Framework Spring

Maior framework para desenvolvimento de aplicações Java. Composto de diversas bibliotecas e módulos voltados para criação de aplicações Java, principalmente para Web.

Dentro do **Spring Framework**, temos 2 principais tecnologias para desenvolvimento de aplicações web:

- **Spring MVC**
  Conjunto de bibliotecas do Spring para criação de projetos web através do padrão **Model**, **View** e **Controller**.

- **Spring Boot**
  Conjunto de bibliotecas do Spring para criação de projetos web baseados em arquitetura de microserviços, ou seja, projetos que funcionam como **APIs REST**.

Além destas tecnologias para desenvolvimento web, o **Spring Framework** também possui módulos para:

- Envio de emails
- Acesso a banco de dados, através da JPA e Hibernate
- Etc.

Escopo do projeto:
Sistema de controle de finanças

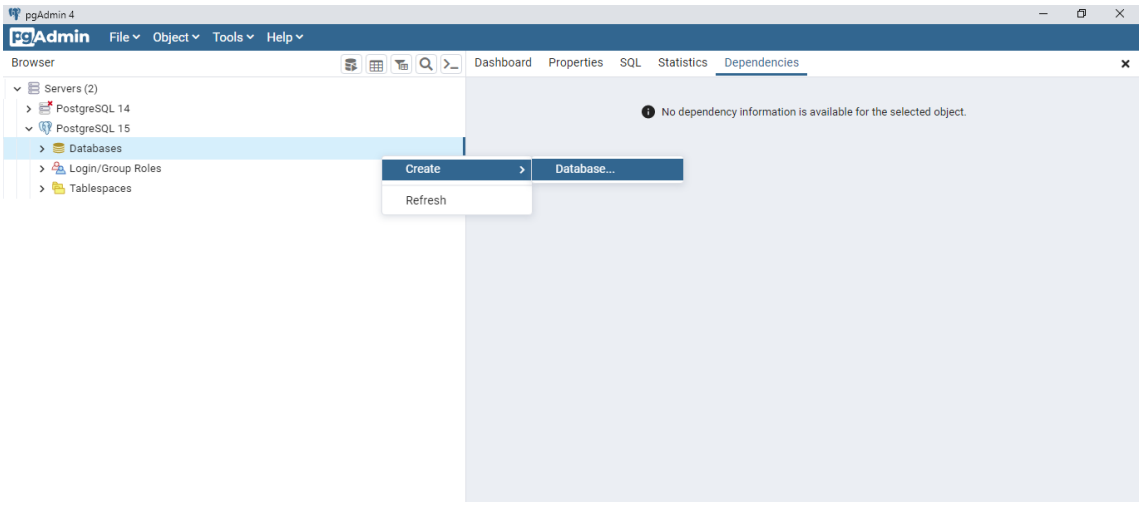
- É preciso desenvolver uma aplicação que permita a um usuário gerenciar suas contas e movimentações financeiras. O sistema deverá permitir:
  - O usuário deverá criar uma conta de acesso no sistema
  - O usuário, através da sua conta, poderá fazer um login na aplicação
  - O sistema deverá permitir ao usuário cadastrar suas contas, consultá-las, editá-las e exclui-las
  - As contas poderão ser a pagar ou a receber e deverão ter:

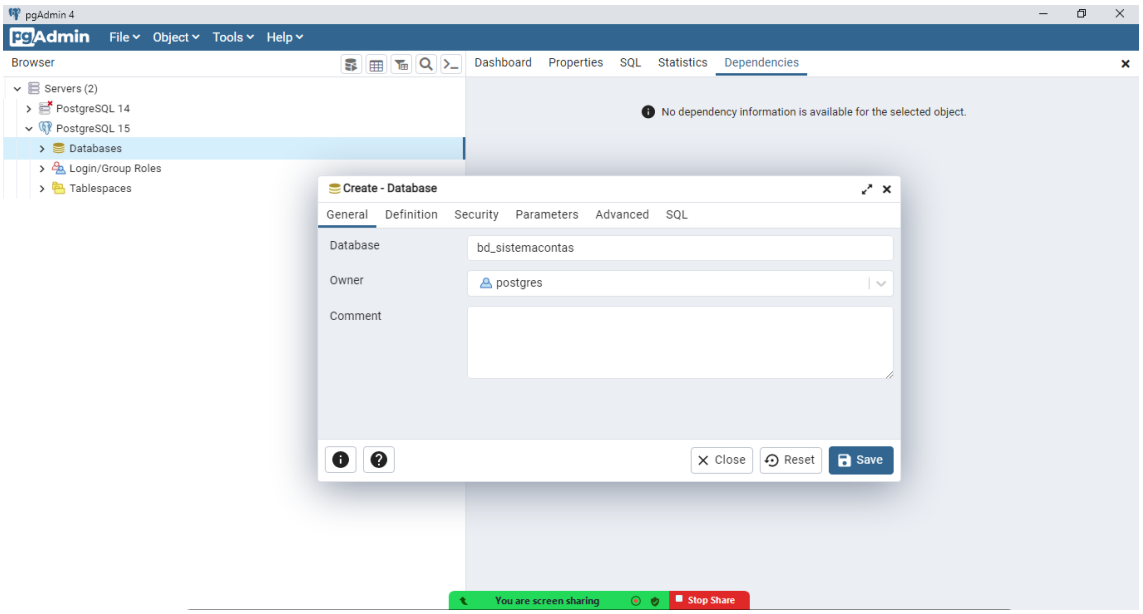
        - Nome, Data, Valor, Tipo (Pagar ou Receber), Observações e Categoria (que poderá ser cadastrado pelo usuário)
    - O sistema deverá gerar relatórios e dashboards para o usuário consolidando dados de suas contas
    - O sistema também deverá permitir ao usuário alterar sua senha de acesso.

Parte 01: Preparando o ambiente

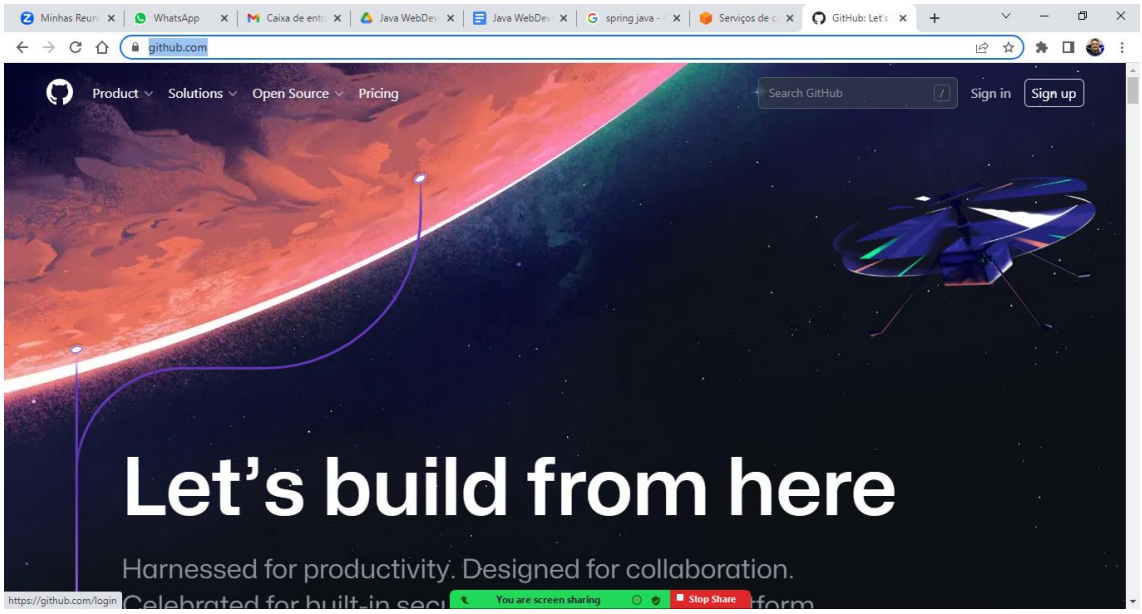
- Criando o banco de dados do projeto
- Criar um repositório no GITHUB para publicar o código fonte do projeto

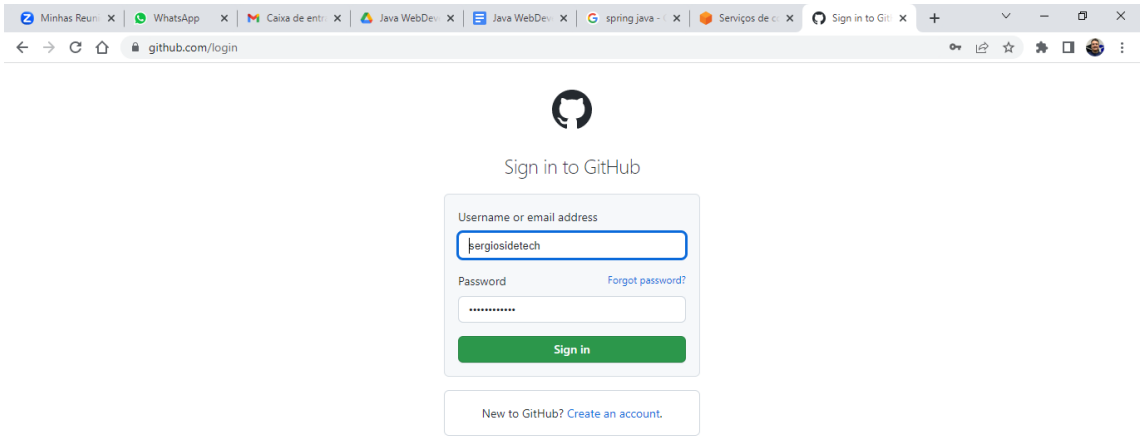
PgAdmin
Nome do banco de dados: **bd_sistemacontas**





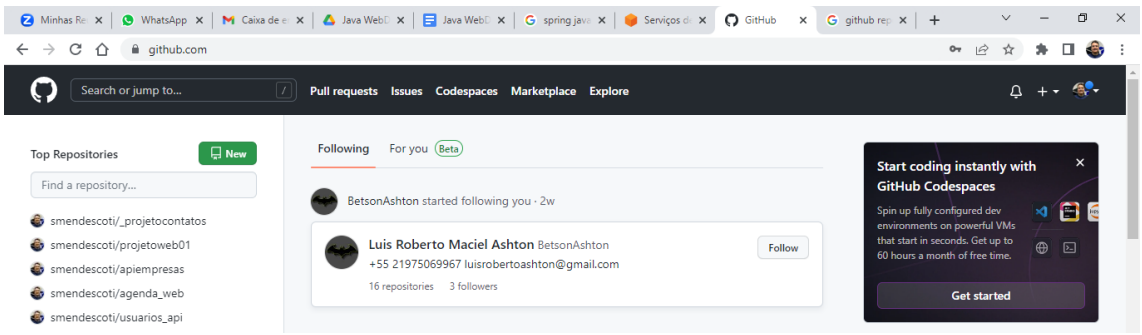
Criando um repositório no GITHUB para publicar o código fonte do projeto:
https://github.com/

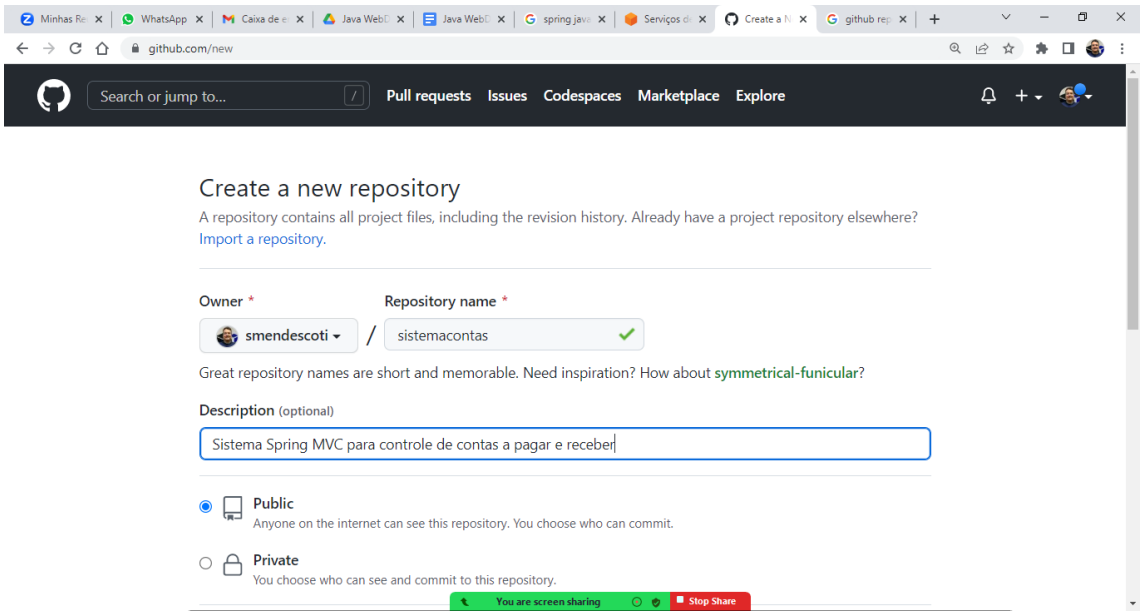


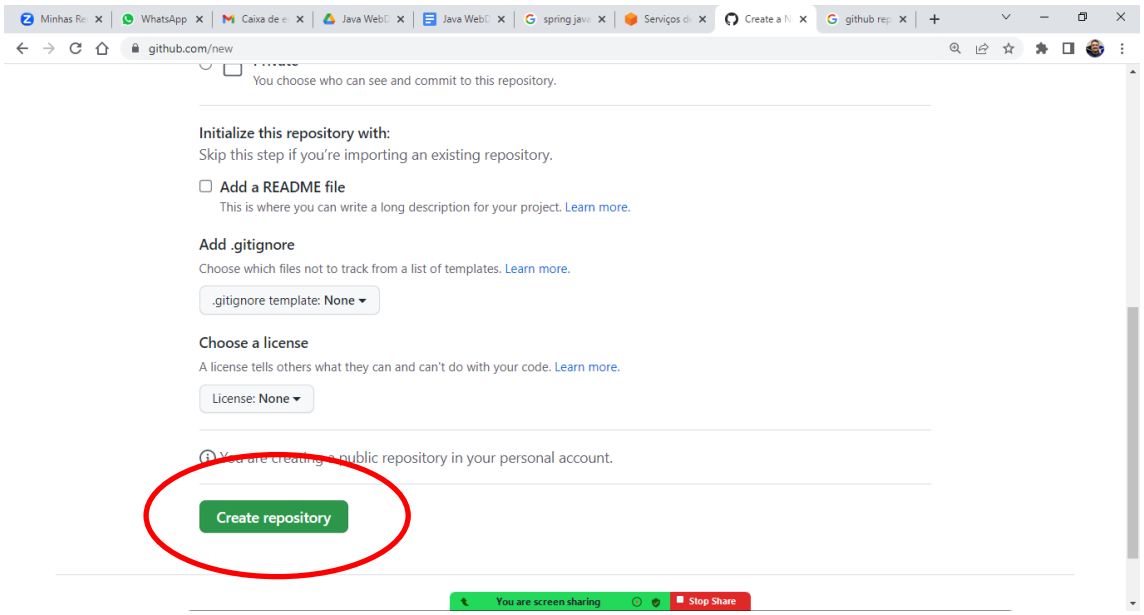


Repositórios no GitHub

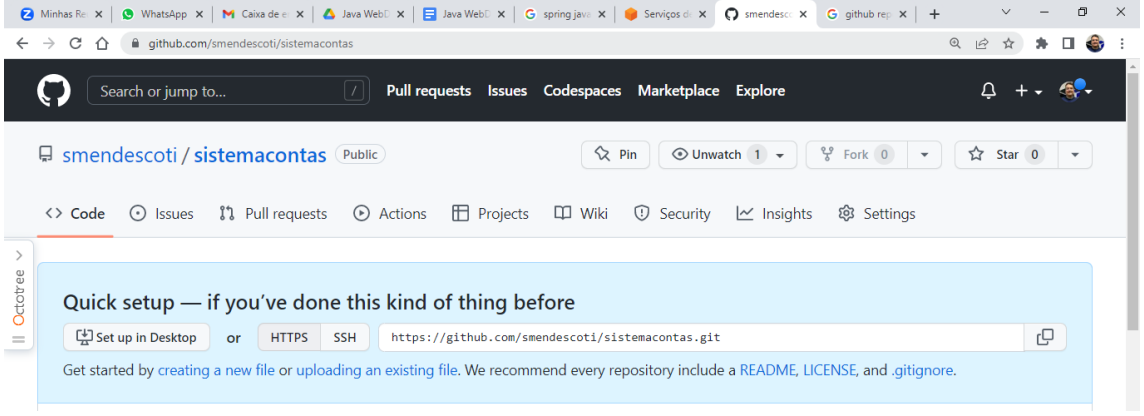
Recurso através do qual podemos publicar o código fonte de um projeto. Para cada projeto que iremos salvar no GITHUB precisamos criar um repositório.







https://github.com/smendescoti/sistemacontas



Parte 02: Criando o projeto

Eclipse IDE

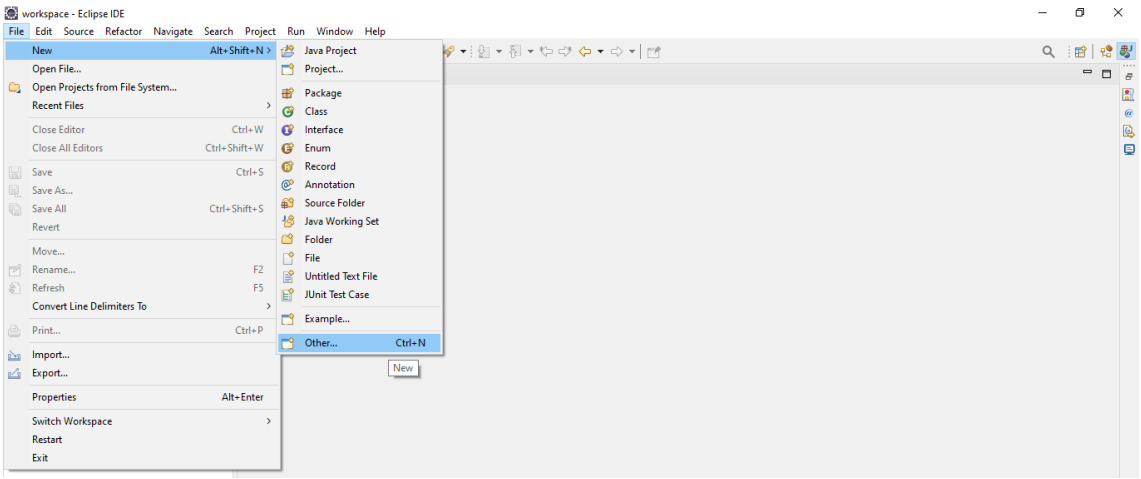
Apache Maven

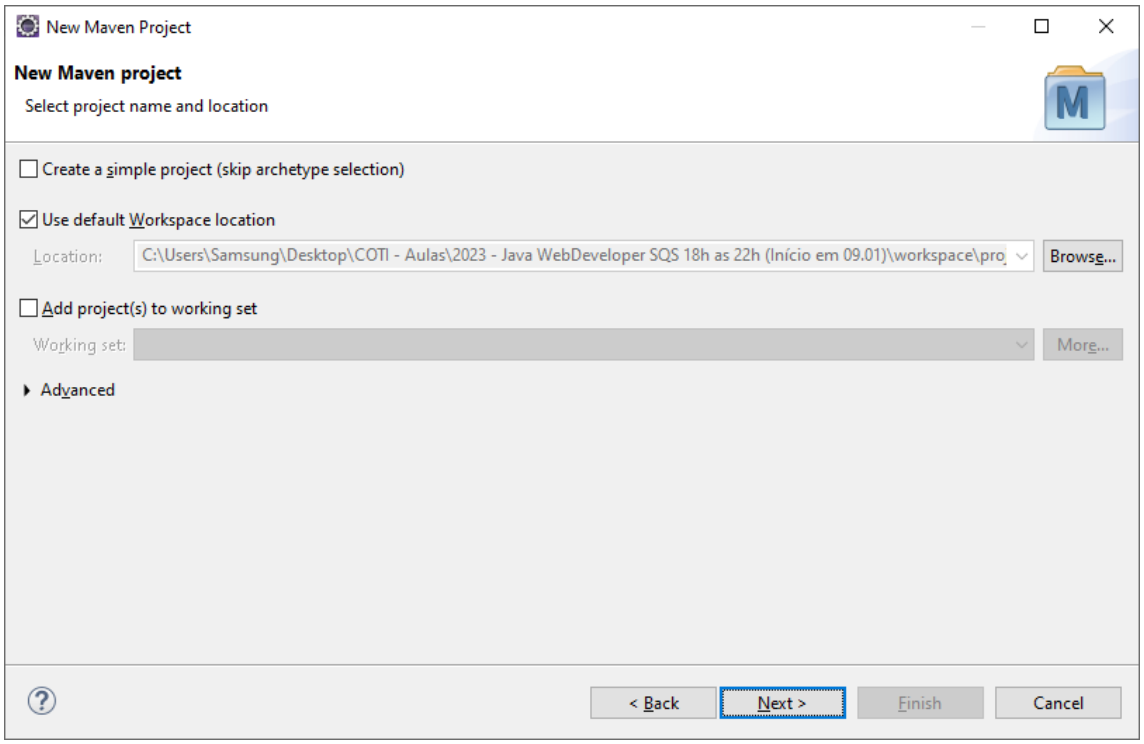
Framework Java utilizado para gerenciar os pacotes e bibliotecas utilizados em um projeto. Utiliza um arquivo de configuração no projeto para que possamos mapear quais bibliotecas serão instaladas na aplicação.

Este arquivo chama-se **/pom.xml**

Inclusive, o Maven já possui um recurso para criar projetos Java com o mínimo de configuração necessária (Hello World)

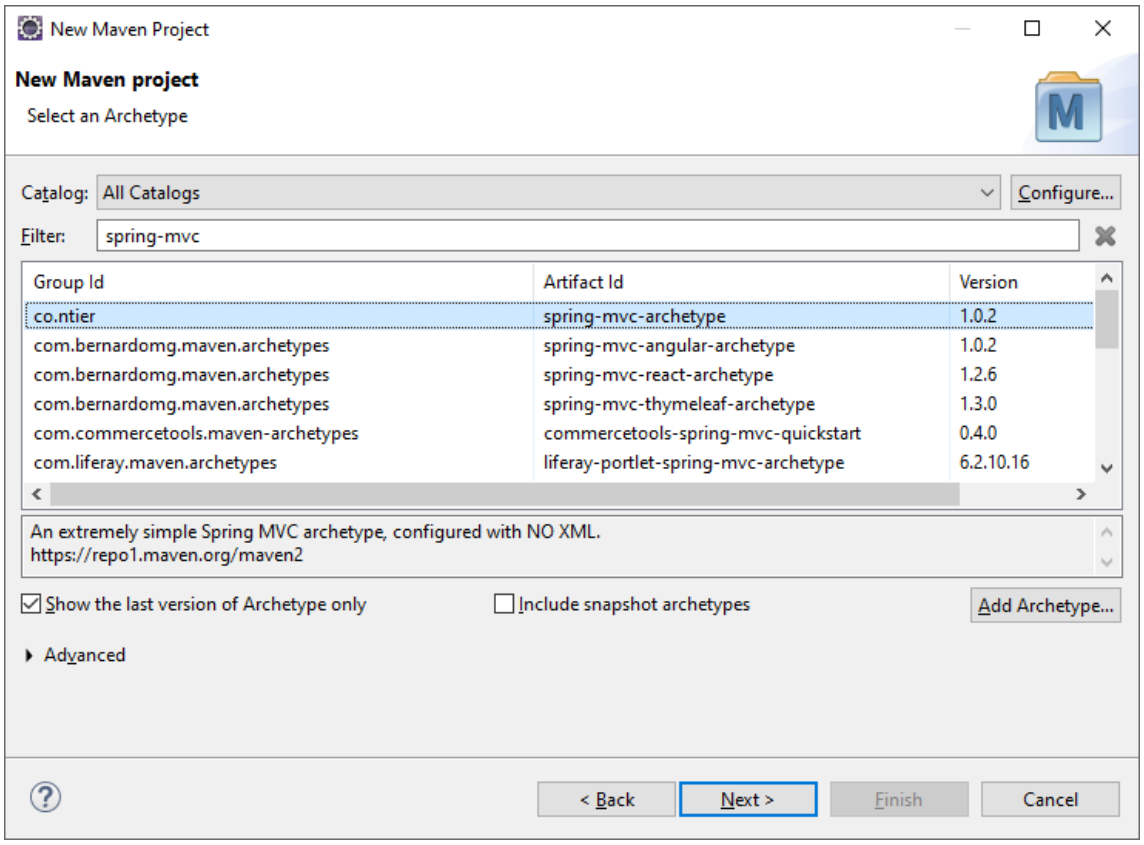
Sendo assim, vamos utilizar o Maven para criar um projeto Hello World baseado em Spring MVC.



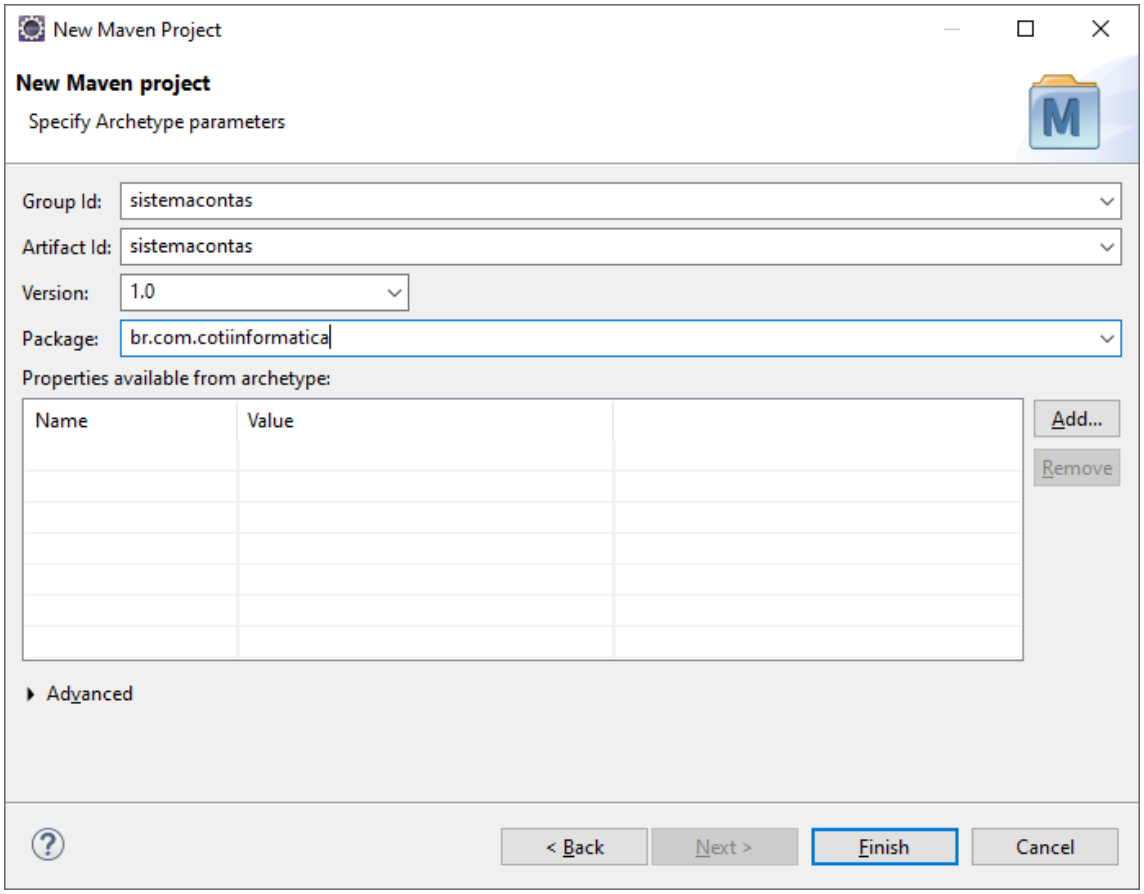


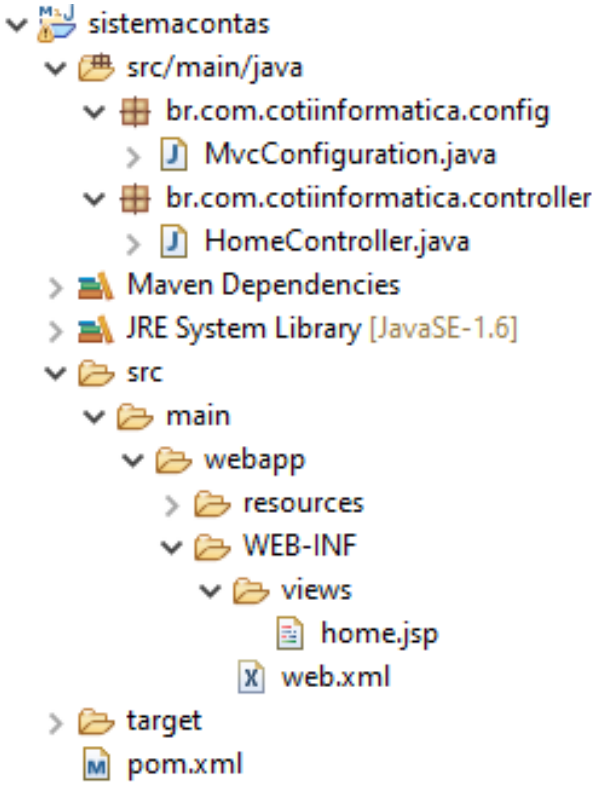
Selecione um Archetype
Aqui, iremos escolher o tipo de projeto que o Maven irá criar.

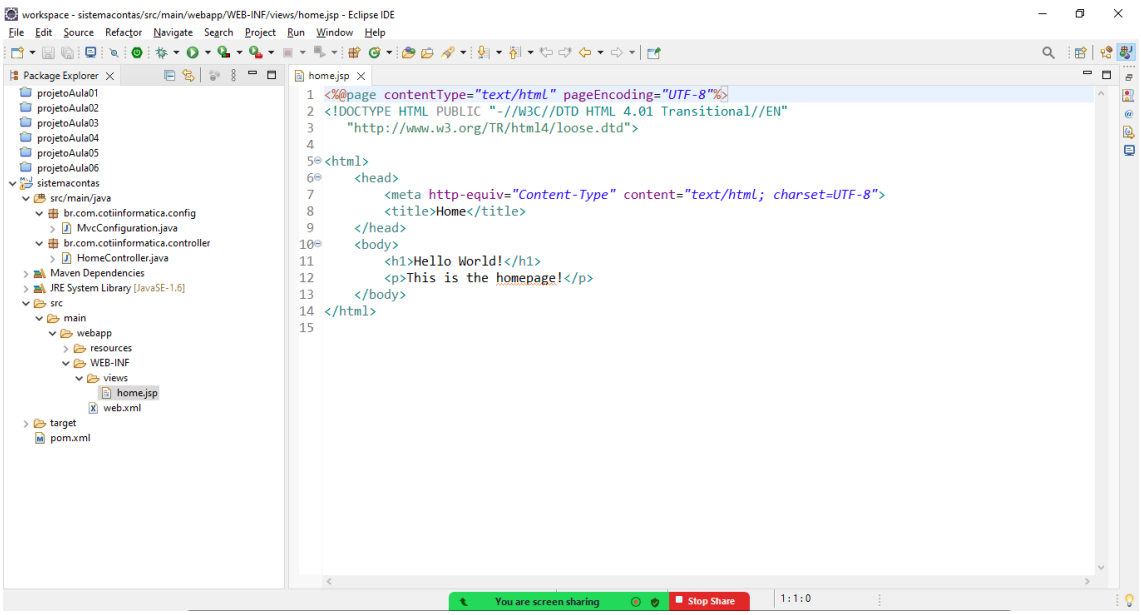
Selecione o tipo: **spring-mvc-archetype**



Preenchendo as informações do projeto:



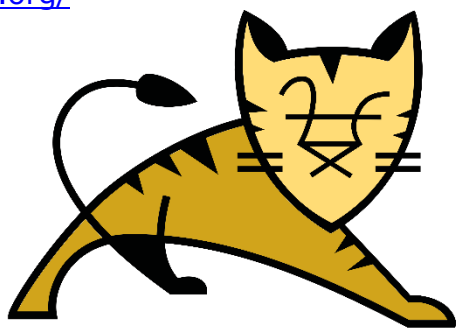




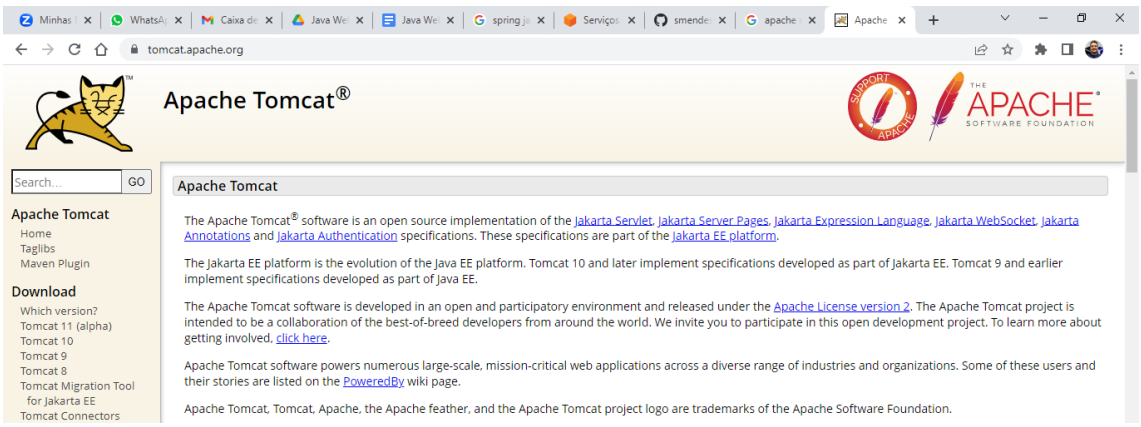
Para que possamos executarmos o projeto, precisamos de um servidor local que possa "rodar" a aplicação. Este servidor será o **Apache Tomcat**.

Apache Tomcat

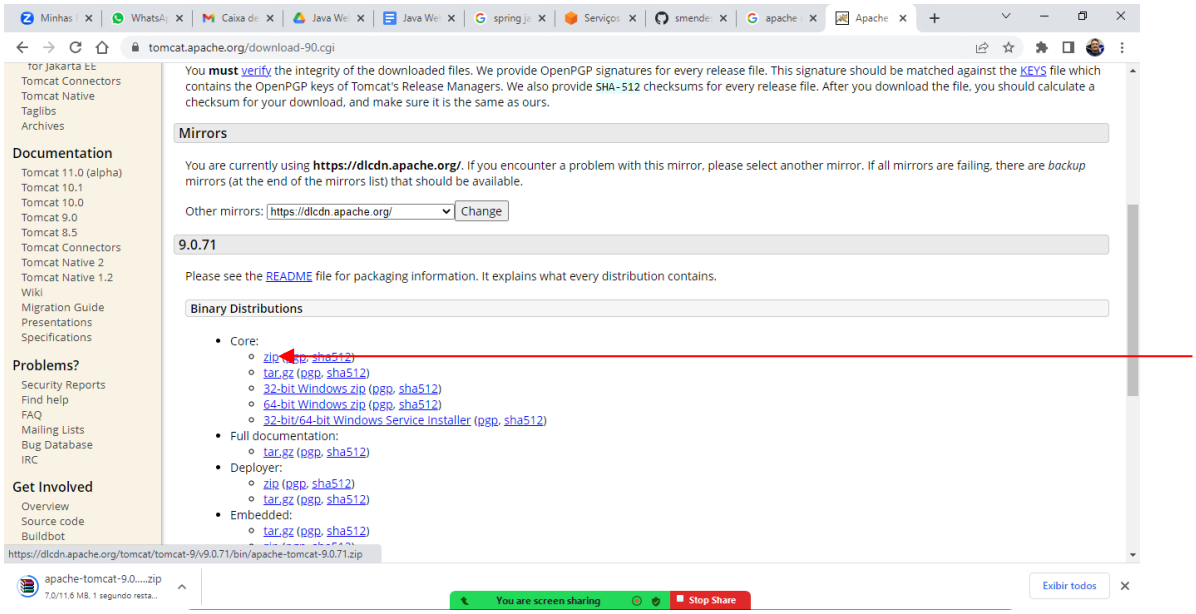
Servidor utilizado para executar projetos Java Web.
https://tomcat.apache.org/



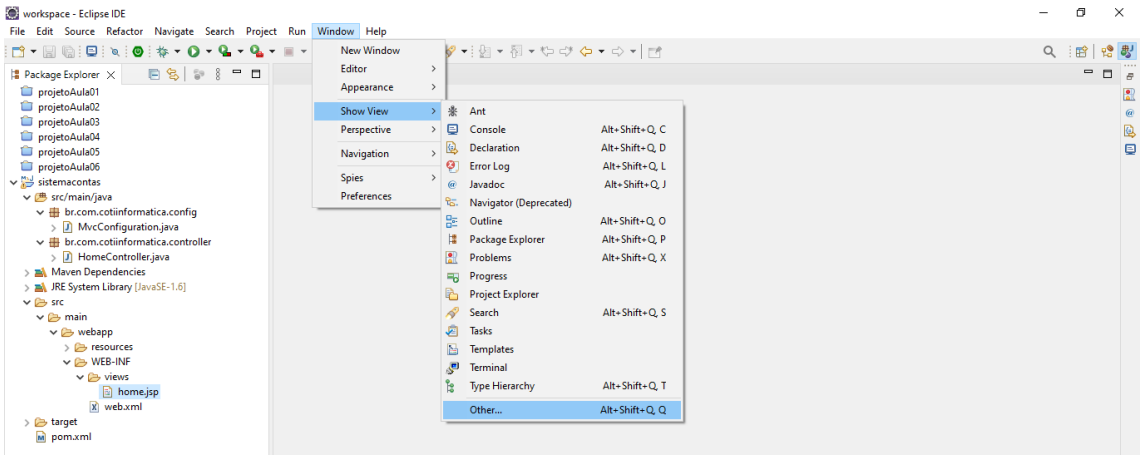
Apache Tomcat

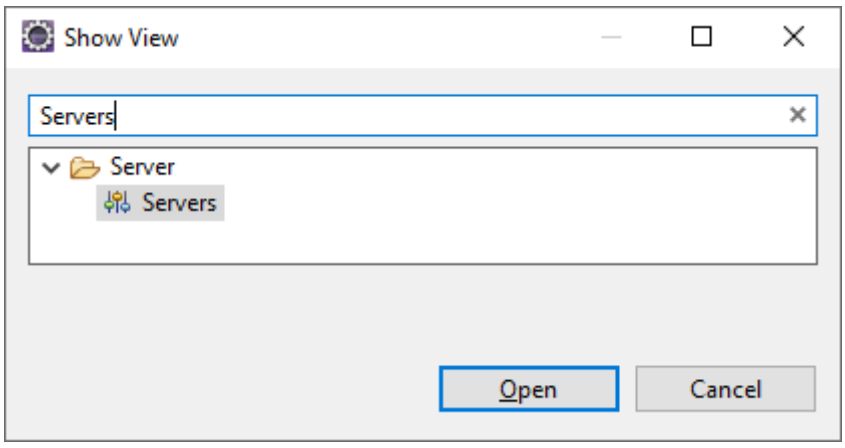


https://tomcat.apache.org/download-90.cgi

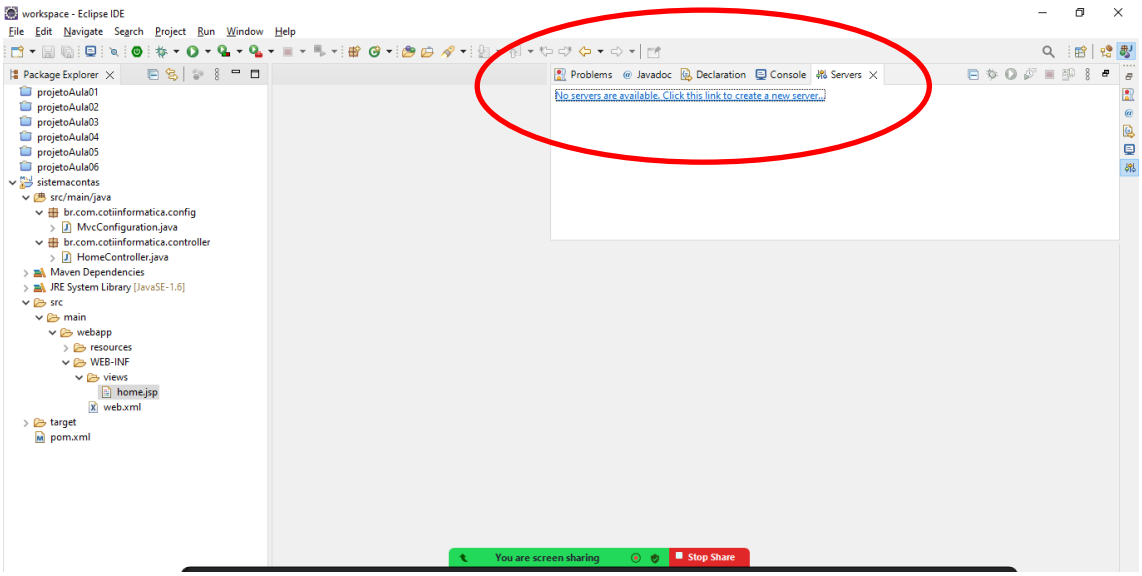


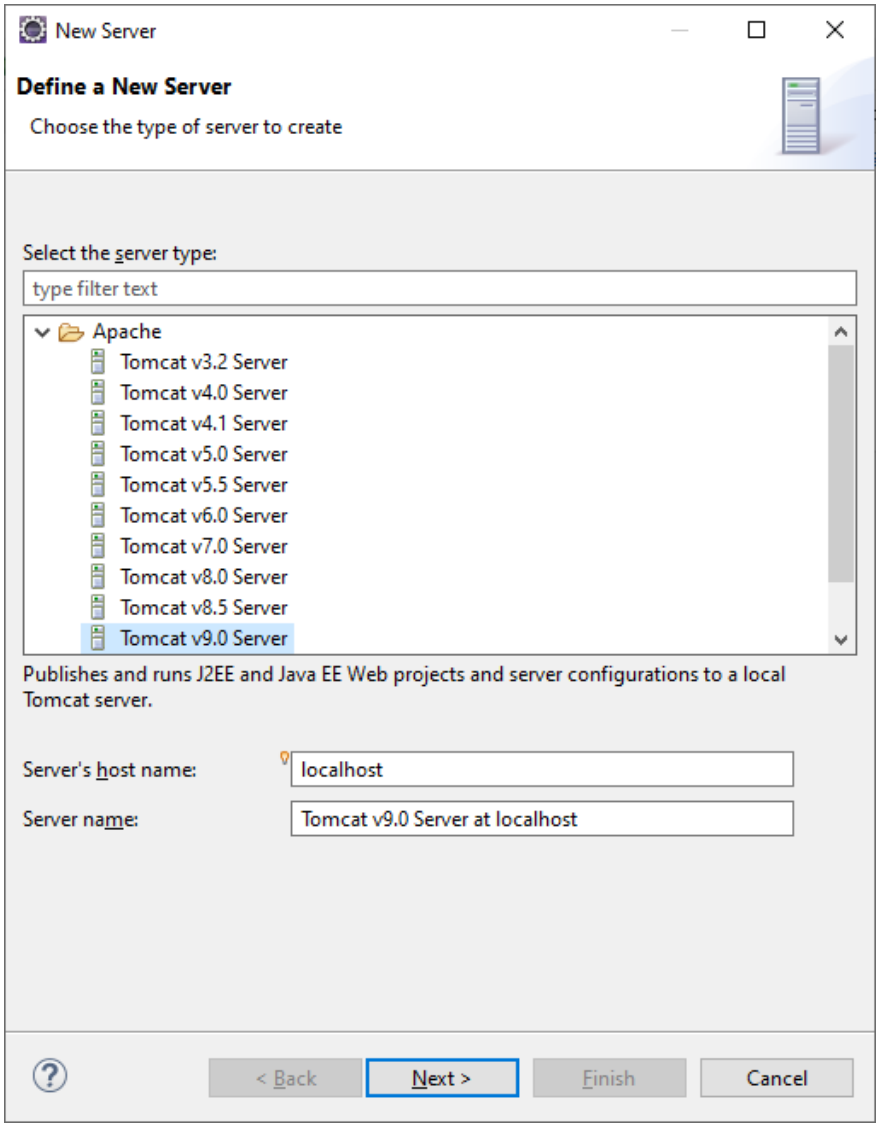
Exibindo a janela de configuração de servidores do eclipse:
Windows / Show View / Other



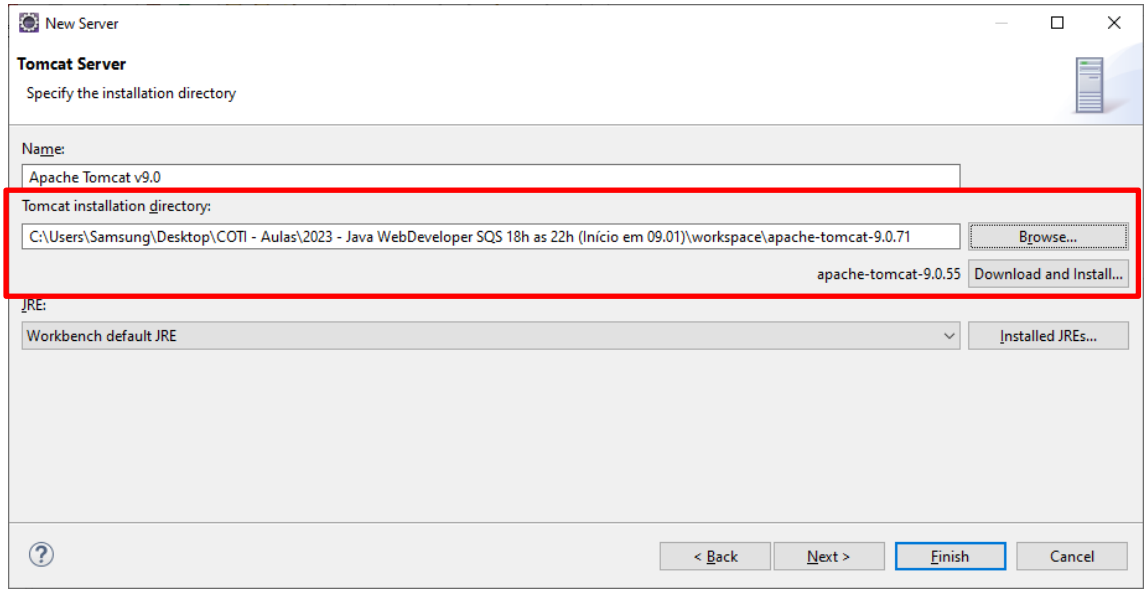


Configurando o servidor:

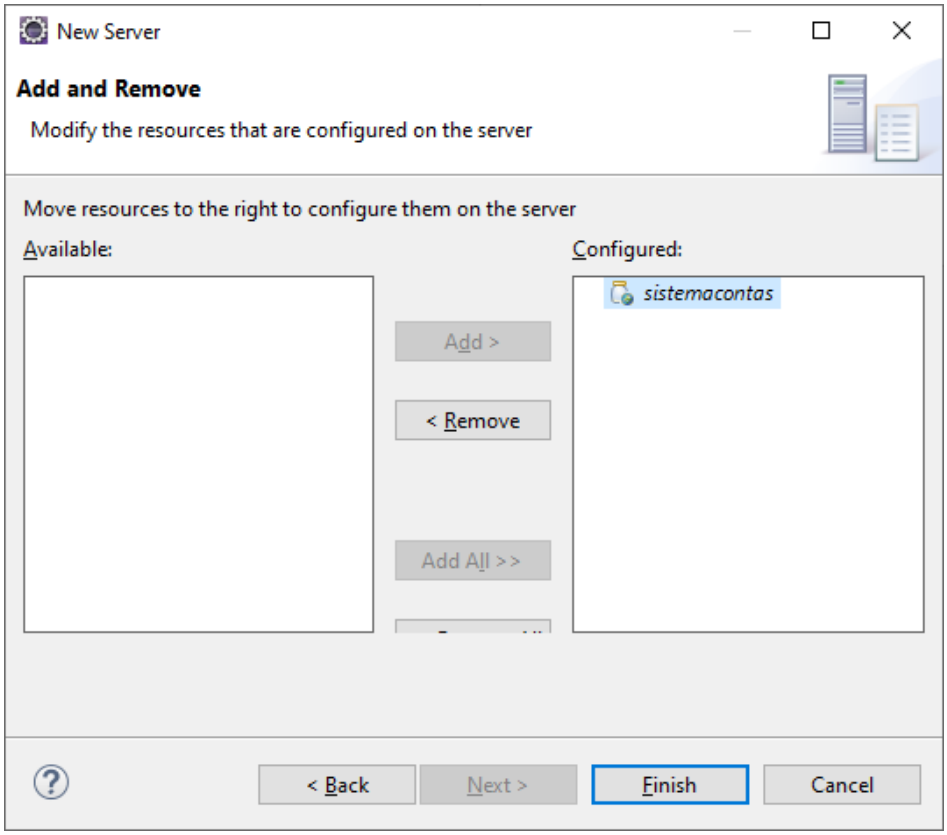


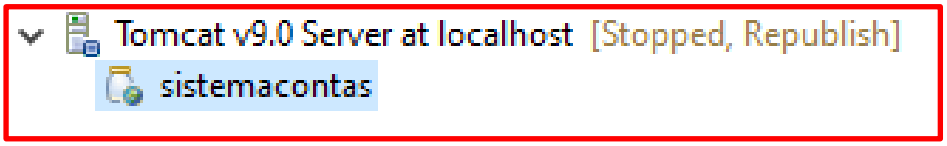


Selecione a pasta do servidor:

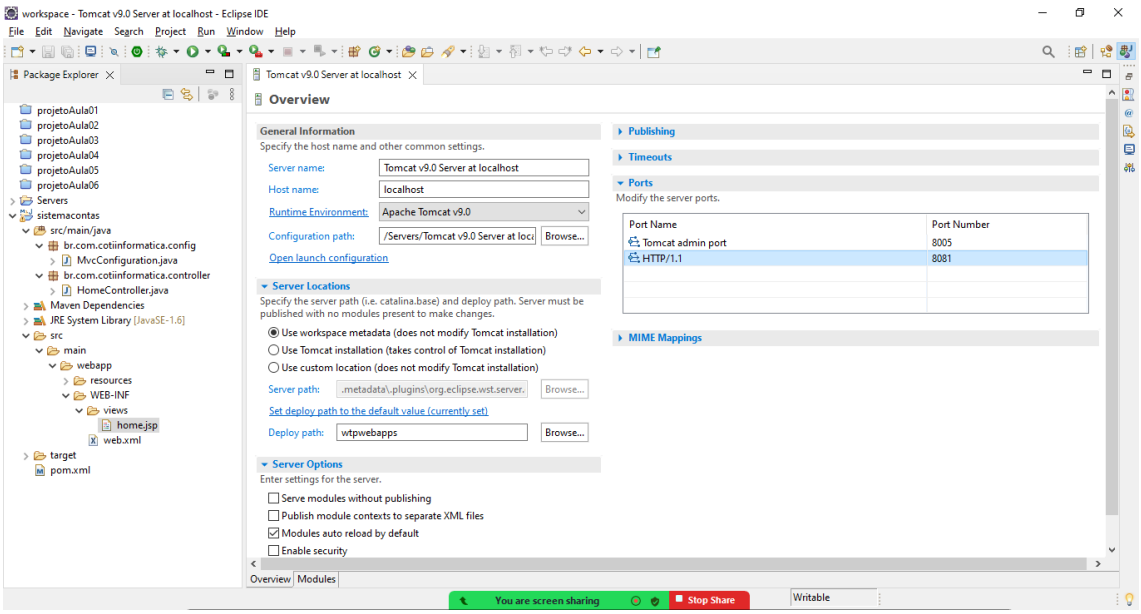


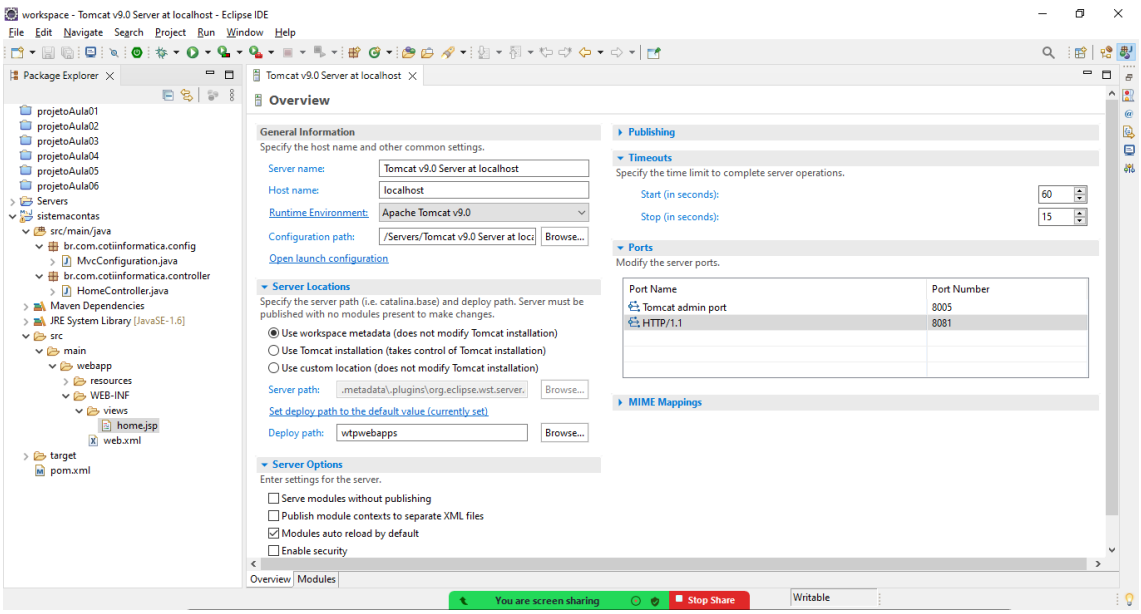
Adicionando o projeto no servidor:



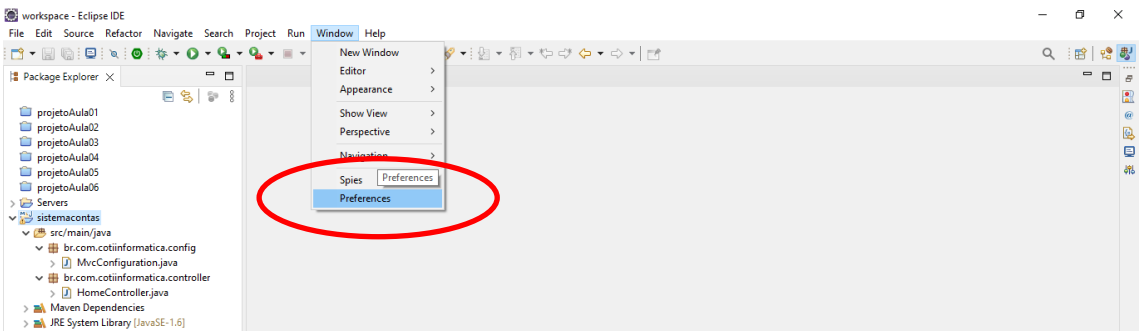


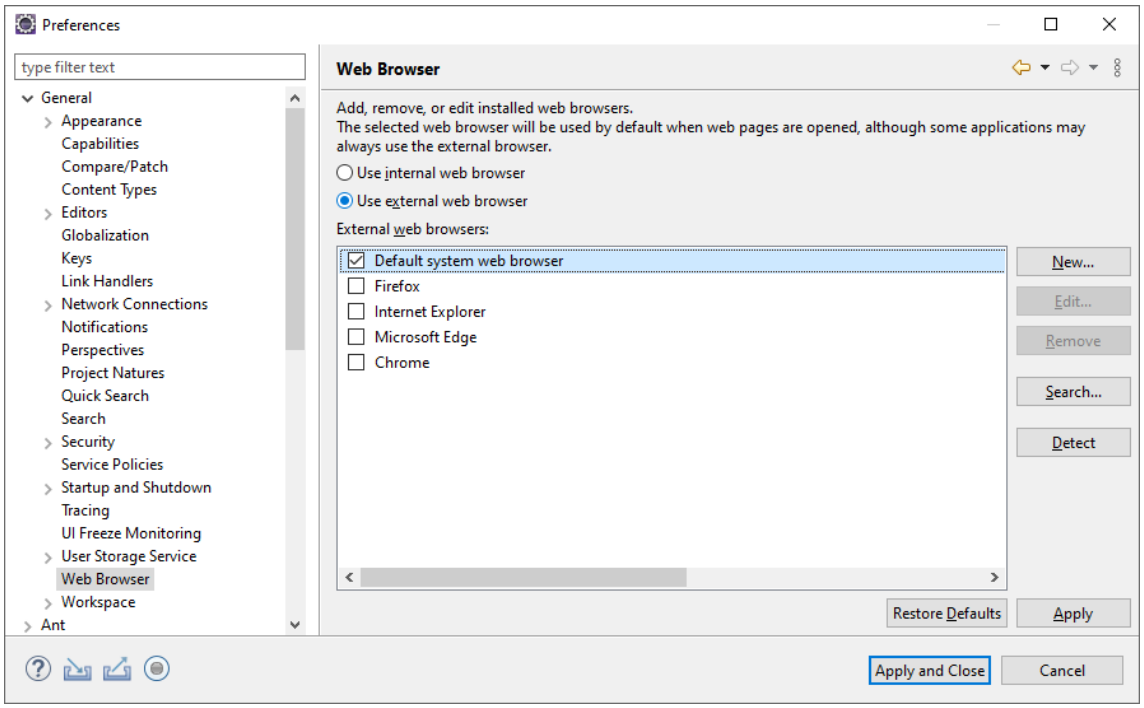
Configurando a porta para execução do projeto:



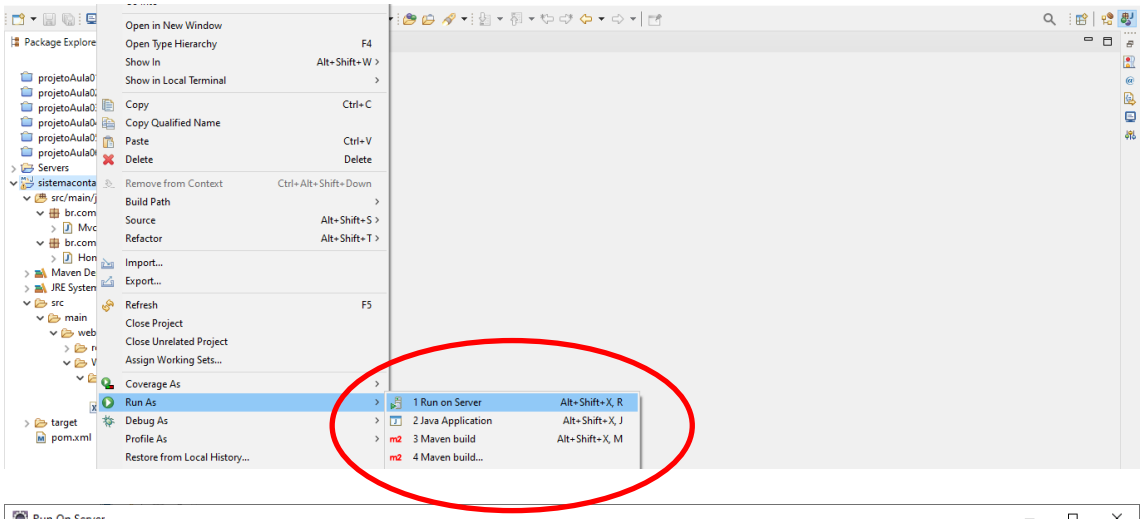


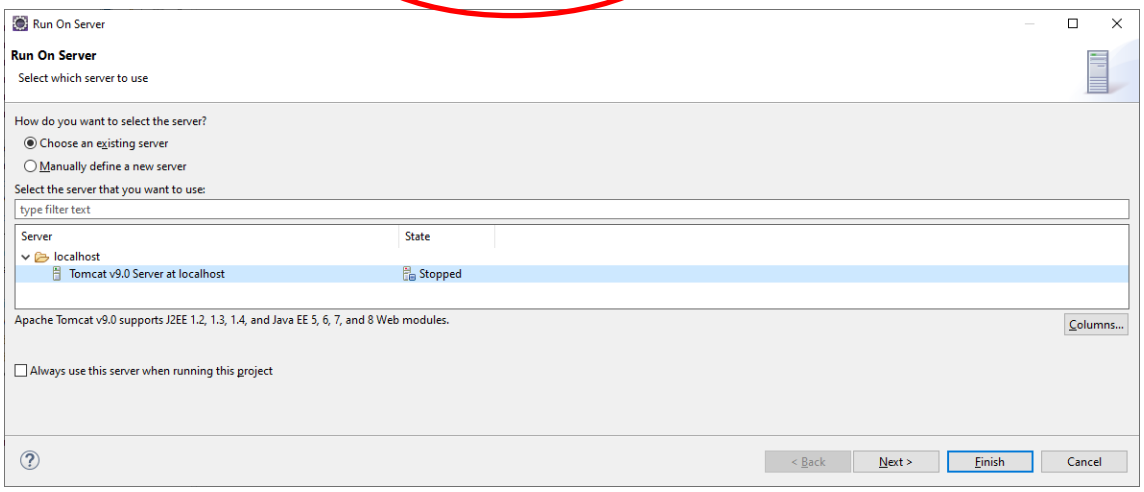
Antes de executar o projeto, vamos configurar em qual navegador ele será executado:



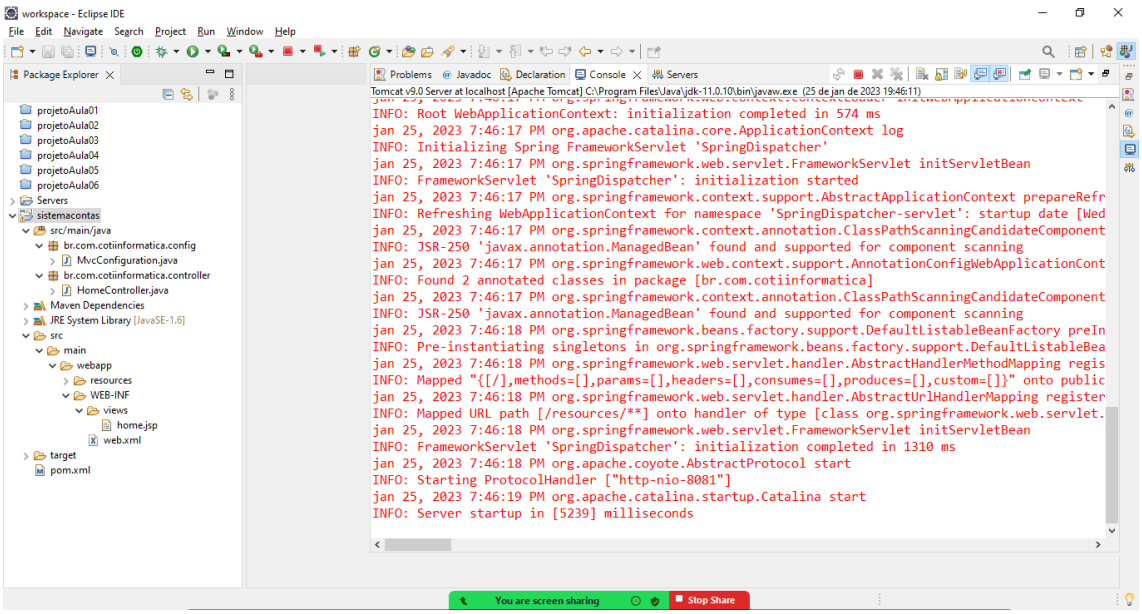


Executando o projeto:

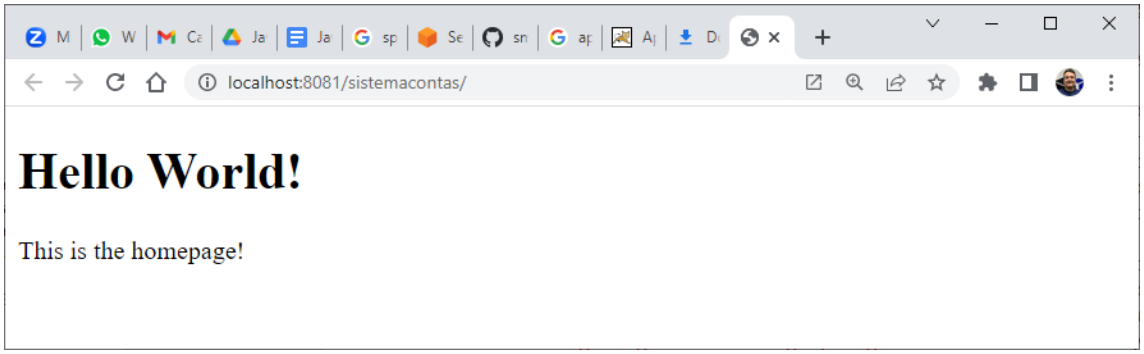




Log de execução do tomcat:



http://localhost:8081/sistemacontas/



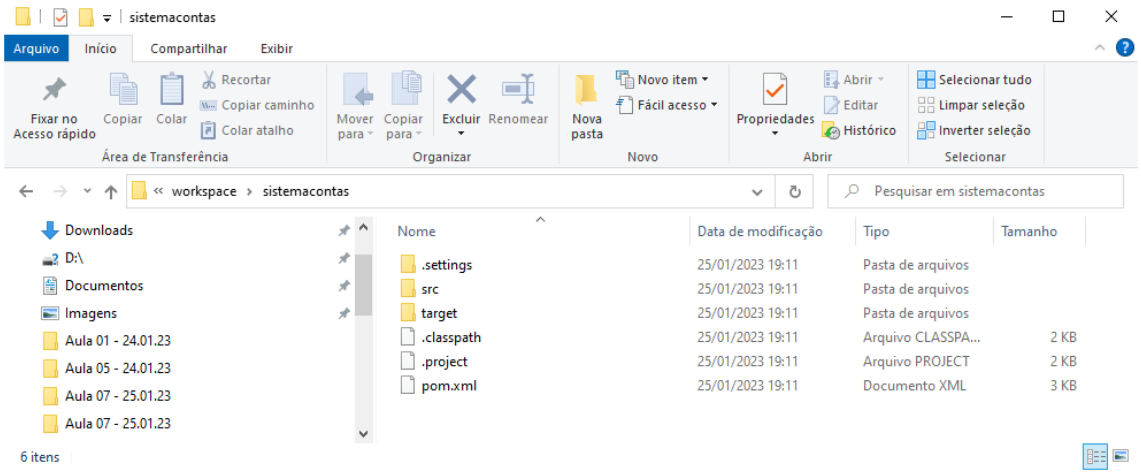
/WEB-INF/views/**home.jsp**

Página inicial do projeto (Está configurada como página de inicialização do projeto). As páginas web do projeto Java possuem extensão **JSP – Java Server Pages**.

```
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
   "http://www.w3.org/TR/html4/loose.dtd">

<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Home</title>
    </head>
    <body>
        <h1>Hello World!</h1>
        <p>This is the homepage!</p>
    </body>
</html>
```

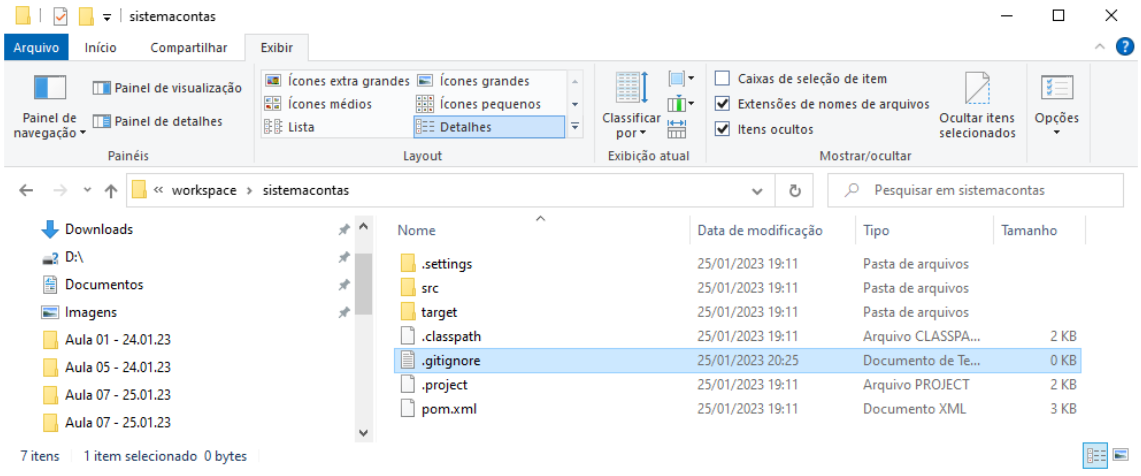
Podemos agora já publicar o código fonte do projeto no GITHUB:

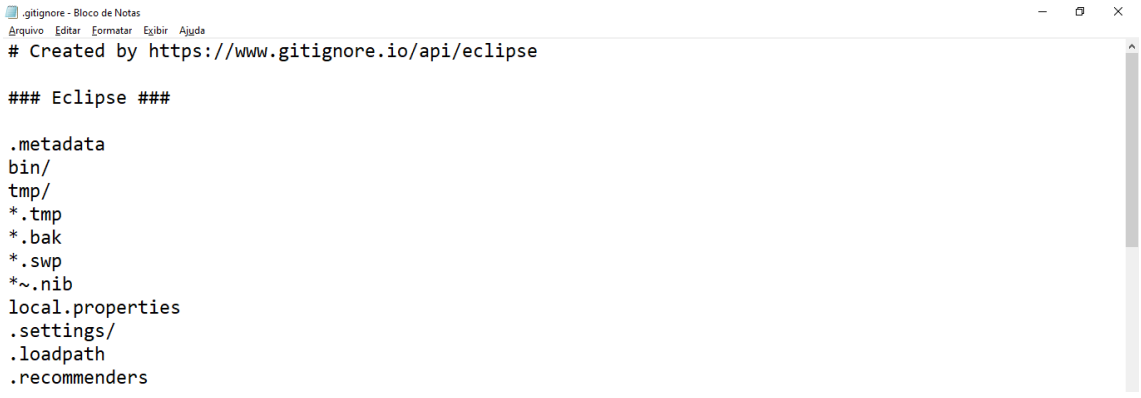
** Para que possamos publicar o projeto no GITHUB, precisamos criar alguns arquivos de configuração no projeto:



.gitignore

Arquivo de configuração onde vamos definir quais pastas e arquivos do projeto não serão enviados para o GITHUB.



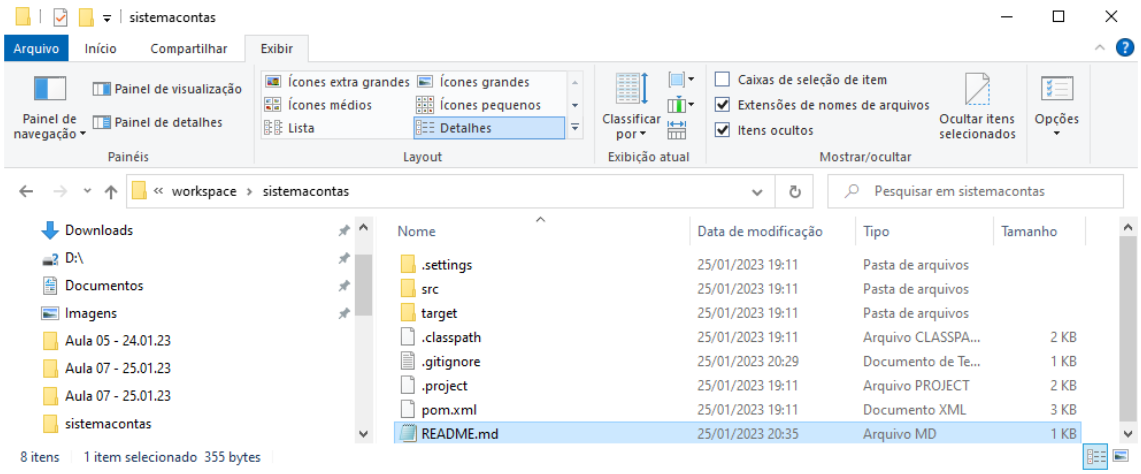


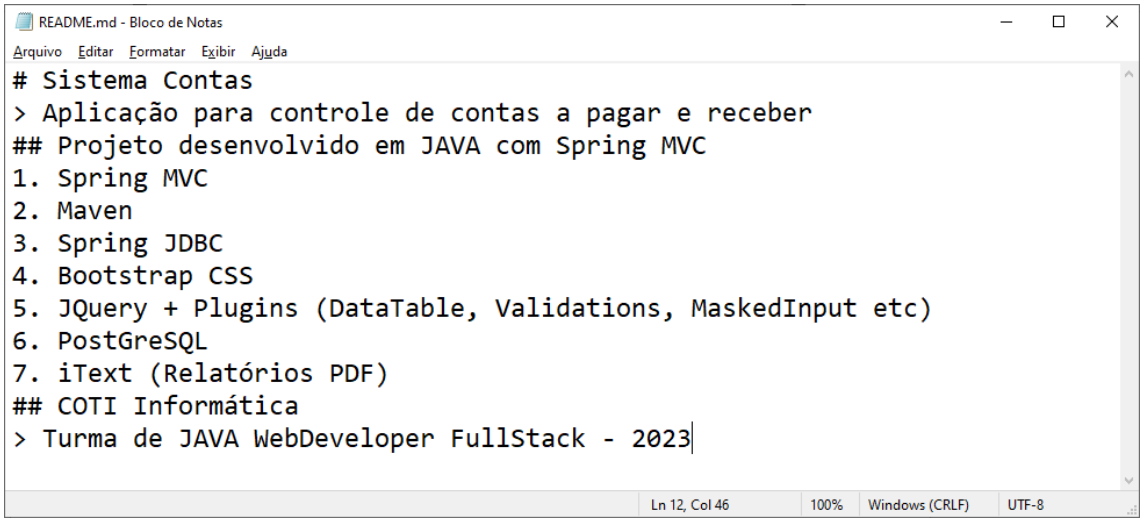
```
# Created by https://www.gitignore.io/api/eclipse

### Eclipse ###

.metadata
bin/
tmp/
*.tmp
*.bak
*.swp
*~.nib
local.properties
.settings/
.loadpath
.recommenders

# External tool builders
.externalToolBuilders/

# Locally stored "Eclipse launch configurations"
*.launch

# PyDev specific (Python IDE for Eclipse)
*.pydevproject

# CDT-specific (C/C++ Development Tooling)
.cproject

# Java annotation processor (APT)
.factorypath

# PDT-specific (PHP Development Tools)
.buildpath

# sbteclipse plugin
.target

# Tern plugin
.tern-project

# TeXlipse plugin
.texlipse

# STS (Spring Tool Suite)
.springBeans

# Code Recommenders
.recommenders/

# Scala IDE specific (Scala & Java development for Eclipse)
.cache-main
.scala_dependencies
.worksheet

### Eclipse Patch ###
# Eclipse Core
.project

# JDT-specific (Eclipse Java Development Tools)
.classpath

# End of https://www.gitignore.io/api/eclipse
```

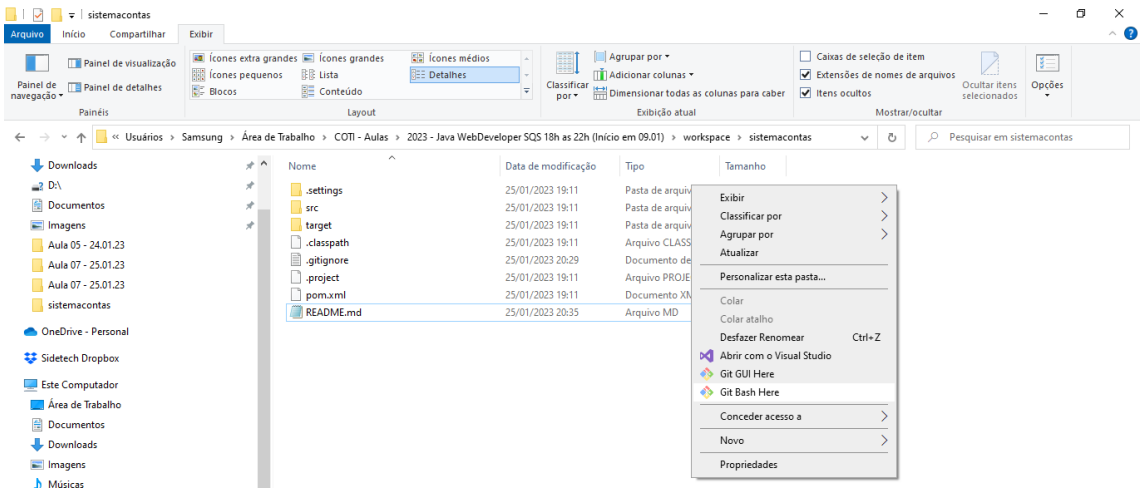
README.md

(Arquivo de instruções do projeto)

Arquivo utilizado pelo GITHUB para criarmos uma página de apresentação do projeto, falando sobre o sistema e explicando o que é necessário para executar a aplicação.



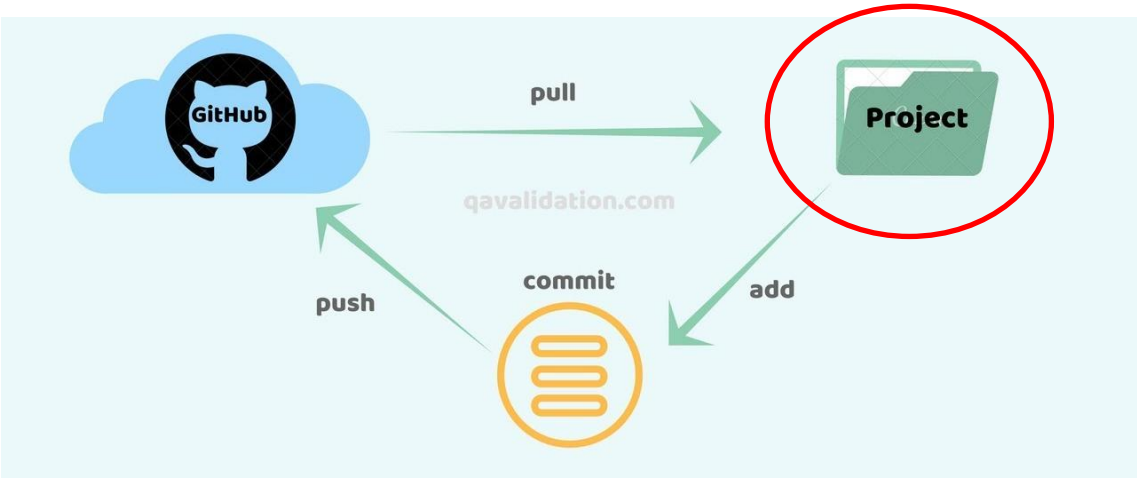




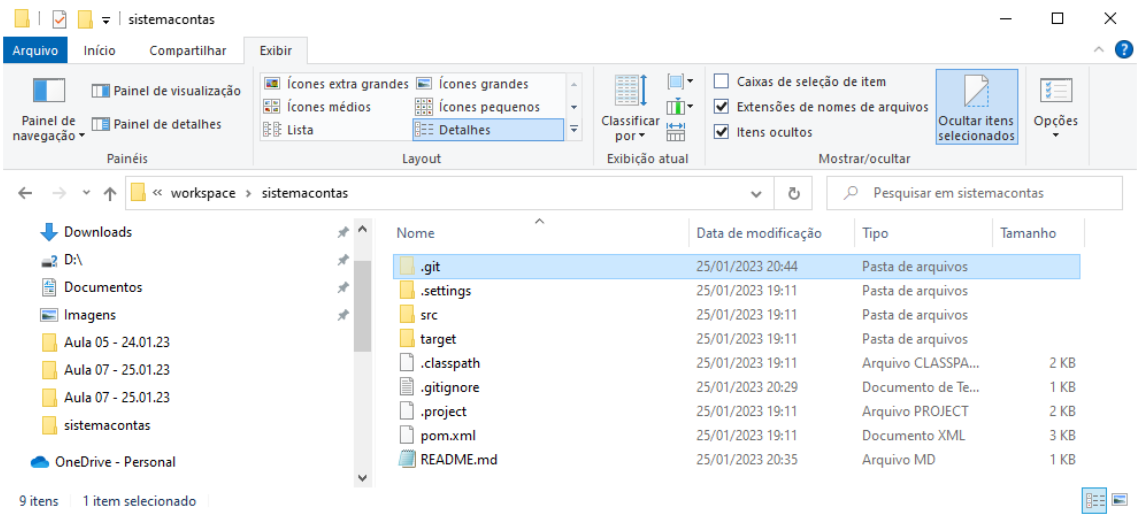
Registrando o usuário do GITHUB:

```
Samsung@DESKTOP-P9F6D9F MINGW64 ~/Desktop/COTI - Aulas/2023 - Java WebDeveloper SQS 18h as 22h (Início em 09.01)/workspace/sistemacontas
$ git config --global user.name 'smendescoti'

Samsung@DESKTOP-P9F6D9F MINGW64 ~/Desktop/COTI - Aulas/2023 - Java WebDeveloper SQS 18h as 22h (Início em 09.01)/workspace/sistemacontas
$ git config --global user.email 'sergio.coti@gmail.com'
```

Em seguida, vamos iniciar um repositório do GIT na pasta do projeto:



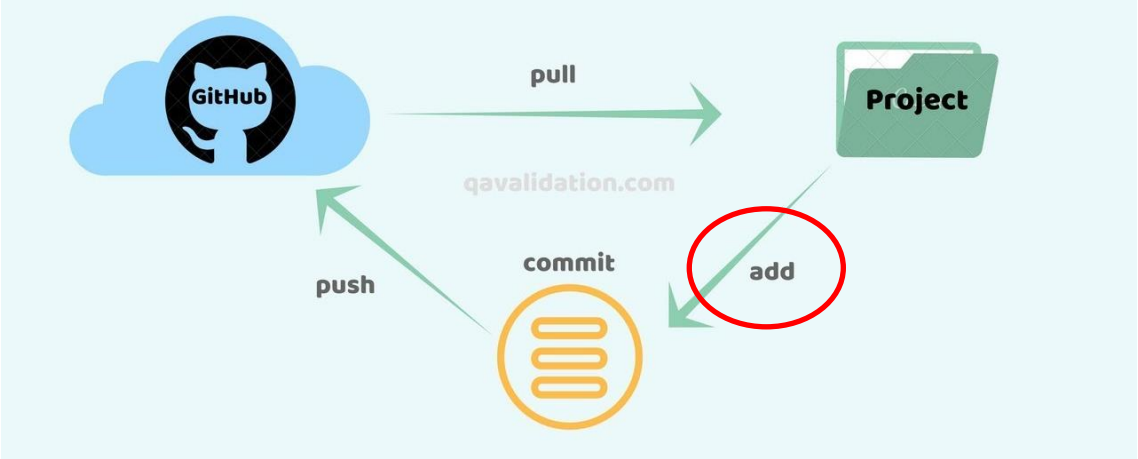

```
Samsung@DESKTOP-P9F6D9F MINGW64 ~/Desktop/COTI - Aulas/2023 - Java WebDeveloper SQS 18h as 22h (Início em 09.01)/workspace/sistemacontas
$ git init
```



COMMIT

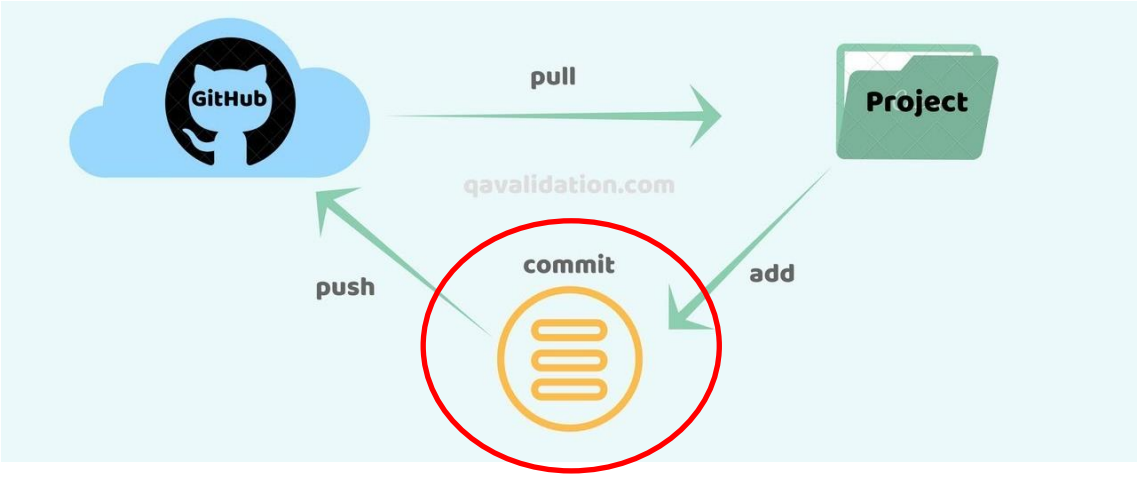
Nome dado ao processo de enviar arquivos do projeto local para o repositório do GITHUB. Em um commit podemos enviar desde muitos arquivos e pastas até somente alterações pequenas feitas no projeto.

- Primeiro, vamos adicionar todos os arquivos do projeto no COMMIT.




```
Samsung@DESKTOP-P9F6D9F MINGW64 ~/Desktop/COTI - Aulas/2023 - Java WebDeveloper SQS 18h as 22h (Início em 09.01)/workspace/sistemacontas (master)
$ git add .
```

- Em seguida, vamos dar um nome para o COMMIT.



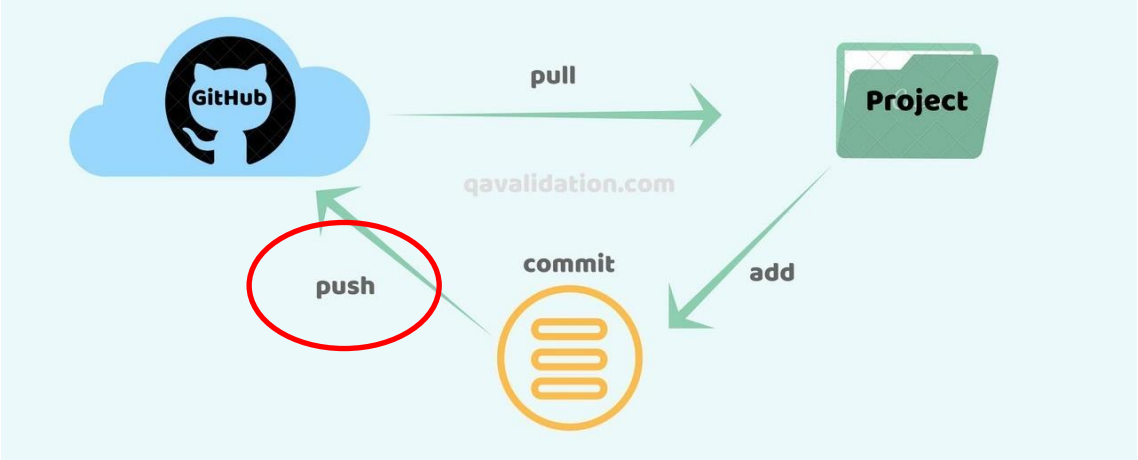

```
Samsung@DESKTOP-P9F6D9F MINGW64 ~/Desktop/COTI - Aulas/2023 - Java WebDeveloper SQS 18h as 22h (Início em 09.01)/workspace/sistemacontas (master)
$ git commit -m 'first commit'
```

```
MINGW64:/c/Users/Samsung/Desktop/COTI - Aulas/2023 - Java WebDeveloper SQS 18h as 22h (Início em 09.01)/workspace/sistemacontas

Samsung@DESKTOP-P9F6D9F MINGW64 ~/Desktop/COTI - Aulas/2023 - Java WebDeveloper SQS 18h as 22h (Início em 09.01)/workspace
/sistemacontas
$ git init
Initialized empty Git repository in C:/Users/Samsung/Desktop/COTI - Aulas/2023 - Java WebDeveloper SQS 18h as 22h (Início
em 09.01)/workspace/sistemacontas/.git/

Samsung@DESKTOP-P9F6D9F MINGW64 ~/Desktop/COTI - Aulas/2023 - Java WebDeveloper SQS 18h as 22h (Início em 09.01)/workspace
/sistemacontas (master)
$ git add .

Samsung@DESKTOP-P9F6D9F MINGW64 ~/Desktop/COTI - Aulas/2023 - Java WebDeveloper SQS 18h as 22h (Início em 09.01)/workspace
/sistemacontas (master)
$ git commit -m 'first commit'
[master (root-commit) 8d4f71c] first commit
 13 files changed, 376 insertions(+)
 create mode 100644 .gitignore
 create mode 100644 README.md
 create mode 100644 pom.xml
 create mode 100644 src/main/java/br/com/cotiinformatica/config/MvcConfiguration.java
 create mode 100644 src/main/java/br/com/cotiinformatica/controller/HomeController.java
 create mode 100644 src/main/webapp/WEB-INF/views/home.jsp
 create mode 100644 src/main/webapp/WEB-INF/web.xml
 create mode 100644 src/main/webapp/resources/style.css
 create mode 100644 target/classes/br/com/cotiinformatica/config/MvcConfiguration.class
 create mode 100644 target/classes/br/com/cotiinformatica/controller/HomeController.class
 create mode 100644 target/m2e-wtp/web-resources/META-INF/MANIFEST.MF
 create mode 100644 target/m2e-wtp/web-resources/META-INF/maven/sistemacontas/sistemacontas/pom.properties
 create mode 100644 target/m2e-wtp/web-resources/META-INF/maven/sistemacontas/sistemacontas/pom.xml

Samsung@DESKTOP-P9F6D9F MINGW64 ~/Desktop/COTI - Aulas/2023 - Java WebDeveloper SQS 18h as 22h (Início em 09.01)/workspace
/sistemacontas (master)
$
```

You are screen sharing Stop Share

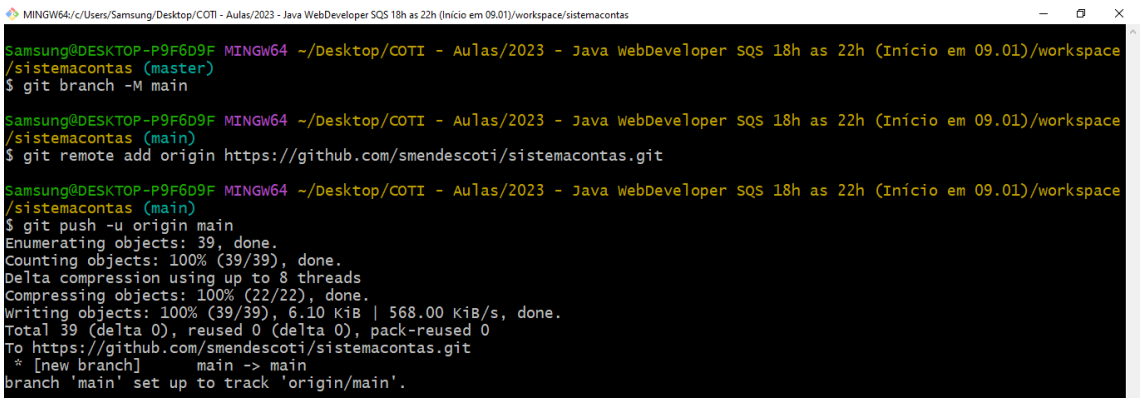
PUSH

Comando para fazer o upload do conteúdo
de um COMMIT para o repositório do GITHUB:

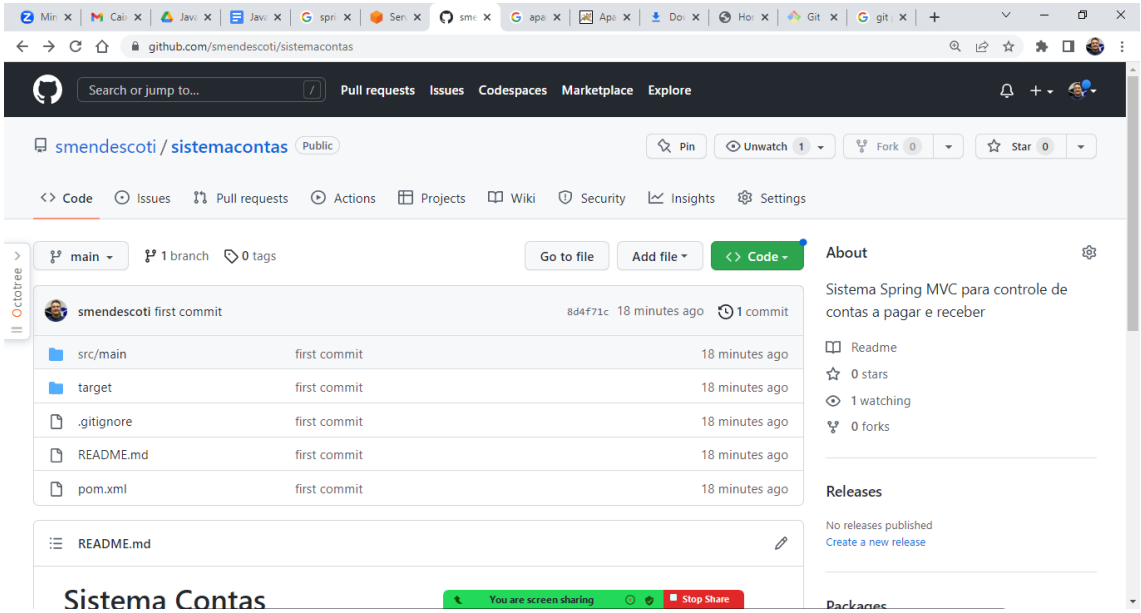



```
Samsung@DESKTOP-P9F6D9F MINGW64 ~/Desktop/COTI - Aulas/2023 -
Java WebDeveloper SQS 18h as 22h (Início em
09.01)/workspace/sistemacontas (master)
$ git branch -M main

Samsung@DESKTOP-P9F6D9F MINGW64 ~/Desktop/COTI - Aulas/2023 -
Java WebDeveloper SQS 18h as 22h (Início em
09.01)/workspace/sistemacontas (main)
$ git remote add origin
https://github.com/smendescoti/sistemacontas.git
```

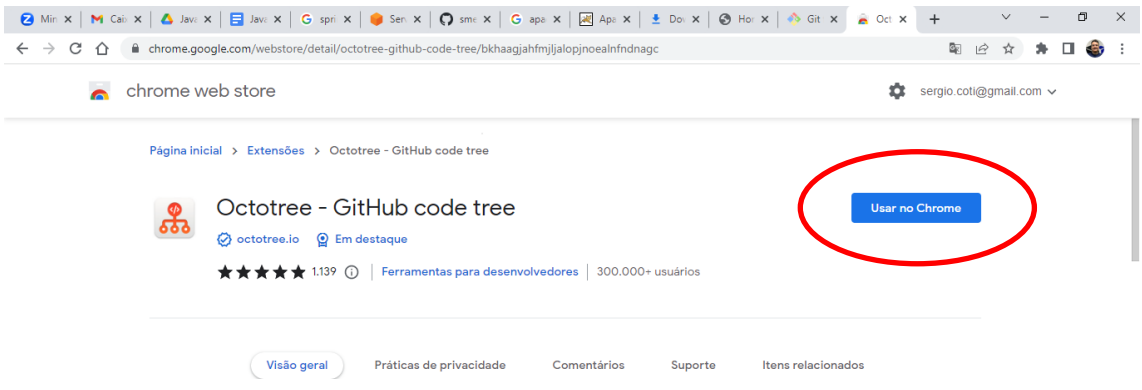
```
Samsung@DESKTOP-P9F6D9F MINGW64 ~/Desktop/COTI - Aulas/2023 - Java WebDeveloper SQS 18h as 22h (Início em 09.01)/workspace/sistemacontas (main)
$ git push -u origin main
```

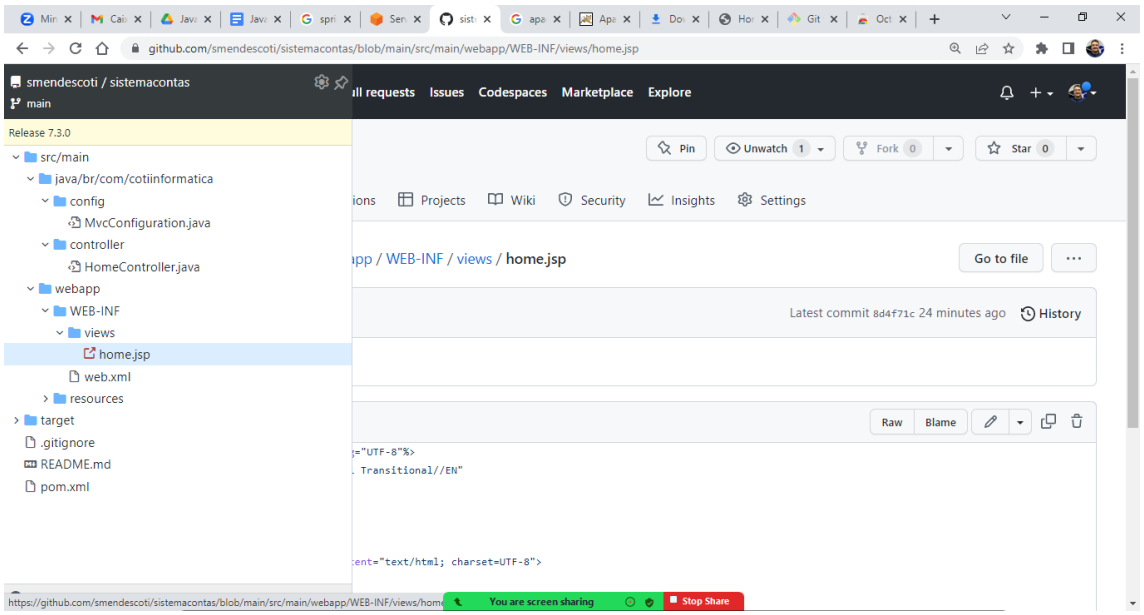


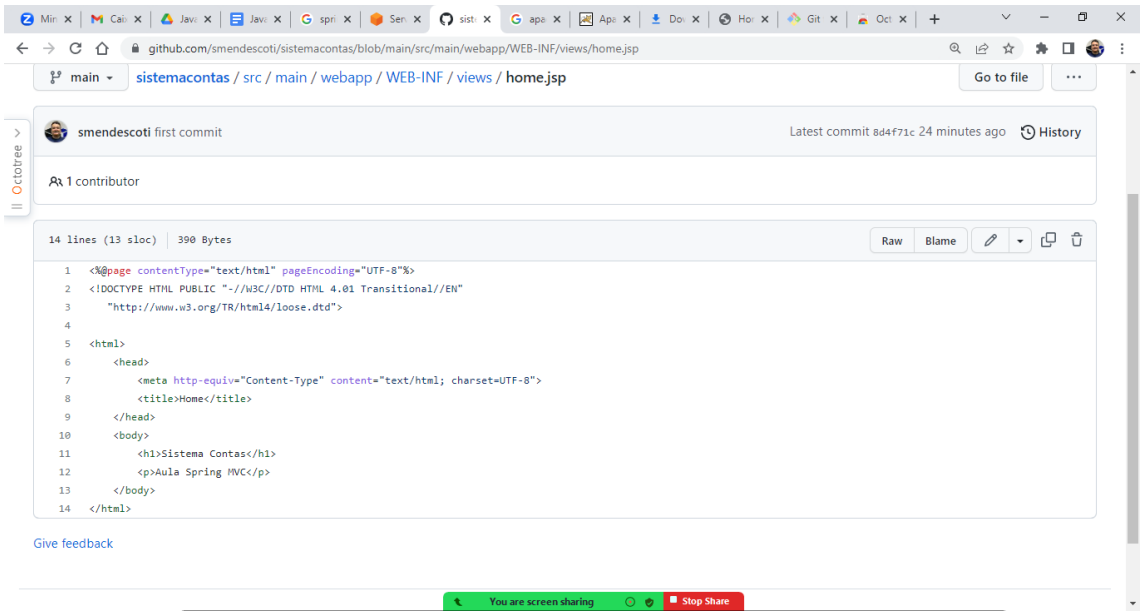
https://github.com/smendescoti/sistemacontas



https://chrome.google.com/webstore/detail/octotree-github-code-tree/bkhaagjahfmjljalopjnoealnfndnagc







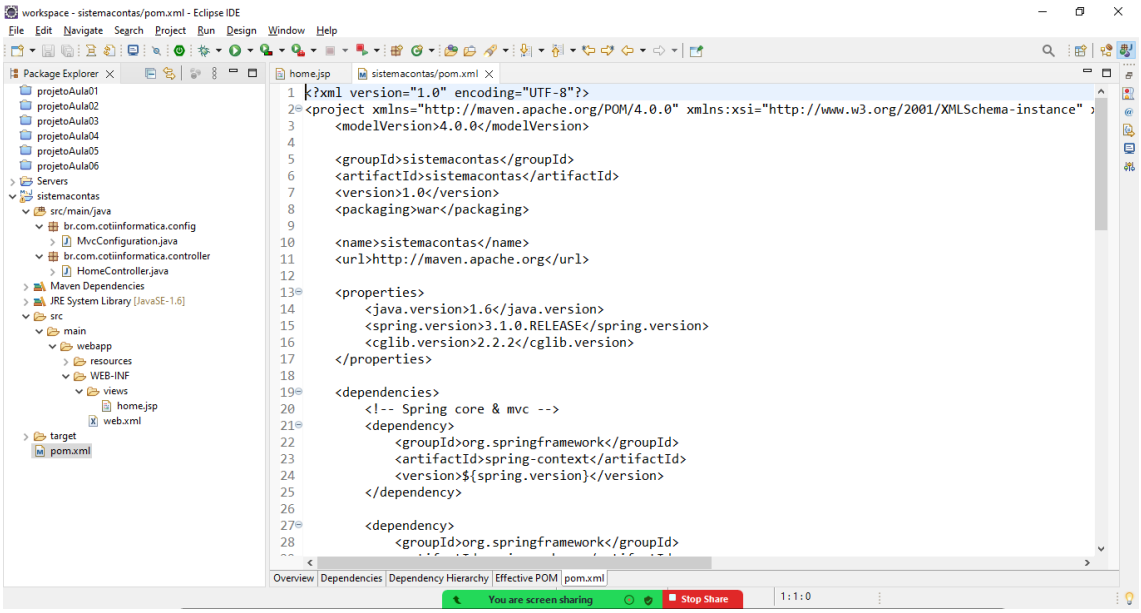
Voltando ao projeto:

Instalando bibliotecas que precisamos para desenvolver o projeto:

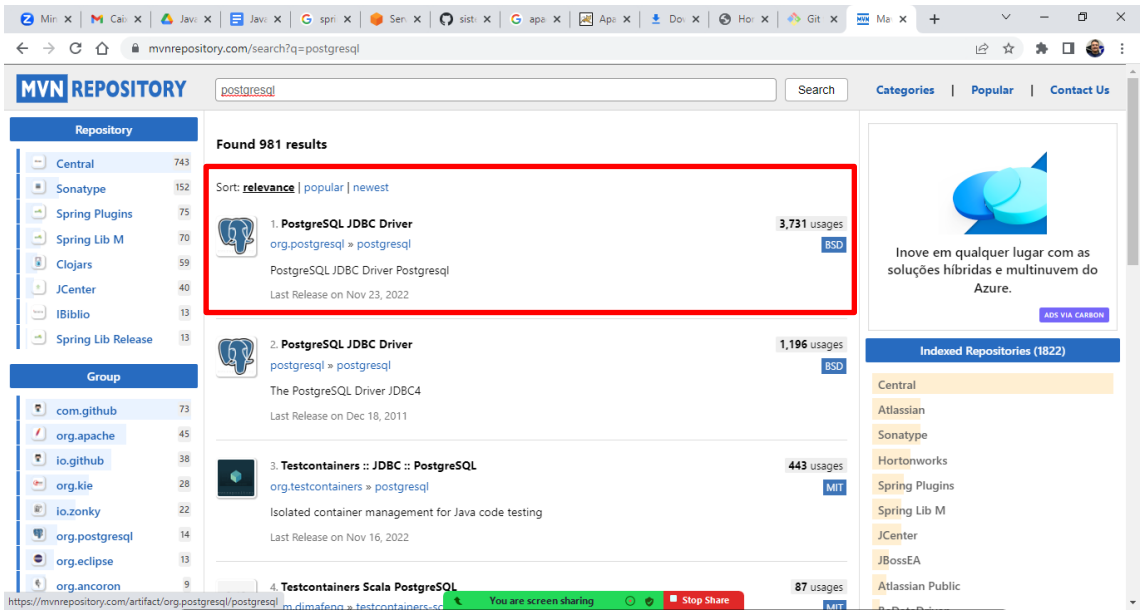
- Driver JDBC para conexão com o PostGreSQL
- Lombok

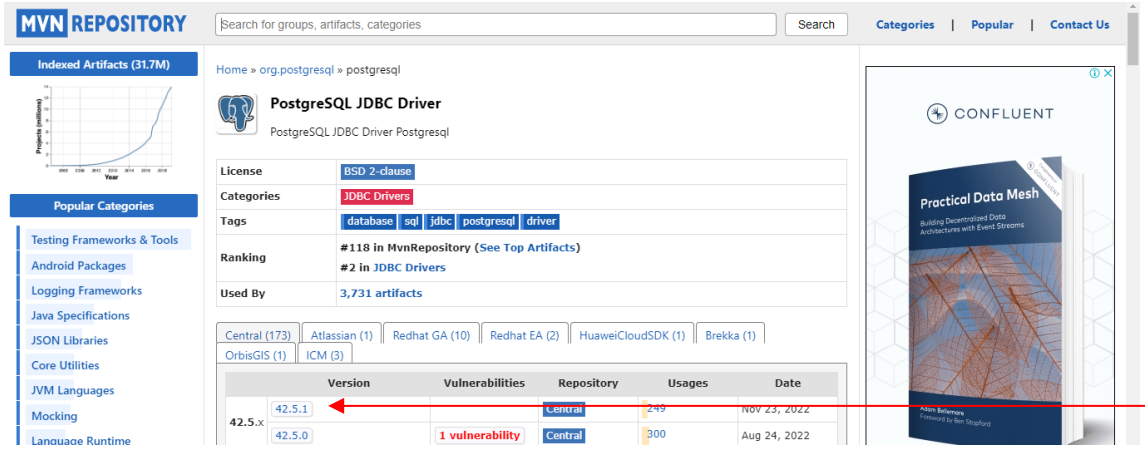
/pom.xml

Principal arquivo de configuração do framework MAVEN. É utilizado para que possamos configurar quais bibliotecas serão instaladas no nosso projeto.

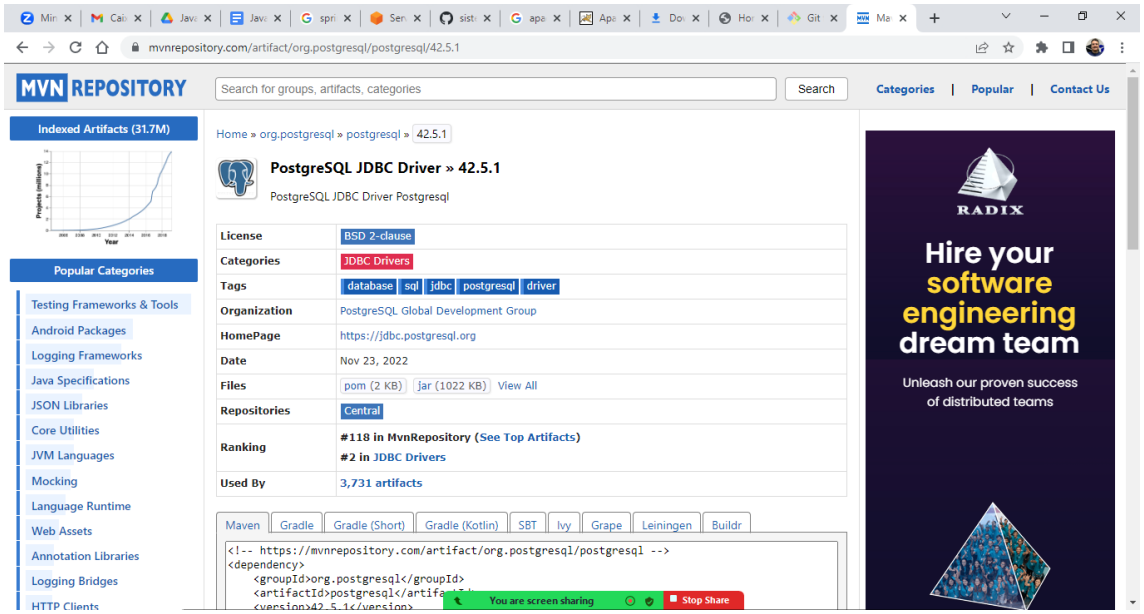


Adicionando a biblioteca do POSTGRESQL:

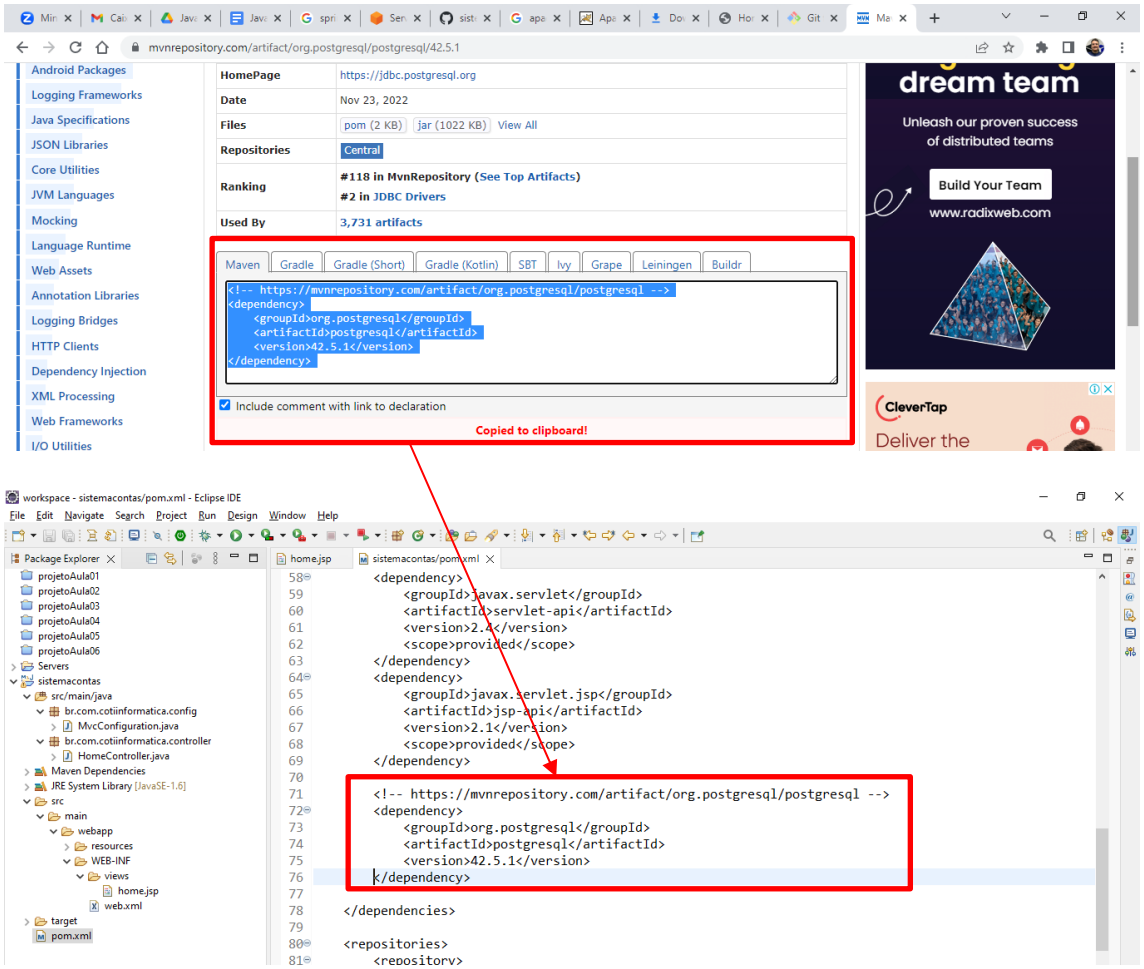




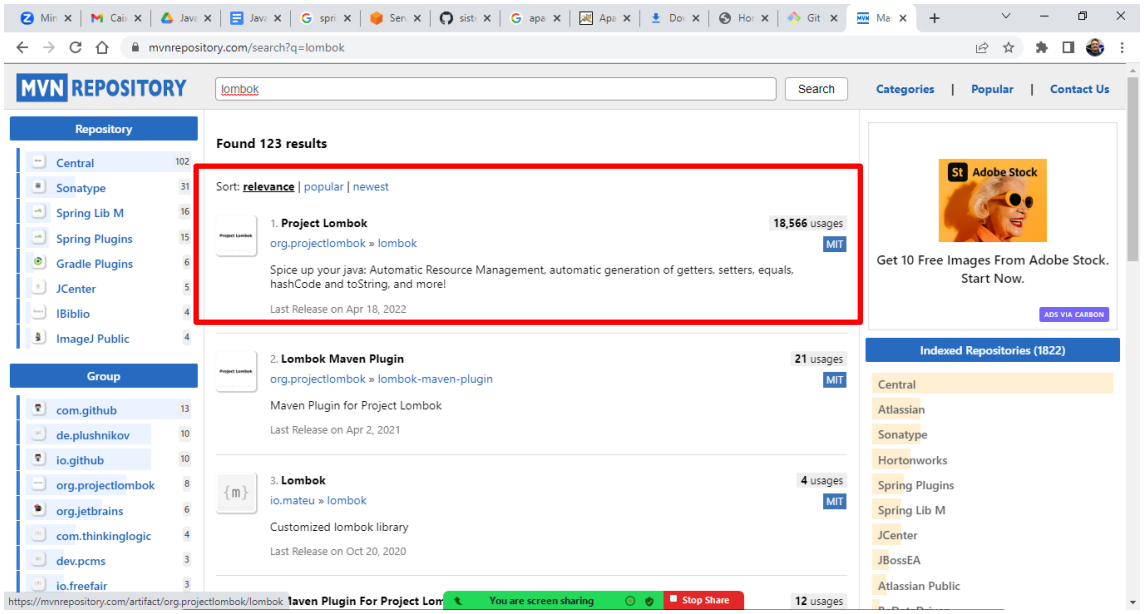
https://mvnrepository.com/artifact/org.postgresql/postgresql/42.5.1



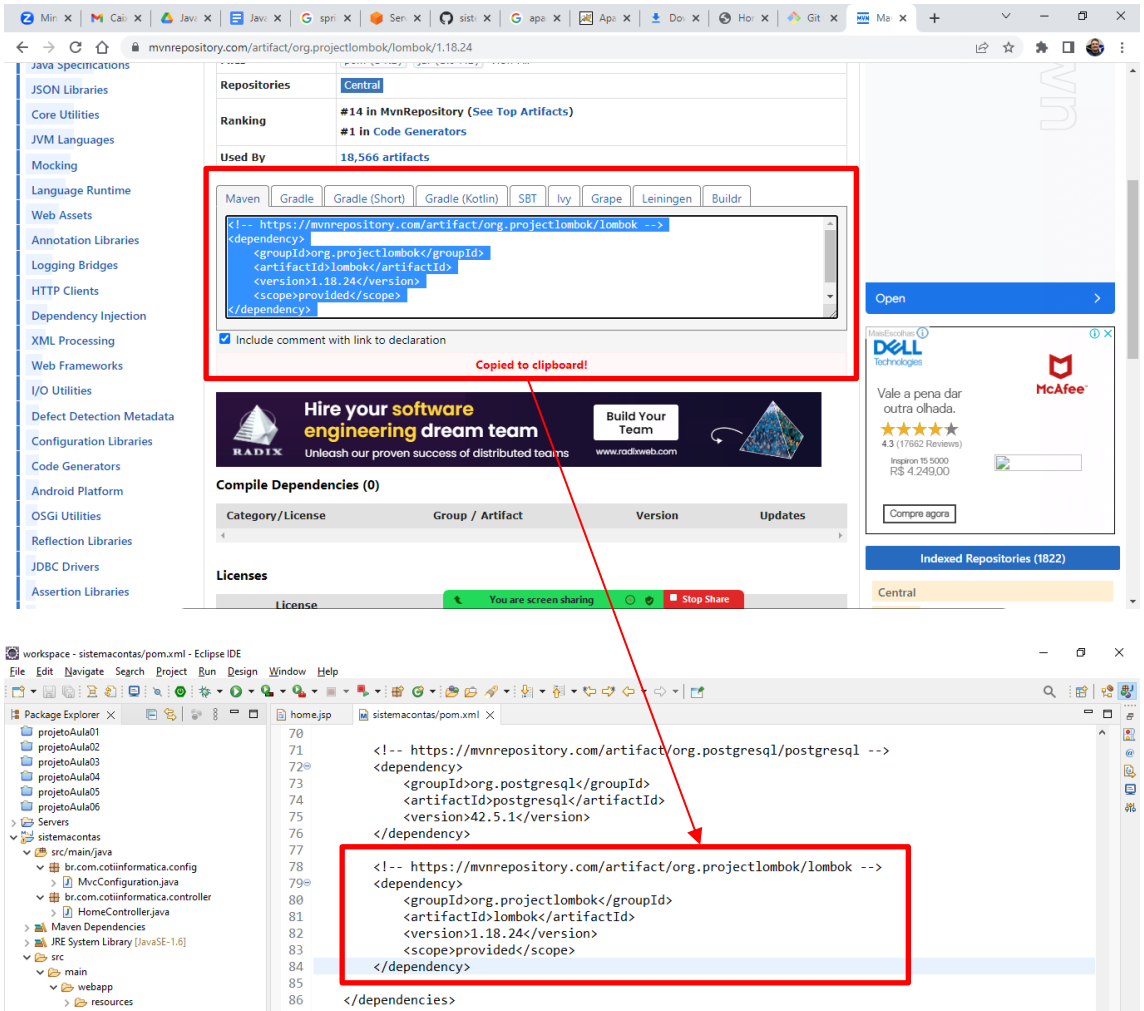
Copie o XML para incluir a referência da biblioteca no /pom.xml



Adicionando a biblioteca do LOMBOK:



https://mvnrepository.com/artifact/org.projectlombok/lombok/1.18.24



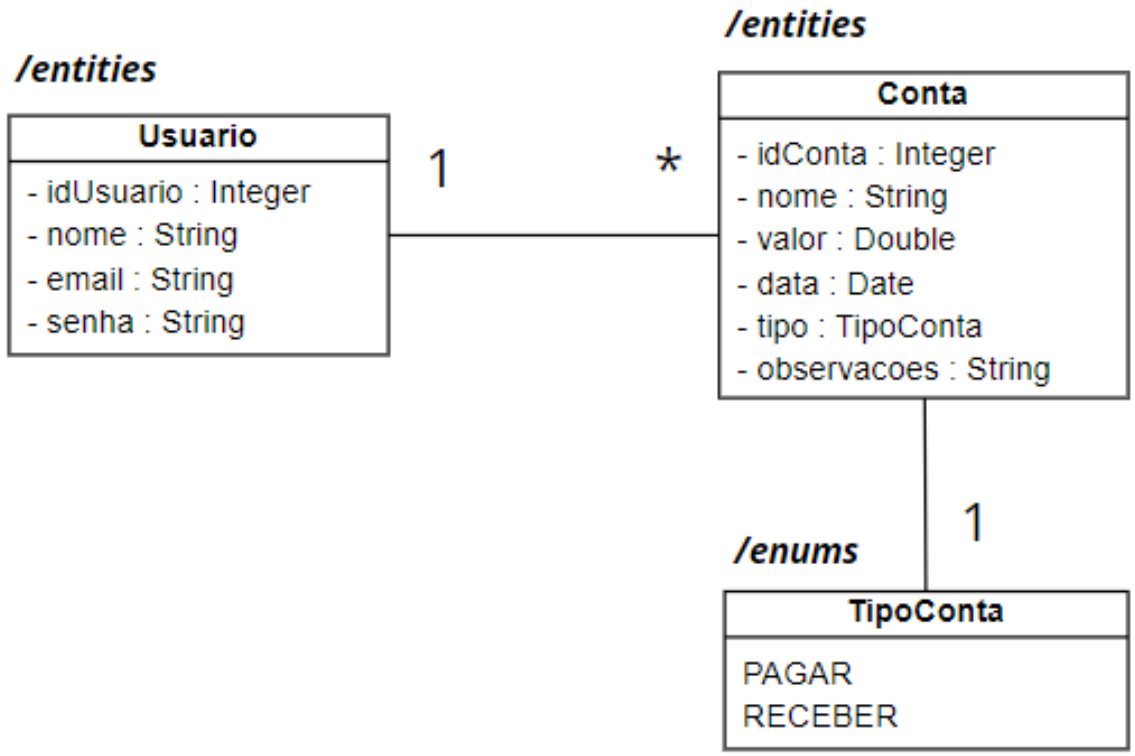
```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
http://maven.apache.org/xsd/maven-4.0.0.xsd">
	<modelVersion>4.0.0</modelVersion>

	<groupId>sistemacontas</groupId>
	<artifactId>sistemacontas</artifactId>
	<version>1.0</version>
	<packaging>war</packaging>

	<name>sistemacontas</name>
	<url>http://maven.apache.org</url>

	<properties>
		<java.version>1.6</java.version>
		<spring.version>3.1.0.RELEASE</spring.version>
		<cglib.version>2.2.2</cglib.version>
	</properties>

	<dependencies>
		<!-- Spring core & mvc -->
		<dependency>
			<groupId>org.springframework</groupId>
			<artifactId>spring-context</artifactId>
			<version>${spring.version}</version>
		</dependency>

		<dependency>
			<groupId>org.springframework</groupId>
			<artifactId>spring-webmvc</artifactId>
			<version>${spring.version}</version>
		</dependency>
		<dependency>
			<groupId>org.springframework</groupId>
			<artifactId>spring-orm</artifactId>
			<version>${spring.version}</version>
			<type>jar</type>
			<scope>compile</scope>
		</dependency>

		<dependency>
			<groupId>org.springframework</groupId>
			<artifactId>spring-test</artifactId>
			<version>${spring.version}</version>
			<type>jar</type>
			<scope>test</scope>
		</dependency>

		<!-- CGLib for @Configuration -->
		<dependency>
```

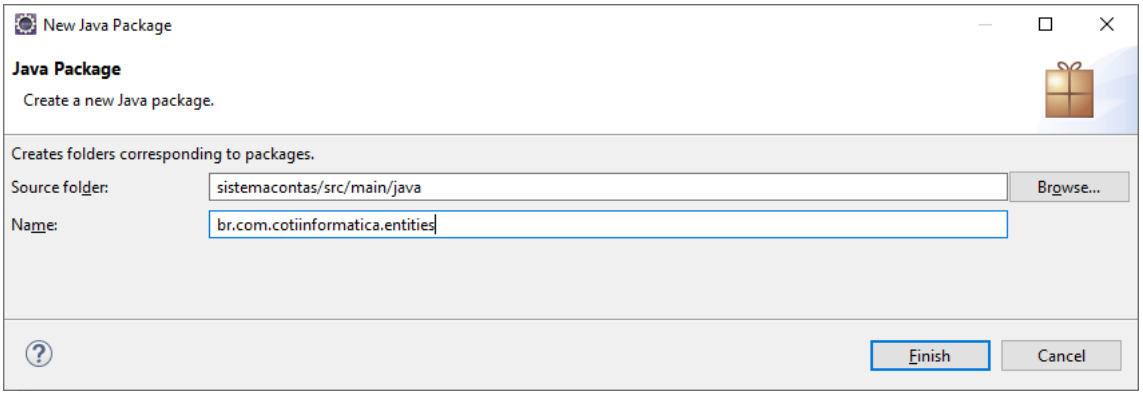
```
			<groupId>cglib</groupId>
			<artifactId>cglib-nodep</artifactId>
			<version>${cglib.version}</version>
			<scope>runtime</scope>
		</dependency>

		<!-- Servlet Spec -->
		<dependency>
			<groupId>javax.servlet</groupId>
			<artifactId>servlet-api</artifactId>
			<version>2.4</version>
			<scope>provided</scope>
		</dependency>
		<dependency>
			<groupId>javax.servlet.jsp</groupId>
			<artifactId>jsp-api</artifactId>
			<version>2.1</version>
			<scope>provided</scope>
		</dependency>

		<!-- https://mvnrepository.com/artifact
			/org.postgresql/postgresql -->
		<dependency>
			<groupId>org.postgresql</groupId>
			<artifactId>postgresql</artifactId>
			<version>42.5.1</version>
		</dependency>

		<!-- https://mvnrepository.com/artifact
			/org.projectlombok/lombok -->
		<dependency>
			<groupId>org.projectlombok</groupId>
			<artifactId>lombok</artifactId>
			<version>1.18.24</version>
			<scope>provided</scope>
		</dependency>

	</dependencies>

	<repositories>
		<repository>
			<id>springsource-milestones</id>
			<name>SpringSource Milestones Proxy</name>
			<url>https://oss.sonatype.org/content
				/repositories/springsource-milestones</url>
		</repository>
	</repositories>

	<build>
		<finalName>sistemacontas</finalName>
		<plugins>
			<plugin>
```

```
                        <groupId>org.apache.maven.plugins</groupId>
                        <artifactId>maven-compiler-plugin</artifactId>
                        <version>2.0.2</version>
                        <configuration>
                              <source>${java.version}</source>
                              <target>${java.version}</target>
                        </configuration>
                  </plugin>
            </plugins>
      </build>
</project>
```

Parte 03: Modelando as entidades do projeto

Criando as classes JavaBean para definir a primeira versão do modelo de entidades do sistema:





```
package br.com.cotiinformatica.enums;

public enum TipoConta {
	PAGAR,
	RECEBER
}
```

JavaBeans

Padrão Java para construção de classes que tem como objetivo modelar entidades de um sistema (modelo de dados). Essas classes são criadas em Java seguindo o padrão:

- Atributos privados
- Construtor sem entrada de argumentos
- Construtor com entrada de argumentos (sobrecarga de métodos)
- Métodos de encapsulamento
  - Setters
  - Getters
- Sobrescrita de métodos da classe Object

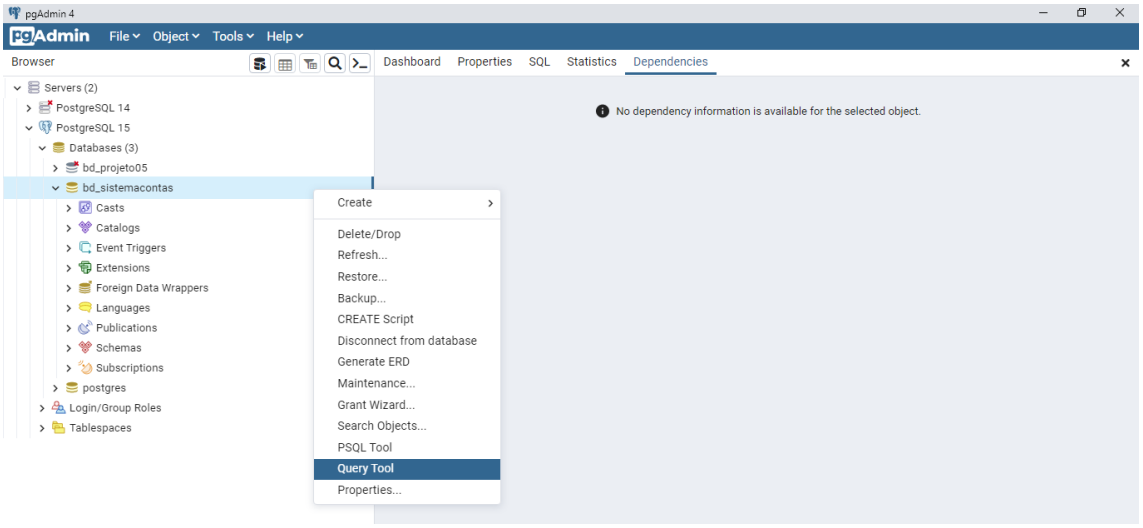
```
package br.com.cotiinformatica.entities;

import java.util.Date;

import br.com.cotiinformatica.enums.TipoConta;
import lombok.AllArgsConstructor;
import lombok.Getter;
import lombok.NoArgsConstructor;
import lombok.Setter;
import lombok.ToString;

@Setter
@Getter
@NoArgsConstructor
@AllArgsConstructor
@ToString
public class Conta {

	private Integer idConta;
	private String nome;
	private Double valor;
	private Date data;
	private TipoConta tipo;
	private String observacoes;
	private Usuario usuario;
}
```

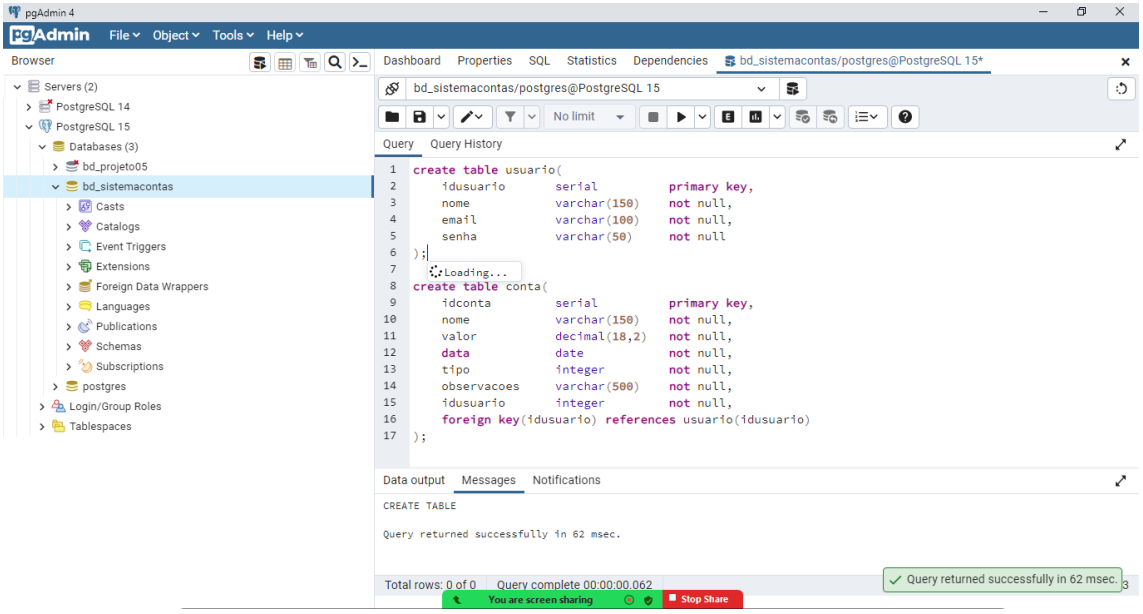
```java
package br.com.cotiinformatica.entities;

import java.util.List;

import lombok.AllArgsConstructor;
import lombok.Getter;
import lombok.NoArgsConstructor;
import lombok.Setter;
import lombok.ToString;

@Setter
@Getter
@NoArgsConstructor
@AllArgsConstructor
@ToString
public class Usuario {

	private Integer idUsuario;
	private String nome;
	private String email;
	private String senha;
	private List<Conta> contas;
}
```

Script para criação das tabelas no banco de dados:

```sql
create table usuario(
	idusuario	serial		primary key,
	nome		varchar(150)	not null,
	email		varchar(100)	not null,
	senha		varchar(50)		not null
);

create table conta(
	idconta		serial		primary key,
	nome		varchar(150)	not null,
	valor		decimal(18,2)	not null,
	data		date		not null,
	tipo		integer		not null,
	observacoes	varchar(500)	not null,
	idusuario	integer		not null,
	foreign key(idusuario) references usuario(idusuario)
);
```

Executando no PostGreSQL:



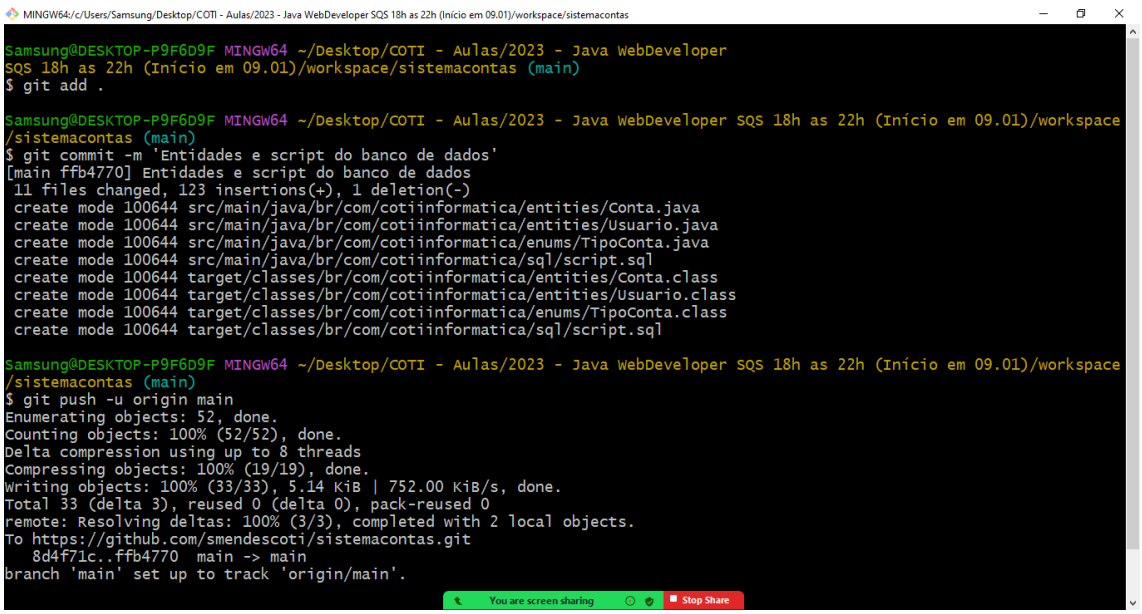


Fazendo o commit do trabalho para o GITHUB:

```
Samsung@DESKTOP-P9F6D9F MINGW64 ~/Desktop/COTI - Aulas/2023 - Java WebDeveloper SQS 18h as 22h (Início em 09.01)/workspace/sistemacontas (main)
$ git add .

Samsung@DESKTOP-P9F6D9F MINGW64 ~/Desktop/COTI - Aulas/2023 - Java WebDeveloper SQS 18h as 22h (Início em 09.01)/workspace/sistemacontas (main)
$ git commit -m 'Entidades e script do banco de dados'
```

Fazendo o PUSH:

```
Samsung@DESKTOP-P9F6D9F MINGW64 ~/Desktop/COTI - Aulas/2023 - Java WebDeveloper SQS 18h as 22h (Início em 09.01)/workspace/sistemacontas (main)
$ git push -u origin main
```



https://github.com/smendescoti/sistemacontas