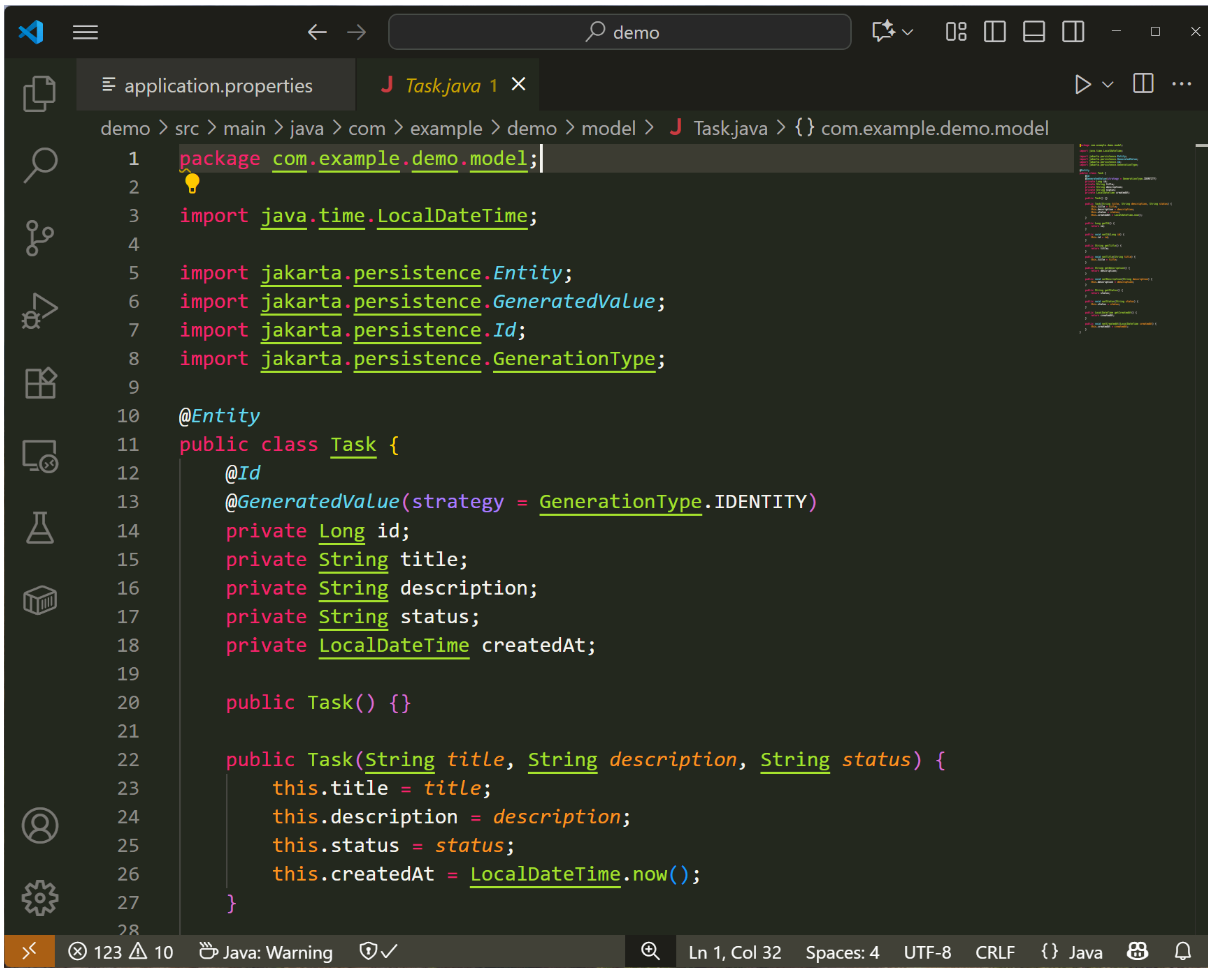
3. Создание модели задачи


demo
application.properties
Task.java 1
demo > src > main > java > com > example > demo > model > Task.java > {} com.example.demo.model
123 10 Java: Warning
Ln 1, Col 32 Spaces: 4 UTF-8 CRLF {} Java

```java
package com.example.demo.model;

import java.time.LocalDateTime;

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

@Entity
public class Task {
    @Id
    @GeneratedValue(strategy = GenerationType.IDENTITY)
    private Long id;
    private String title;
    private String description;
    private String status;
    private LocalDateTime createdAt;

    public Task() {}

    public Task(String title, String description, String status) {
        this.title = title;
        this.description = description;
        this.status = status;
        this.createdAt = LocalDateTime.now();
    }
```

4. Создание репозитория для задач

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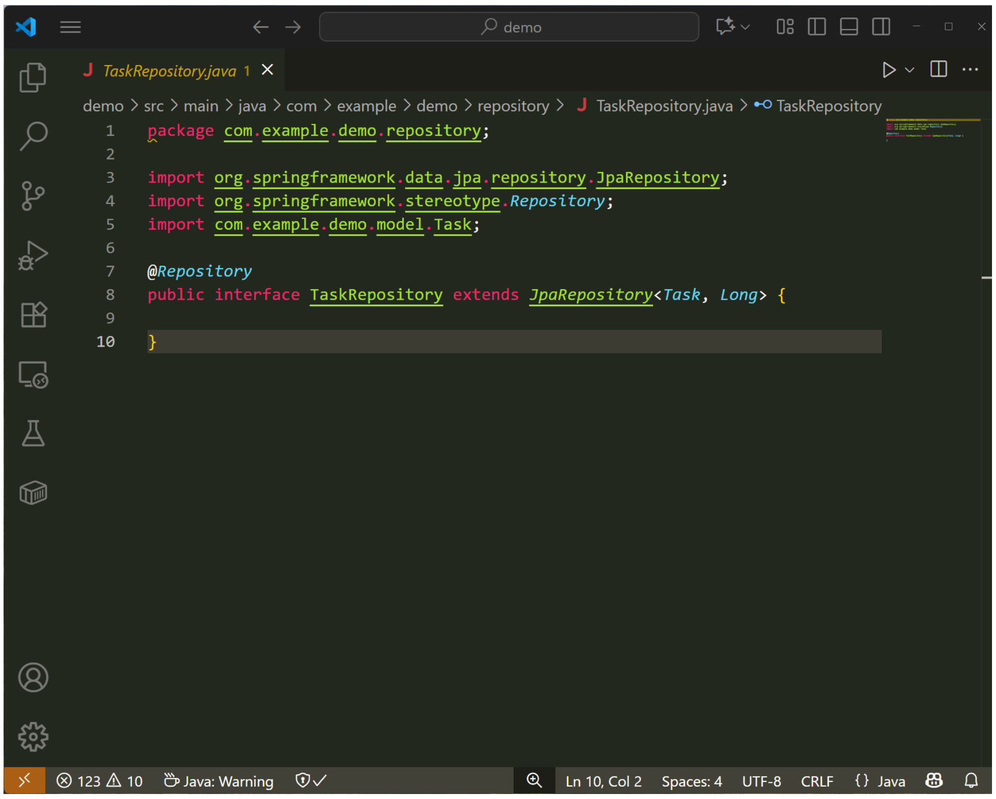


demo > src > main > java > com > example > demo > repository > TaskRepository.java > TaskRepository

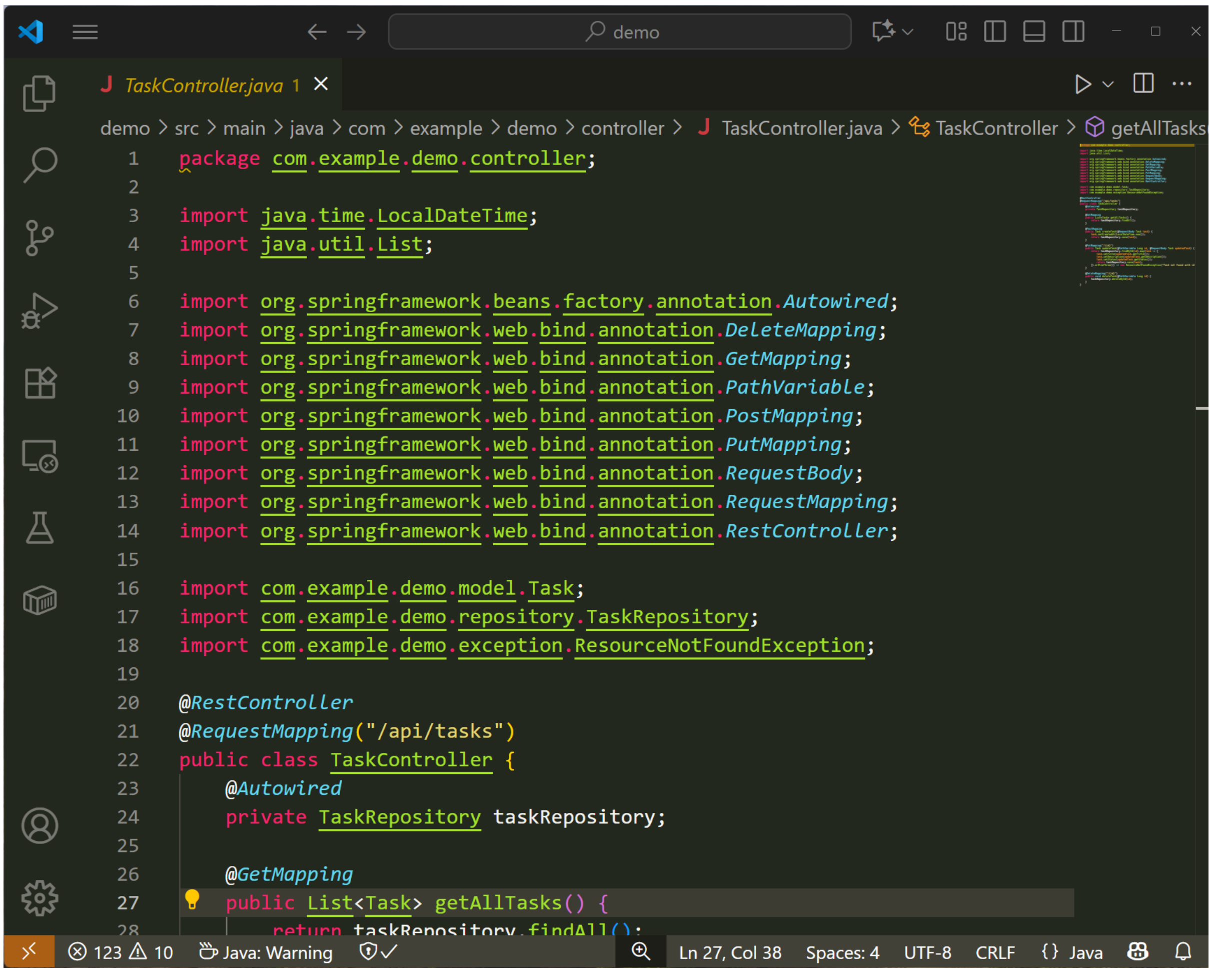
```java
package com.example.demo.repository;

import org.springframework.data.jpa.repository.JpaRepository;
import org.springframework.stereotype.Repository;
import com.example.demo.model.Task;

@Repository
public interface TaskRepository extends JpaRepository<Task, Long> {

}
```

5. Создание Rest контроллера



demo > src > main > java > com > example > demo > controller > TaskController.java > TaskController > getAllTasks

```java
package com.example.demo.controller;

import java.time.LocalDateTime;
import java.util.List;

import org.springframework.beans.factory.annotation.Autowired;
import org.springframework.web.bind.annotation.DeleteMapping;
import org.springframework.web.bind.annotation.GetMapping;
import org.springframework.web.bind.annotation.PathVariable;
import org.springframework.web.bind.annotation.PostMapping;
import org.springframework.web.bind.annotation.PutMapping;
import org.springframework.web.bind.annotation.RequestBody;
import org.springframework.web.bind.annotation.RequestMapping;
import org.springframework.web.bind.annotation.RestController;

import com.example.demo.model.Task;
import com.example.demo.repository.TaskRepository;
import com.example.demo.exception.ResourceNotFoundException;

@RestController
@RequestMapping("/api/tasks")
public class TaskController {
    @Autowired
    private TaskRepository taskRepository;

    @GetMapping
    public List<Task> getAllTasks() {
        return taskRepository.findAll();
```

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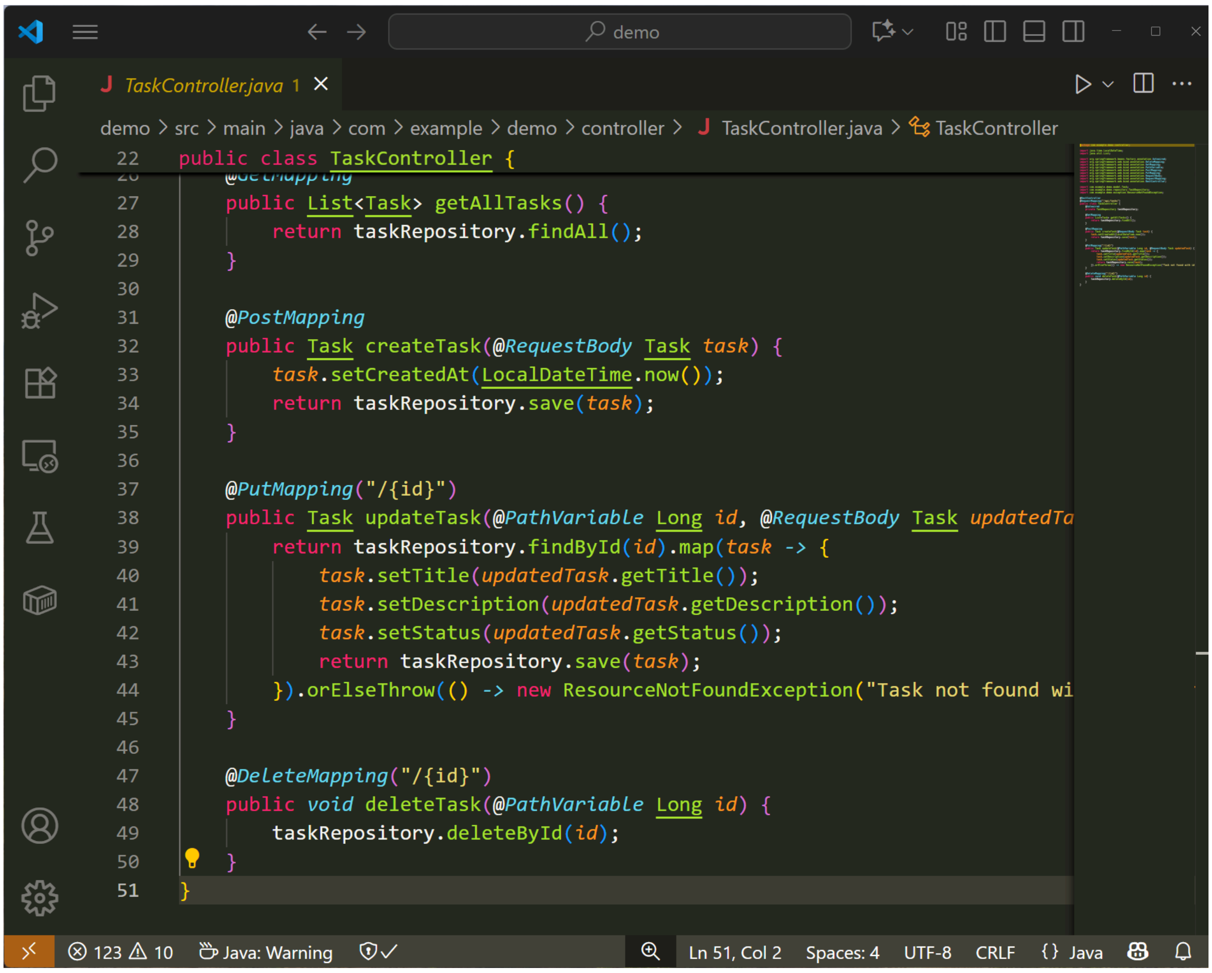

```
public class TaskController {
    @GetMapping
    public List<Task> getAllTasks() {
        return taskRepository.findAll();
    }

    @PostMapping
    public Task createTask(@RequestBody Task task) {
        task.setCreatedAt(LocalDateTime.now());
        return taskRepository.save(task);
    }

    @PutMapping("/{id}")
    public Task updateTask(@PathVariable Long id, @RequestBody Task updatedTa
        return taskRepository.findById(id).map(task -> {
            task.setTitle(updatedTask.getTitle());
            task.setDescription(updatedTask.getDescription());
            task.setStatus(updatedTask.getStatus());
            return taskRepository.save(task);
        }).orElseThrow(() -> new ResourceNotFoundException("Task not found wi
    }

    @DeleteMapping("/{id}")
    public void deleteTask(@PathVariable Long id) {
        taskRepository.deleteById(id);
    }
}
```

demo > src > main > java > com > example > demo > controller > TaskController.java > TaskController

Ln 51, Col 2 Spaces: 4 UTF-8 CRLF {} Java

6. **Добавление безопасности**

1. **Добавление зависимости Spring Security в pom.xml**

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

2. **Базовая аутентификация в application**

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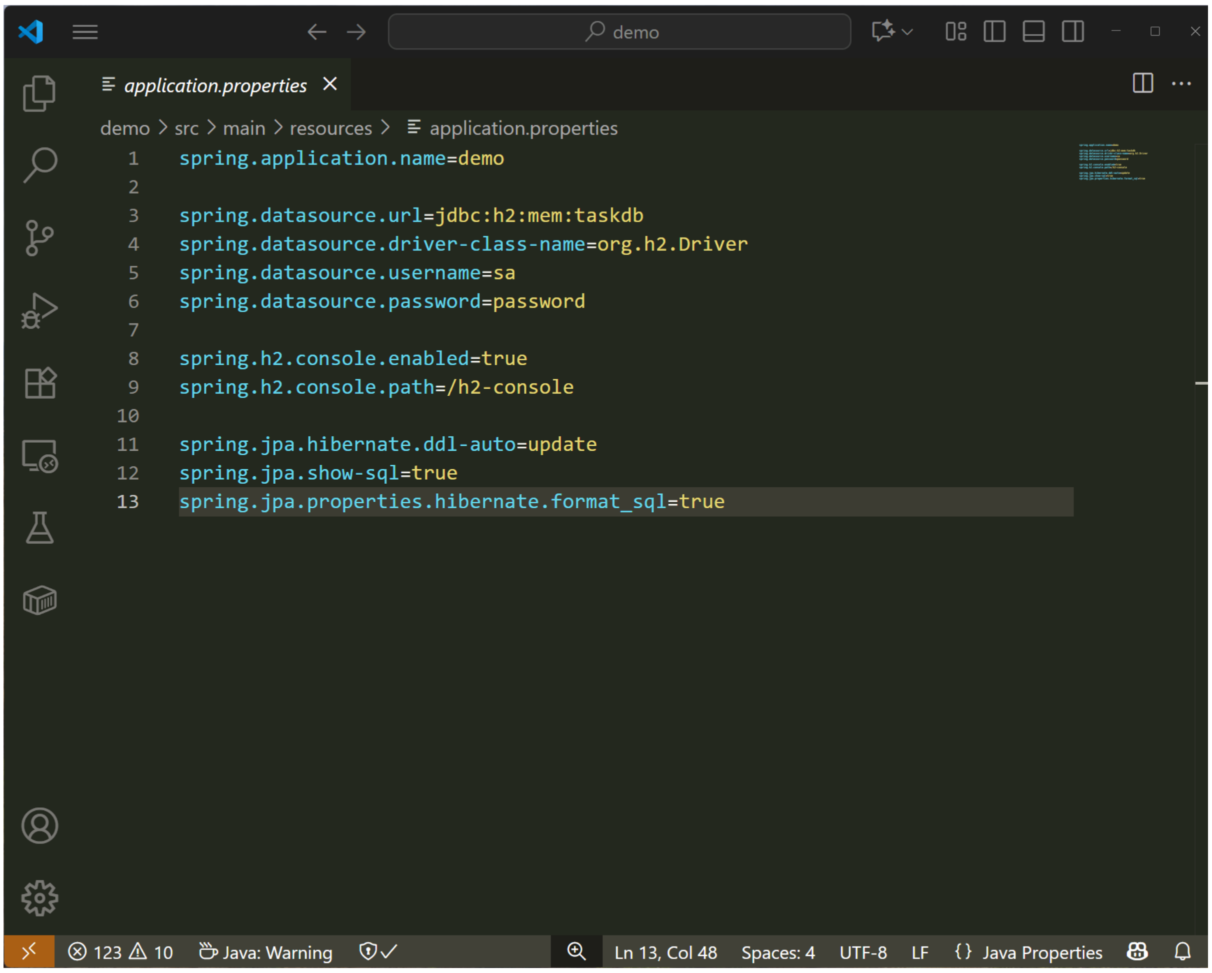

```
spring.application.name=demo

spring.datasource.url=jdbc:h2:mem:taskdb
spring.datasource.driver-class-name=org.h2.Driver
spring.datasource.username=sa
spring.datasource.password=password

spring.h2.console.enabled=true
spring.h2.console.path=/h2-console

spring.jpa.hibernate.ddl-auto=update
spring.jpa.show-sql=true
spring.jpa.properties.hibernate.format_sql=true
```

123 10 Java: Warning Ln 13, Col 48 Spaces: 4 UTF-8 LF Java Properties

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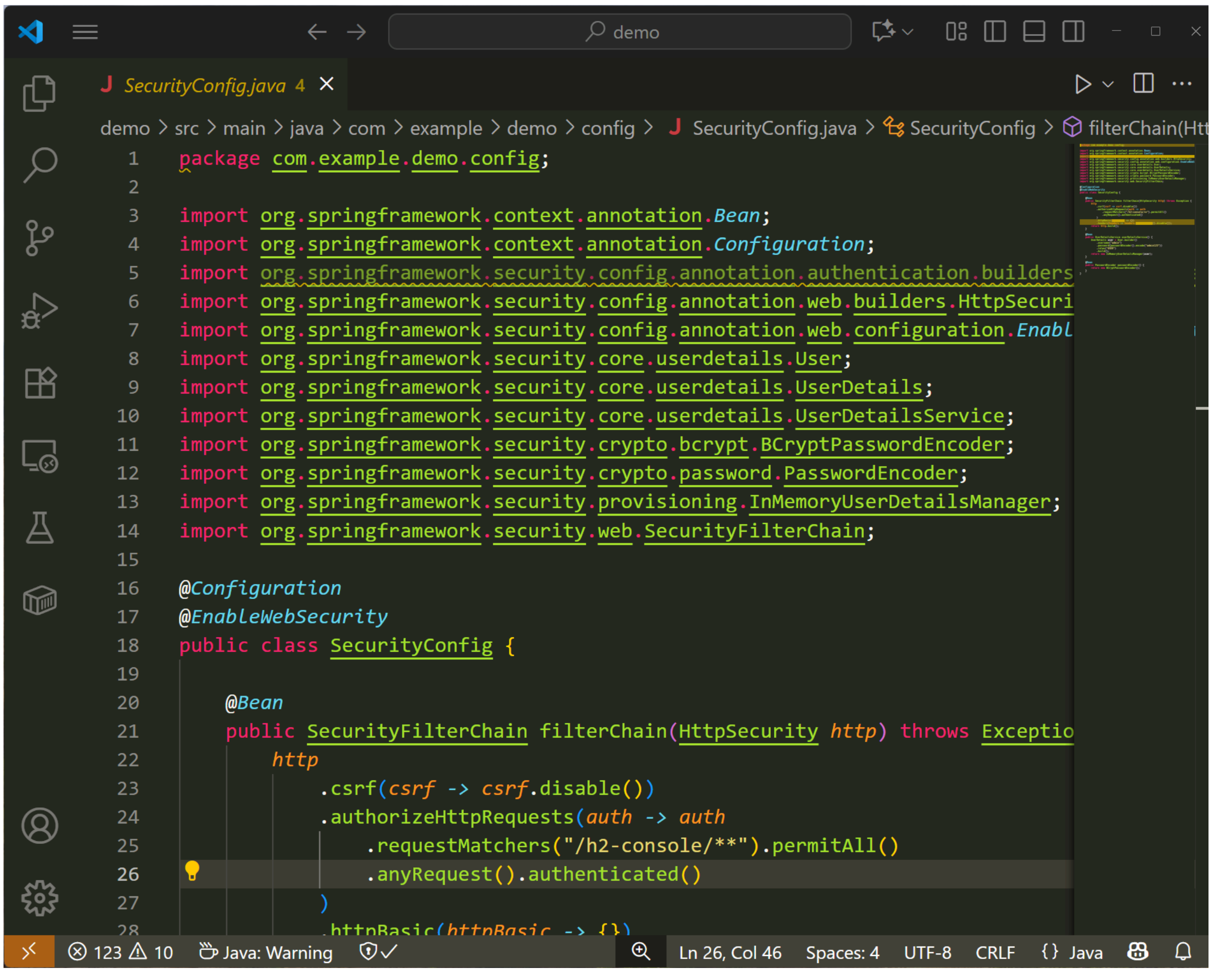
3. Создание security-конфигурации


demo
SecurityConfig.java 4
demo > src > main > java > com > example > demo > config > SecurityConfig.java > SecurityConfig > filterChain(Htt
123 10 Java: Warning
Ln 26, Col 46 Spaces: 4 UTF-8 CRLF {} Java

```java
package com.example.demo.config;

import org.springframework.context.annotation.Bean;
import org.springframework.context.annotation.Configuration;
import org.springframework.security.config.annotation.authentication.builders
import org.springframework.security.config.annotation.web.builders.HttpSecuri
import org.springframework.security.config.annotation.web.configuration.Enabl
import org.springframework.security.core.userdetails.User;
import org.springframework.security.core.userdetails.UserDetails;
import org.springframework.security.core.userdetails.UserDetailsService;
import org.springframework.security.crypto.bcrypt.BCryptPasswordEncoder;
import org.springframework.security.crypto.password.PasswordEncoder;
import org.springframework.security.provisioning.InMemoryUserDetailsManager;
import org.springframework.security.web.SecurityFilterChain;

@Configuration
@EnableWebSecurity
public class SecurityConfig {

    @Bean
    public SecurityFilterChain filterChain(HttpSecurity http) throws Exceptio
        http
            .csrf(csrf -> csrf.disable())
            .authorizeHttpRequests(auth -> auth
                .requestMatchers("/h2-console/**").permitAll()
                .anyRequest().authenticated()
            )
            .httpBasic(httpBasic -> {})
```

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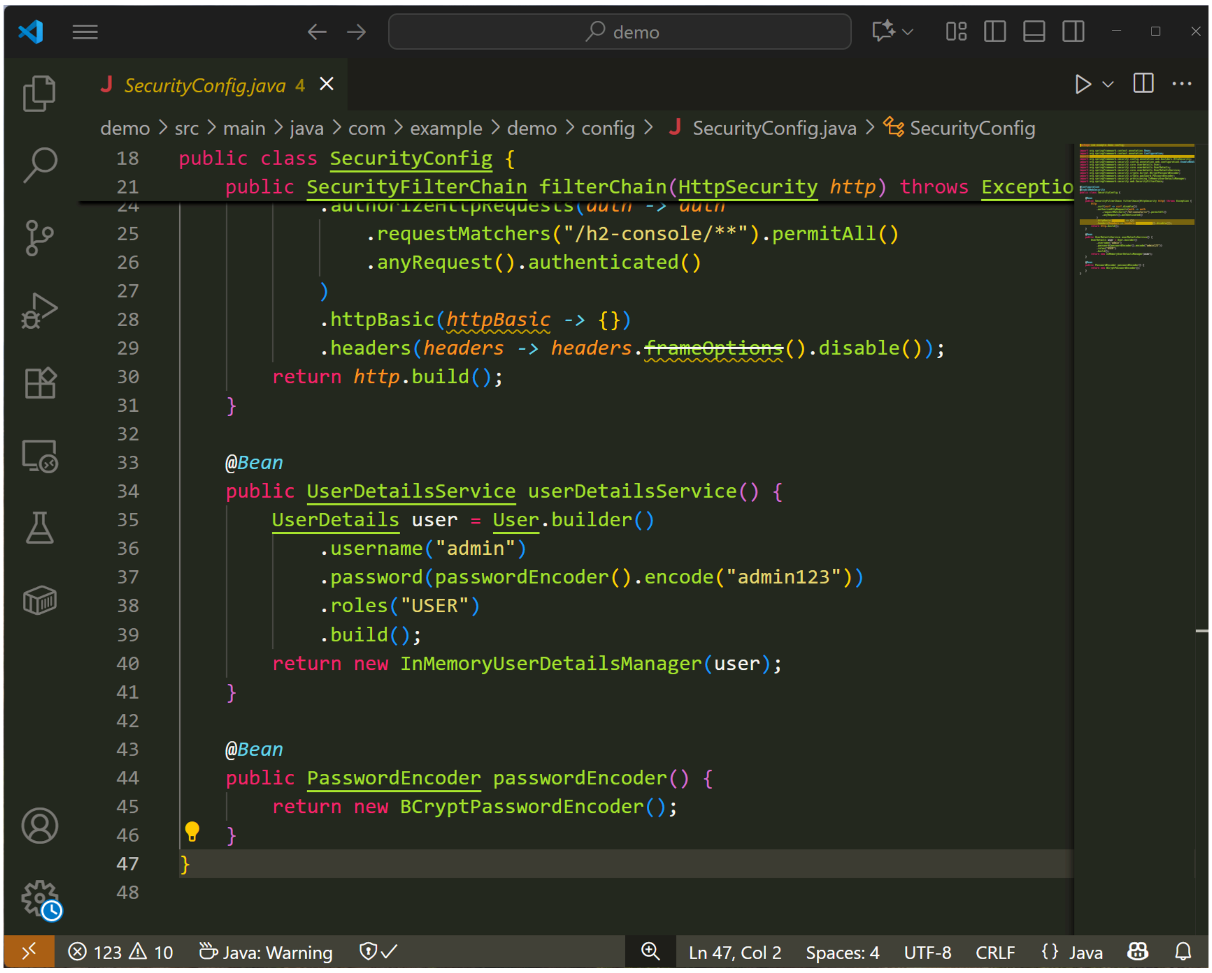


SecurityConfig.java 4

demo > src > main > java > com > example > demo > config > SecurityConfig.java > SecurityConfig

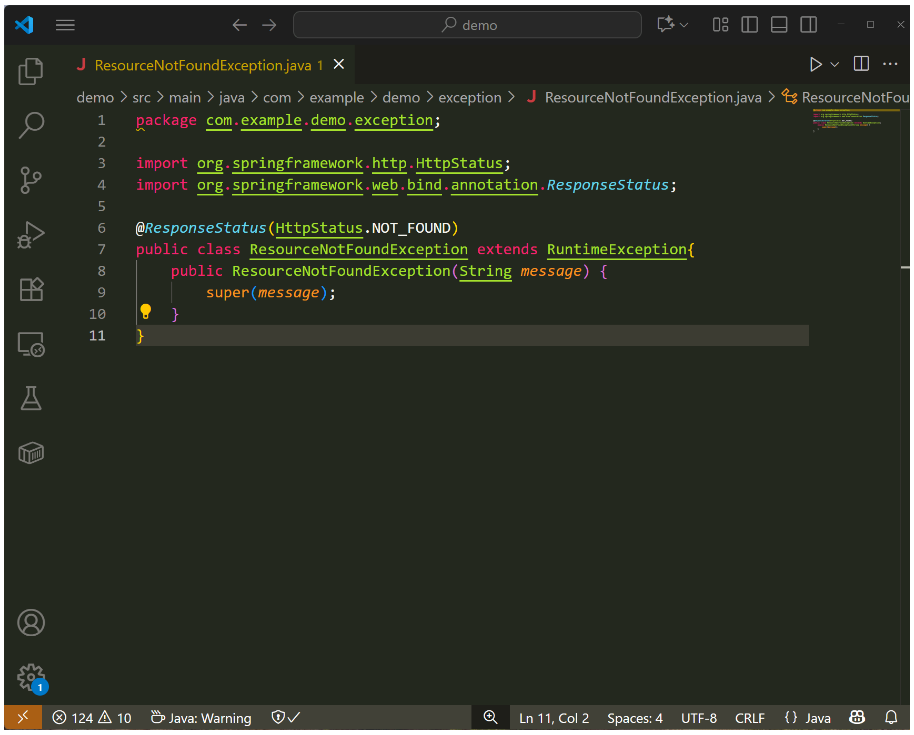
```java
public class SecurityConfig {
    public SecurityFilterChain filterChain(HttpSecurity http) throws Exceptio
                .authorizeHttpRequests(auth -> auth
                    .requestMatchers("/h2-console/**").permitAll()
                    .anyRequest().authenticated()
                )
                .httpBasic(httpBasic -> {})
                .headers(headers -> headers.~~frameOptions~~().disable());
            return http.build();
    }

    @Bean
    public UserDetailsService userDetailsService() {
        UserDetails user = User.builder()
            .username("admin")
            .password(passwordEncoder().encode("admin123"))
            .roles("USER")
            .build();
        return new InMemoryUserDetailsManager(user);
    }

    @Bean
    public PasswordEncoder passwordEncoder() {
        return new BCryptPasswordEncoder();
    }
}
```

⊗ 123 ⚠ 10 Java: Warning Ln 47, Col 2 Spaces: 4 UTF-8 CRLF {} Java

Exception



ResourceNotFoundException.java 1

demo > src > main > java > com > example > demo > exception > ResourceNotFoundException.java > ResourceNotFou

```java
package com.example.demo.exception;

import org.springframework.http.HttpStatus;
import org.springframework.web.bind.annotation.ResponseStatus;

@ResponseStatus(HttpStatus.NOT_FOUND)
public class ResourceNotFoundException extends RuntimeException{
    public ResourceNotFoundException(String message) {
        super(message);
    }
}
```

⊗ 124 ⚠ 10 Java: Warning Ln 11, Col 2 Spaces: 4 UTF-8 CRLF {} Java

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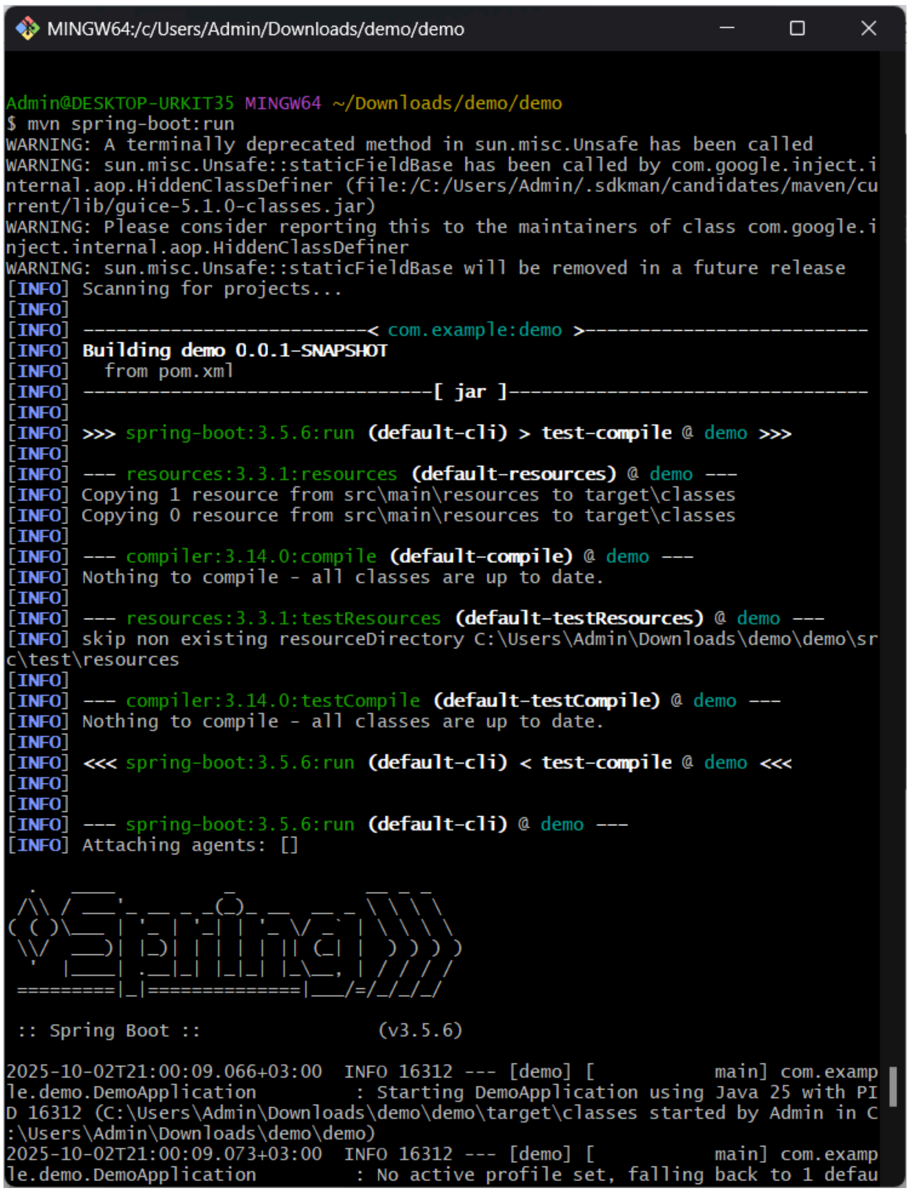
7. Тестирование приложения

mvn spring-boot:run



MINGW64:/c/Users/Admin/Downloads/demo/demo

```
Admin@DESKTOP-URKIT35 MINGW64 ~/Downloads/demo/demo
$ mvn spring-boot:run
WARNING: A terminally deprecated method in sun.misc.Unsafe has been called
WARNING: sun.misc.Unsafe::staticFieldBase has been called by com.google.inject.i
nternal.aop.HiddenClassDefiner (file:/C:/Users/Admin/.sdkman/candidates/maven/cu
rrent/lib/guice-5.1.0-classes.jar)
WARNING: Please consider reporting this to the maintainers of class com.google.i
nject.internal.aop.HiddenClassDefiner
WARNING: sun.misc.Unsafe::staticFieldBase will be removed in a future release
[INFO] Scanning for projects...
[INFO]
[INFO] --------------------------< com.example:demo >--------------------------
[INFO] Building demo 0.0.1-SNAPSHOT
[INFO]   from pom.xml
[INFO] --------------------------------[ jar ]---------------------------------
[INFO]
[INFO] >>> spring-boot:3.5.6:run (default-cli) > test-compile @ demo >>>
[INFO]
[INFO] --- resources:3.3.1:resources (default-resources) @ demo ---
[INFO] Copying 1 resource from src\main\resources to target\classes
[INFO] Copying 0 resource from src\main\resources to target\classes
[INFO]
[INFO] --- compiler:3.14.0:compile (default-compile) @ demo ---
[INFO] Nothing to compile - all classes are up to date.
[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ demo ---
[INFO] skip non existing resourceDirectory C:\Users\Admin\Downloads\demo\demo\sr
c\test\resources
[INFO]
[INFO] --- compiler:3.14.0:testCompile (default-testCompile) @ demo ---
[INFO] Nothing to compile - all classes are up to date.
[INFO]
[INFO] <<< spring-boot:3.5.6:run (default-cli) < test-compile @ demo <<<
[INFO]
[INFO]
[INFO] --- spring-boot:3.5.6:run (default-cli) @ demo ---
[INFO] Attaching agents: []

  .   ____          _            __ _ _
 /\\ / ___'_ __ _ _(_)_ __  __ _ \ \ \ \
( ( )\___ | '_ | '_| | '_ \/ _` | \ \ \ \
 \\/  ___)| |_)| | | | | || (_| |  ) ) ) )
  '  |____| .__|_| |_|_| |_\__, | / / / /
 =========|_|==============|___/=/_/_/_/

 :: Spring Boot ::                (v3.5.6)

2025-10-02T21:00:09.066+03:00  INFO 16312 --- [demo] [           main] com.examp
le.demo.DemoApplication          : Starting DemoApplication using Java 25 with PI
D 16312 (C:\Users\Admin\Downloads\demo\demo\target\classes started by Admin in C
:\Users\Admin\Downloads\demo\demo)
2025-10-02T21:00:09.073+03:00  INFO 16312 --- [demo] [           main] com.examp
le.demo.DemoApplication          : No active profile set, falling back to 1 defau
```

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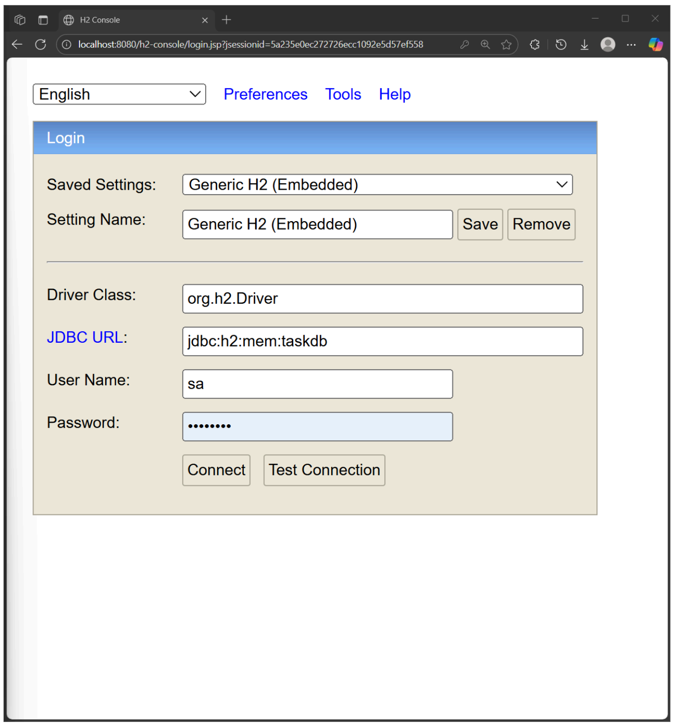
h2-console

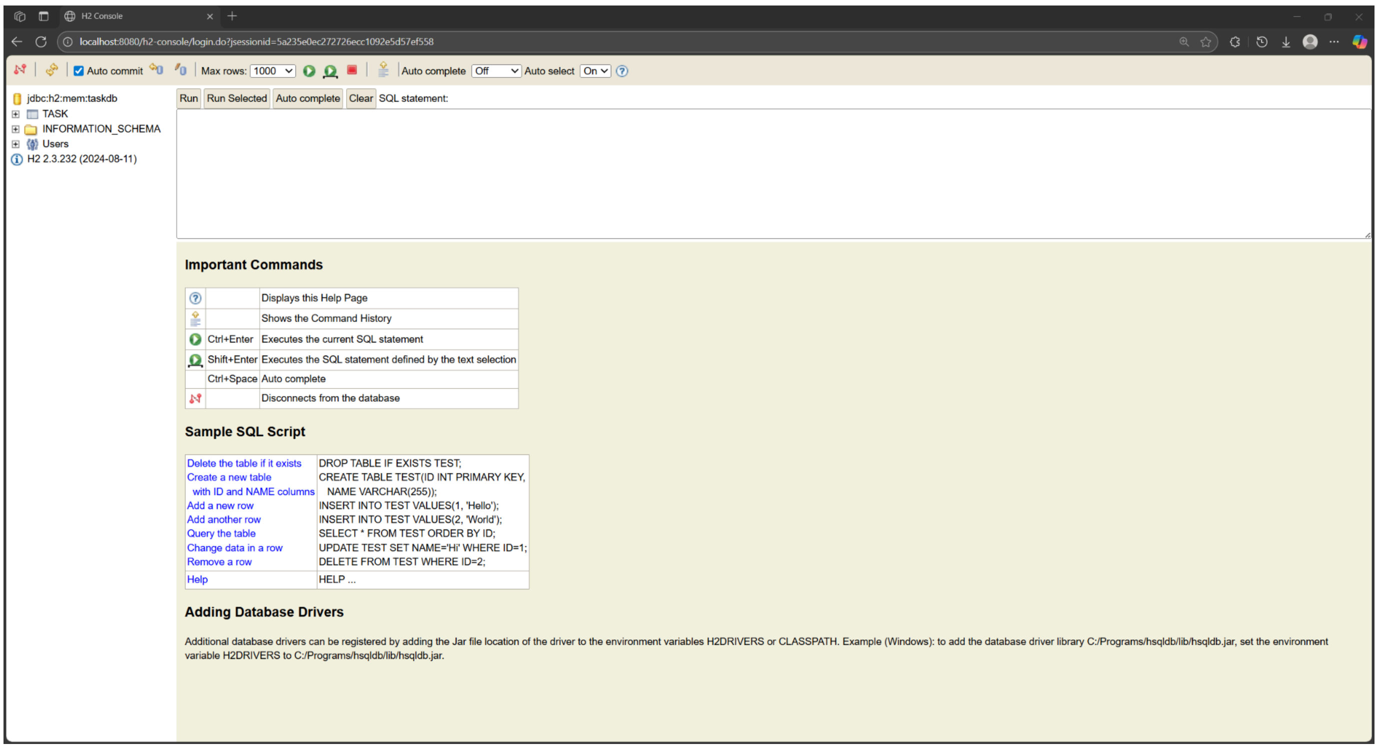


localhost:8080/h2-console/login.jsp?jsessionid=5a235e0ec272726ecc1092e5d57ef558

English · Preferences · Tools · Help

Login

Saved Settings:	Generic H2 (Embedded)
Setting Name:	Generic H2 (Embedded)
Driver Class:	org.h2.Driver
JDBC URL:	jdbc:h2:mem:taskdb
User Name:	sa
Password:	••••••••



localhost:8080/h2-console/login.do?jsessionid=5a235e0ec272726ecc1092e5d57ef558

Auto commit ✓ · Max rows: 1000 · Auto complete: Off · Auto select: On

jdbc:h2:mem:taskdb
- TASK
- INFORMATION_SCHEMA
- Users

H2 2.3.232 (2024-08-11)

SQL statement:

Important Commands

?		Displays this Help Page
		Shows the Command History
▶	Ctrl+Enter	Executes the current SQL statement
▶	Shift+Enter	Executes the SQL statement defined by the text selection
	Ctrl+Space	Auto complete
		Disconnects from the database

Sample SQL Script

Delete the table if it exists	DROP TABLE IF EXISTS TEST;
Create a new table with ID and NAME columns	CREATE TABLE TEST(ID INT PRIMARY KEY, NAME VARCHAR(255));
Add a new row	INSERT INTO TEST VALUES(1, 'Hello');
Add another row	INSERT INTO TEST VALUES(2, 'World');
Query the table	SELECT * FROM TEST ORDER BY ID;
Change data in a row	UPDATE TEST SET NAME='Hi' WHERE ID=1;
Remove a row	DELETE FROM TEST WHERE ID=2;
Help	HELP ...

Adding Database Drivers

Additional database drivers can be registered by adding the Jar file location of the driver to the environment variables H2DRIVERS or CLASSPATH. Example (Windows): to add the database driver library C:/Programs/hsqldb/lib/hsqldb.jar, set the environment variable H2DRIVERS to C:/Programs/hsqldb/lib/hsqldb.jar.

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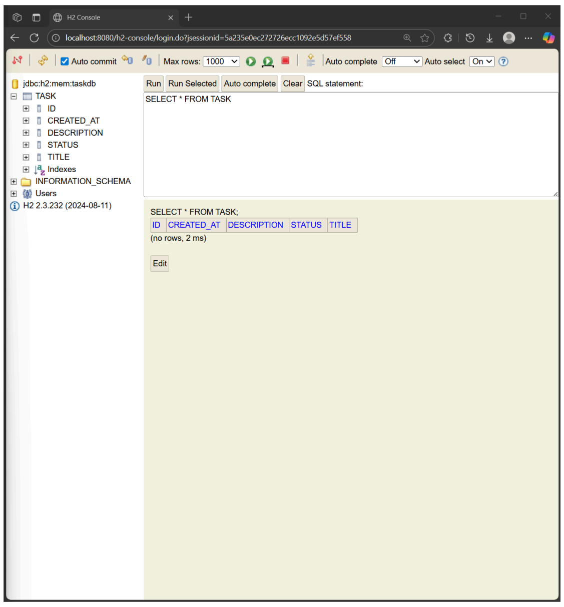

localhost:8080/h2-console/login.do?jsessionid=5a235e0ec272726ecc1092e5d57ef558

Auto commit Max rows: 1000 Auto complete Off Auto select On

jdbc:h2:mem:taskdb
- TASK
  - ID
  - CREATED_AT
  - DESCRIPTION
  - STATUS
  - TITLE
  - Indexes
- INFORMATION_SCHEMA
- Users
- H2 2.3.232 (2024-08-11)

SQL statement:

```
SELECT * FROM TASK
```

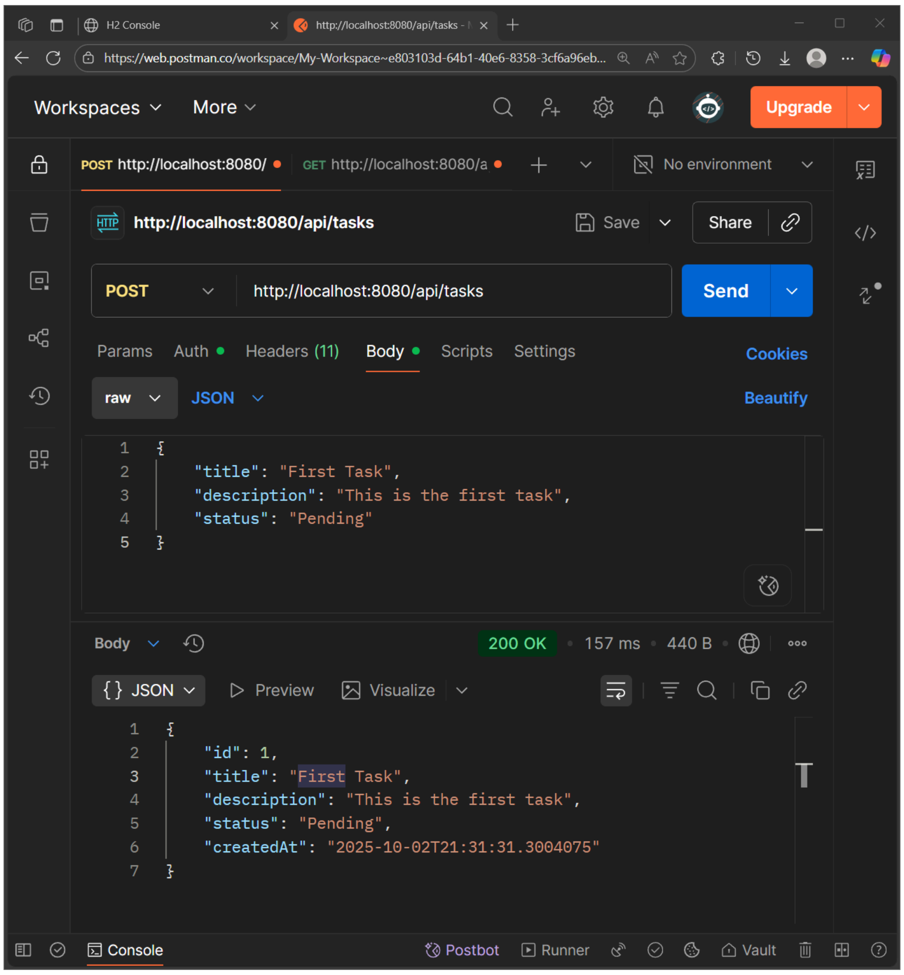
```
SELECT * FROM TASK;
```

ID	CREATED_AT	DESCRIPTION	STATUS	TITLE

(no rows, 2 ms)

Postman:

1. Создание новой задачи


https://web.postman.co/workspace/My-Workspace~e803103d-64b1-40e6-8358-3cf6a96eb...

POST http://localhost:8080/api/tasks

```
{
    "title": "First Task",
    "description": "This is the first task",
    "status": "Pending"
}
```

200 OK • 157 ms • 440 B

```
{
    "id": 1,
    "title": "First Task",
    "description": "This is the first task",
    "status": "Pending",
    "createdAt": "2025-10-02T21:31:31.3004075"
}
```

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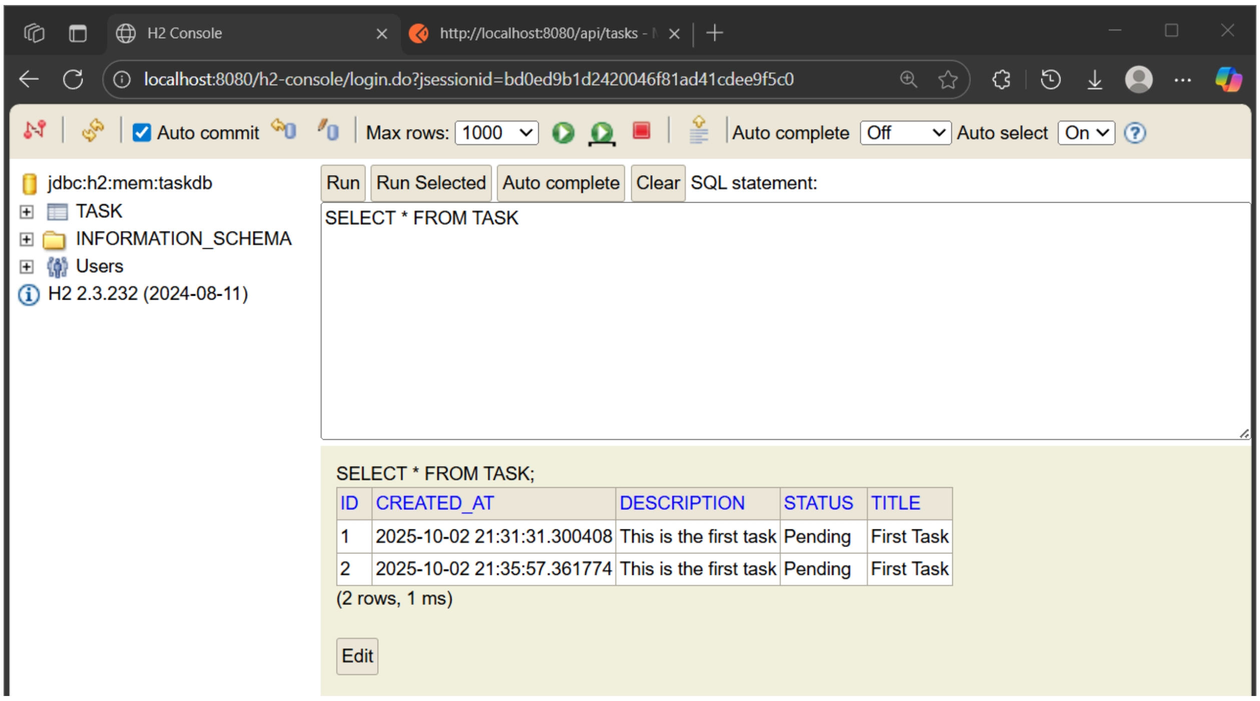


localhost:8080/h2-console/login.do?jsessionid=bd0ed9b1d2420046f81ad41cdee9f5c0

Auto commit · Max rows: 1000 · Auto complete Off · Auto select On

jdbc:h2:mem:taskdb
TASK
INFORMATION_SCHEMA
Users
H2 2.3.232 (2024-08-11)

SQL statement:

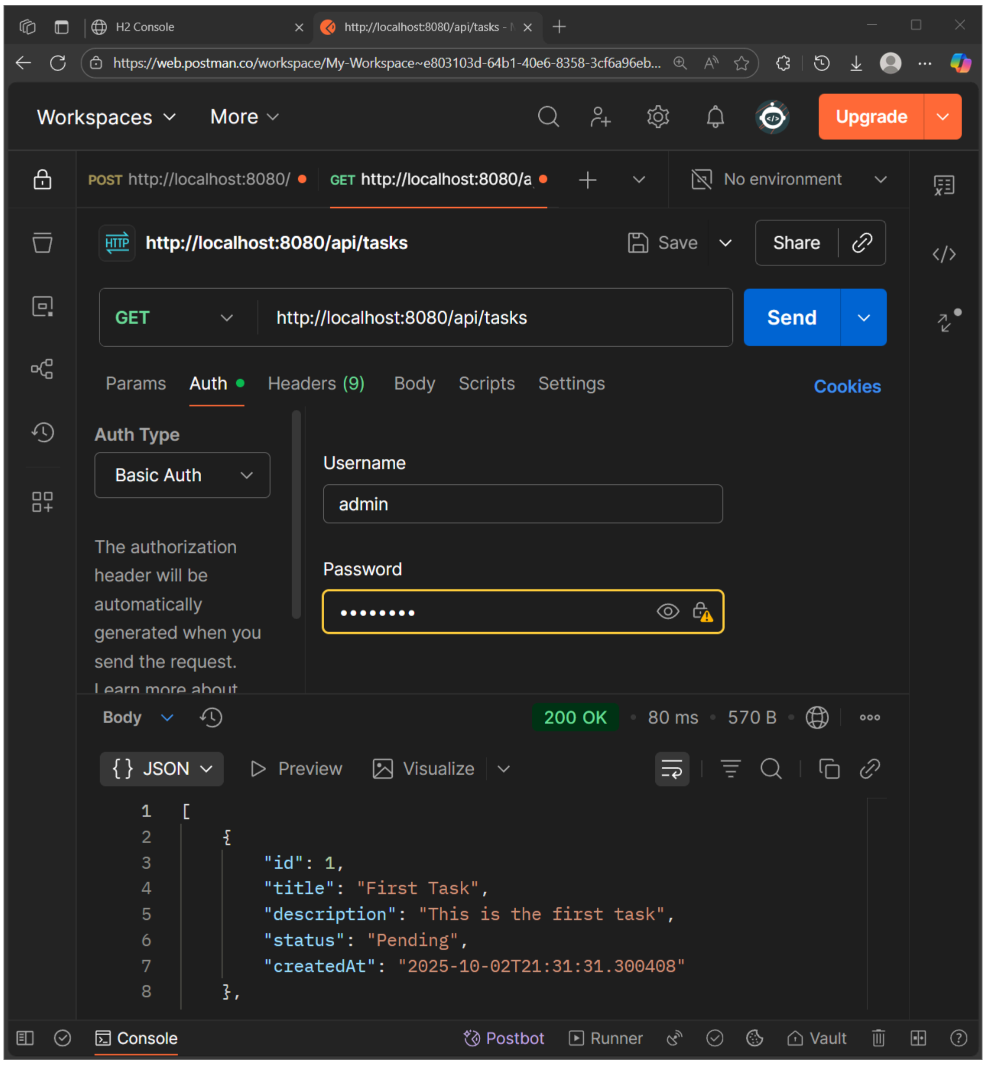
```
SELECT * FROM TASK
```

SELECT * FROM TASK;

ID	CREATED_AT	DESCRIPTION	STATUS	TITLE
1	2025-10-02 21:31:31.300408	This is the first task	Pending	First Task
2	2025-10-02 21:35:57.361774	This is the first task	Pending	First Task

(2 rows, 1 ms)

2. Получение списка задач



GET http://localhost:8080/api/tasks

Auth Type: Basic Auth

Username: admin

Password: ••••••••

The authorization header will be automatically generated when you send the request.

200 OK · 80 ms · 570 B

```
[
    {
        "id": 1,
        "title": "First Task",
        "description": "This is the first task",
        "status": "Pending",
        "createdAt": "2025-10-02T21:31:31.300408"
    },
```

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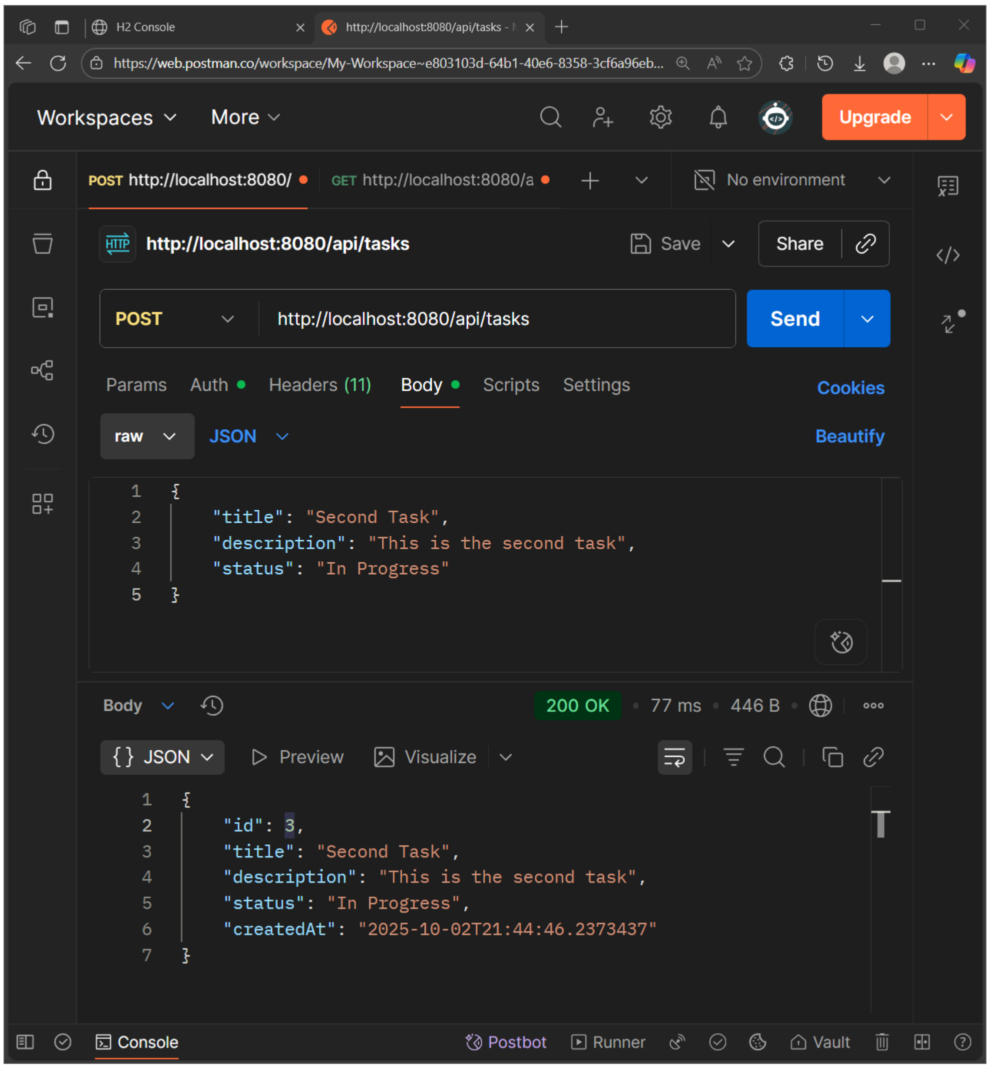
3. Создание еще одной задачи

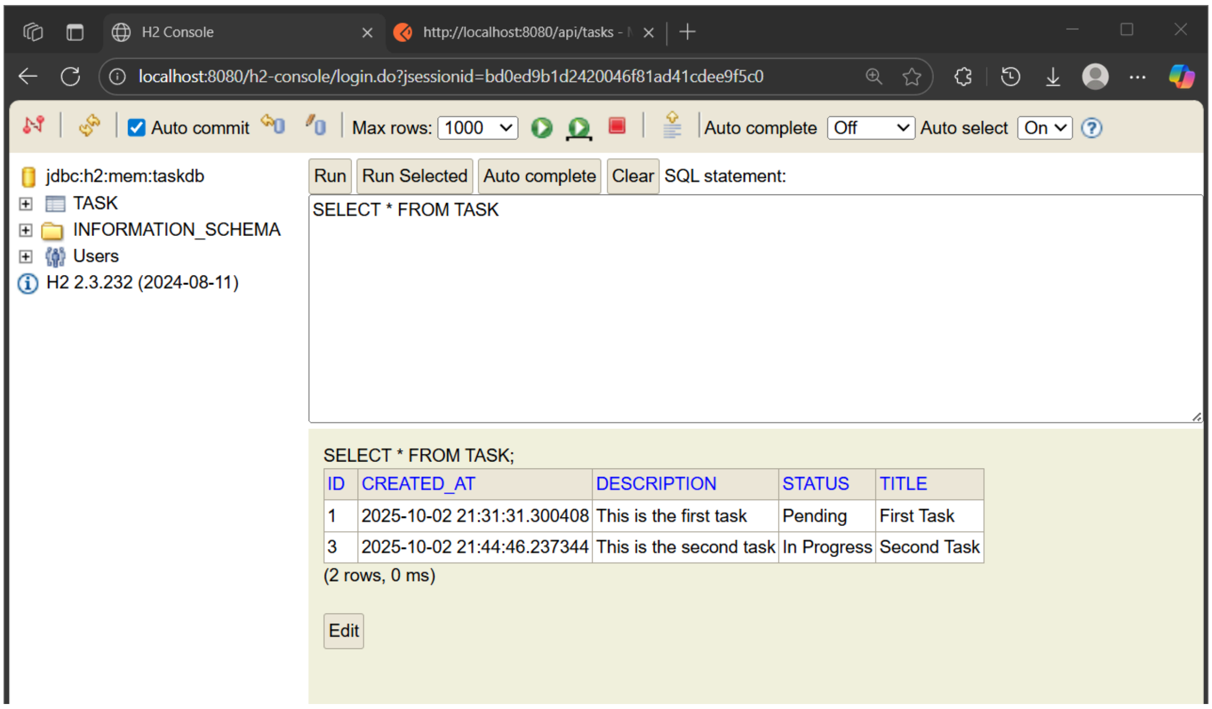

H2 Console
http://localhost:8080/api/tasks
https://web.postman.co/workspace/My-Workspace~e803103d-64b1-40e6-8358-3cf6a96eb...
Workspaces
More
Upgrade
POST http://localhost:8080/
GET http://localhost:8080/a
No environment
Save
Share
Send
Params
Auth
Headers (11)
Body
Scripts
Settings
Cookies
raw
JSON
Beautify
Preview
Visualize
Console
Postbot
Runner
Vault

POST http://localhost:8080/api/tasks

```
{
    "title": "Second Task",
    "description": "This is the second task",
    "status": "In Progress"
}
```

Body 200 OK • 77 ms • 446 B

```
{
    "id": 3,
    "title": "Second Task",
    "description": "This is the second task",
    "status": "In Progress",
    "createdAt": "2025-10-02T21:44:46.2373437"
}
```



```
SELECT * FROM TASK
```

SELECT * FROM TASK;

ID	CREATED_AT	DESCRIPTION	STATUS	TITLE
1	2025-10-02 21:31:31.300408	This is the first task	Pending	First Task
3	2025-10-02 21:44:46.237344	This is the second task	In Progress	Second Task

(2 rows, 0 ms)

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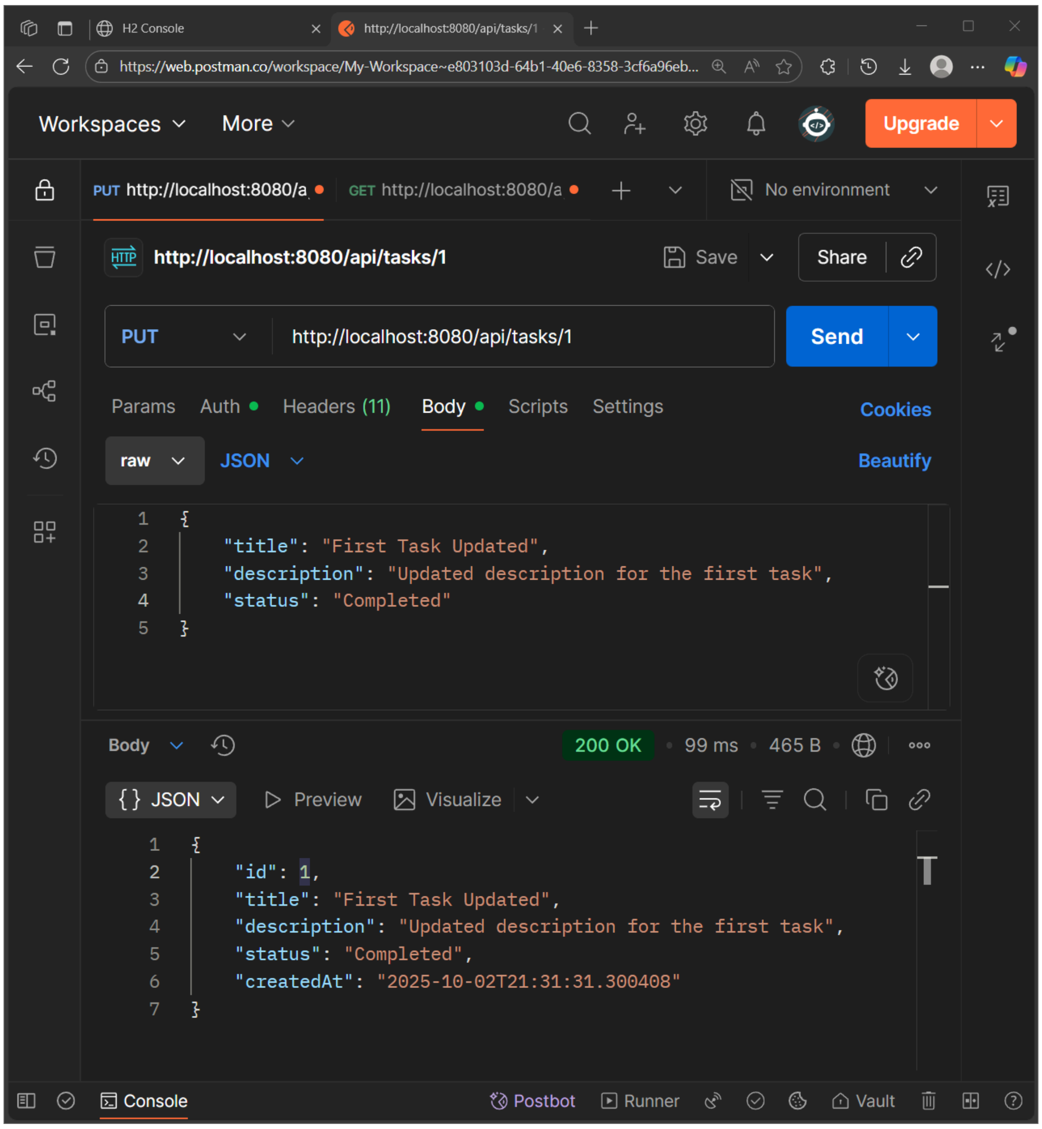
4. Обновление существующей задачи



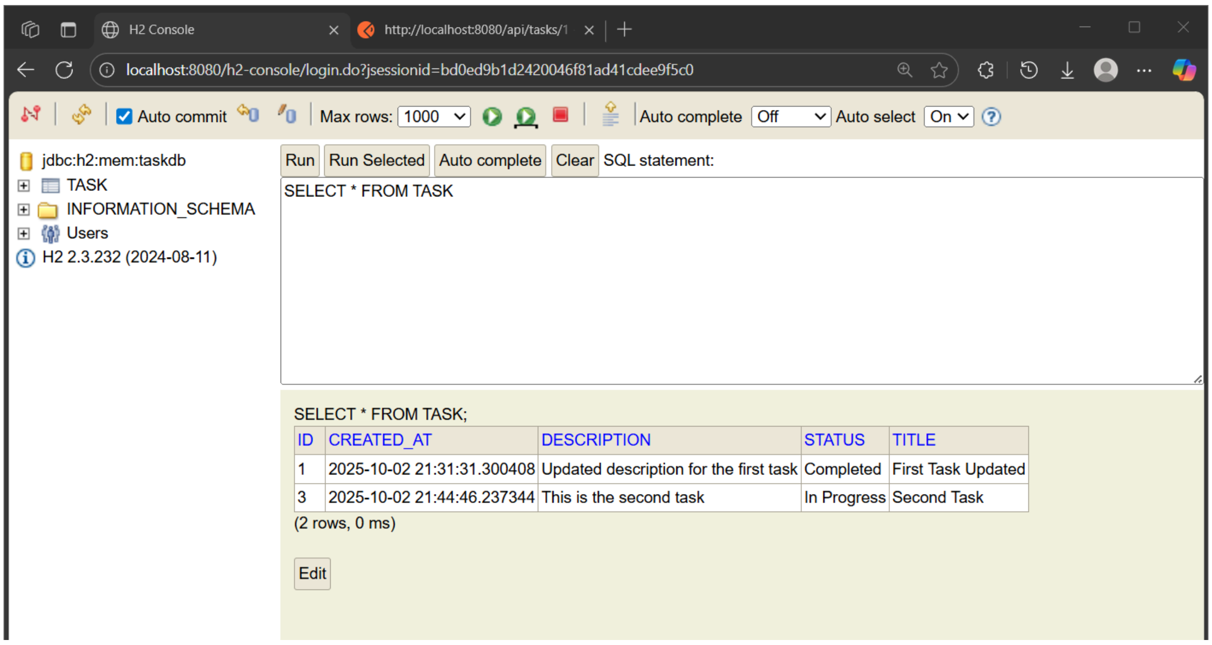
PUT http://localhost:8080/api/tasks/1

Body (raw, JSON):

```
{
    "title": "First Task Updated",
    "description": "Updated description for the first task",
    "status": "Completed"
}
```

200 OK • 99 ms • 465 B

```
{
    "id": 1,
    "title": "First Task Updated",
    "description": "Updated description for the first task",
    "status": "Completed",
    "createdAt": "2025-10-02T21:31:31.300408"
}
```



localhost:8080/h2-console/login.do?jsessionid=bd0ed9b1d2420046f81ad41cdee9f5c0

jdbc:h2:mem:taskdb

```
SELECT * FROM TASK
```

SELECT * FROM TASK;

ID	CREATED_AT	DESCRIPTION	STATUS	TITLE
1	2025-10-02 21:31:31.300408	Updated description for the first task	Completed	First Task Updated
3	2025-10-02 21:44:46.237344	This is the second task	In Progress	Second Task

(2 rows, 0 ms)

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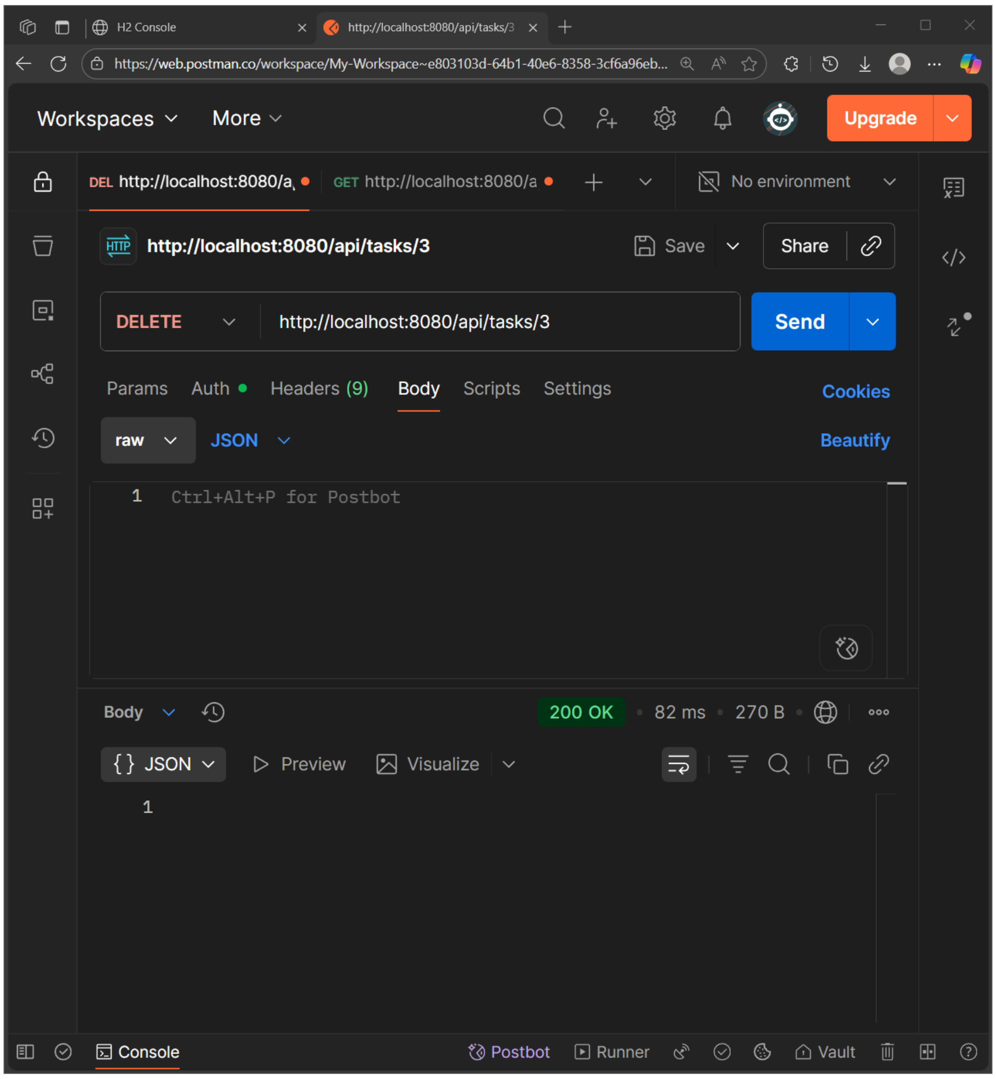
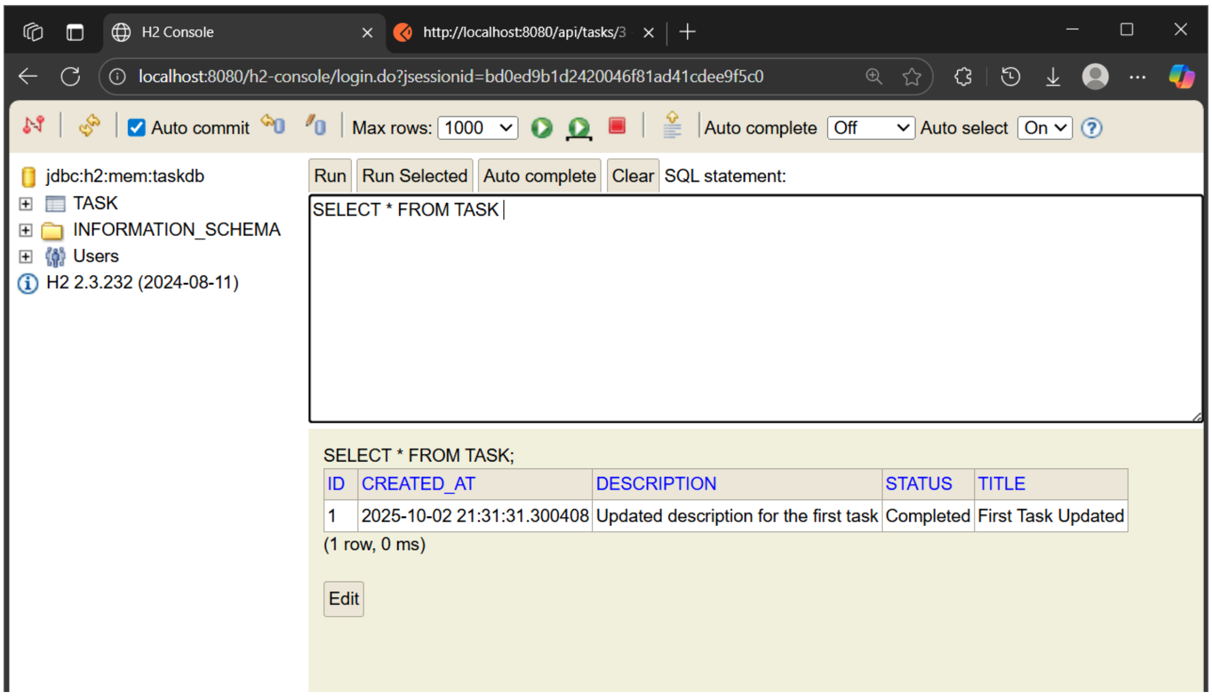
5. Удаление задачи


DELETE http://localhost:8080/api/tasks/3

200 OK • 82 ms • 270 B

```
1
```

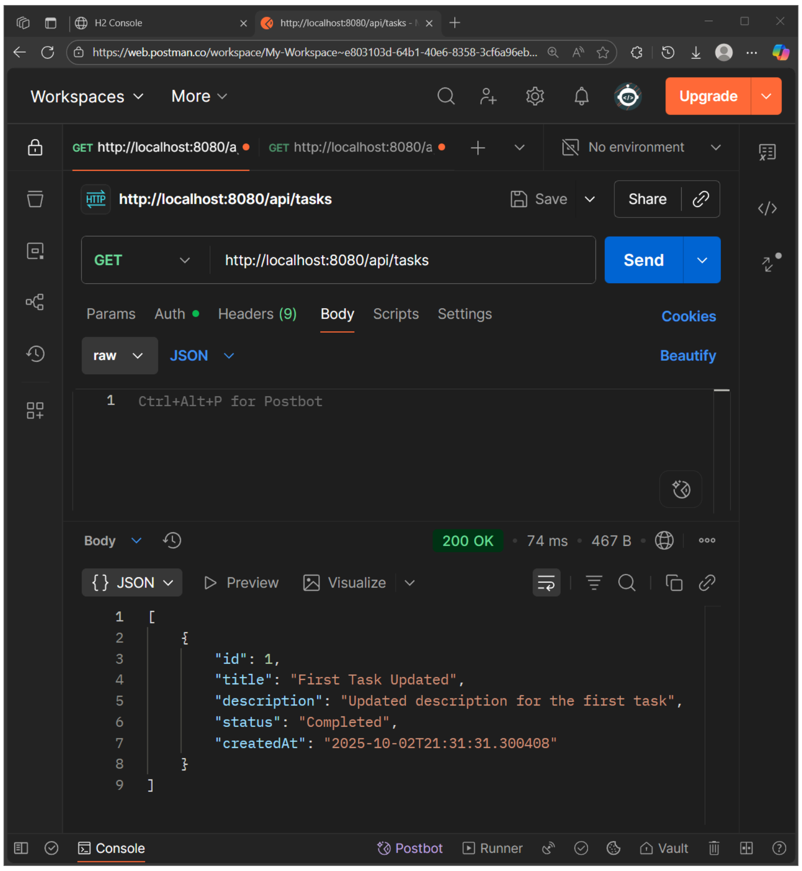

```
SELECT * FROM TASK;
```

ID	CREATED_AT	DESCRIPTION	STATUS	TITLE
1	2025-10-02 21:31:31.300408	Updated description for the first task	Completed	First Task Updated

(1 row, 0 ms)

Баранов Д.А. ИВТ 2.1

6. Проверка списка задач после удаления

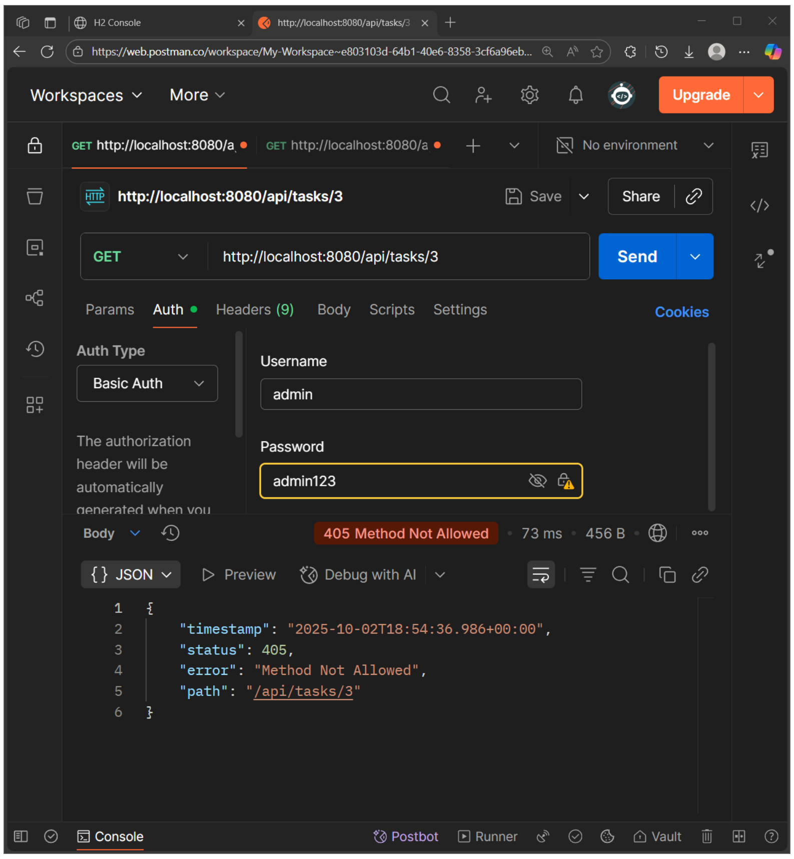


GET http://localhost:8080/api/tasks

200 OK · 74 ms · 467 B

```
[
    {
        "id": 1,
        "title": "First Task Updated",
        "description": "Updated description for the first task",
        "status": "Completed",
        "createdAt": "2025-10-02T21:31:31.300408"
    }
]
```

7. Получение несуществующей задачи



GET http://localhost:8080/api/tasks/3

Auth Type: Basic Auth

Username: admin

Password: admin123

405 Method Not Allowed · 73 ms · 456 B

```
{
    "timestamp": "2025-10-02T18:54:36.986+00:00",
    "status": 405,
    "error": "Method Not Allowed",
    "path": "/api/tasks/3"
}
```

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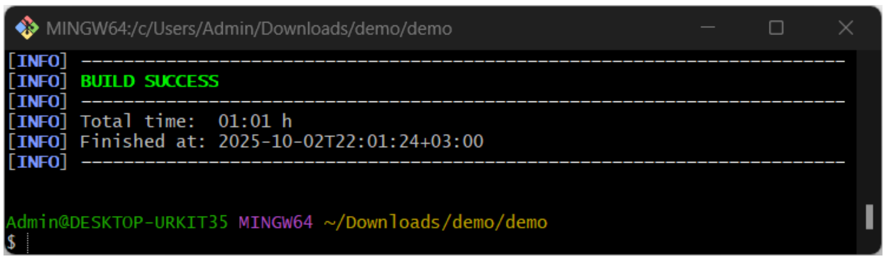
MINGW64:/c/Users/Admin/Downloads/demo/demo

```
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  01:01 h
[INFO] Finished at: 2025-10-02T22:01:24+03:00
[INFO] ------------------------------------------------------------------------


Admin@DESKTOP-URKIT35 MINGW64 ~/Downloads/demo/demo
$
```