0. Видове deploy-ване

Два варианта:

0.1. On-Premise (On-Prem)

имаме собствен сървър или си ко-локираме купената от нас машина в специално нато помещение.

0.2. Cloud

Ние не притежаваме такива сървърни машини, но си плащаме да ползваме

Unmanaged Solution

Имаме достъп до виртуална cloud машина (лимит за трафик, ядра на машината, и т.н.)
Например Tier plan – първоначално безплатно, и когато имаме повече потребители/трафик, то си плащаме

Managed Solution

Не само не се грижим за физически за ядрата и машината, но направо си качваме проекта някъде.

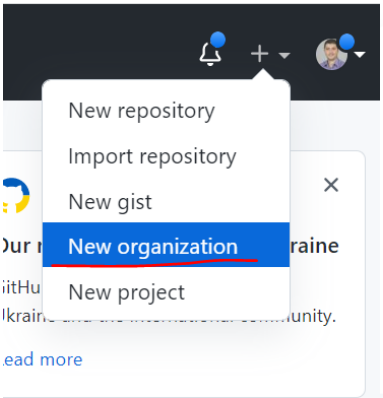
Server application

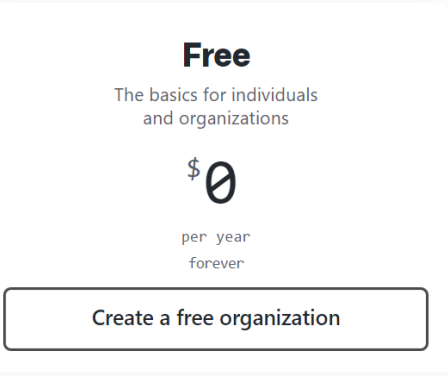
API Rest application – Back4Up, SoftUni server, database services, etc.

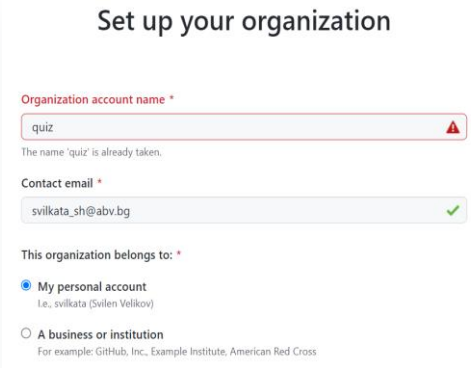
Client-Side application

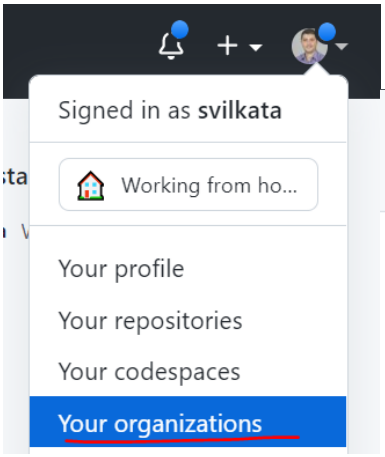
1. Deploying site in Host Github.io (GitHub pages) + VSC (JS Node)

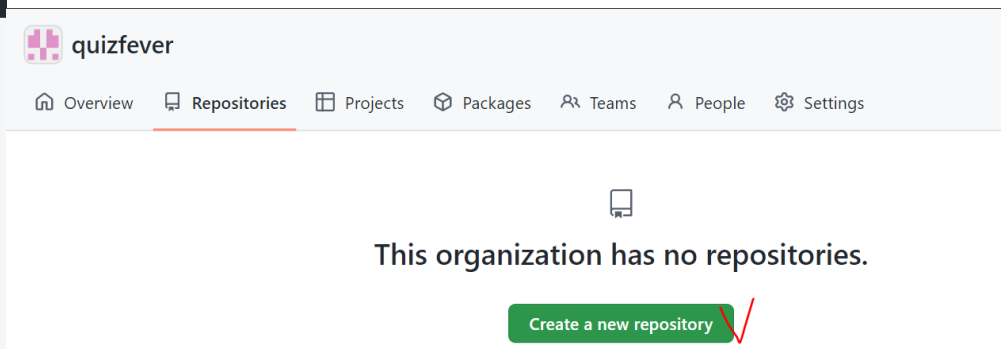
1.1. Настройки в GitHub

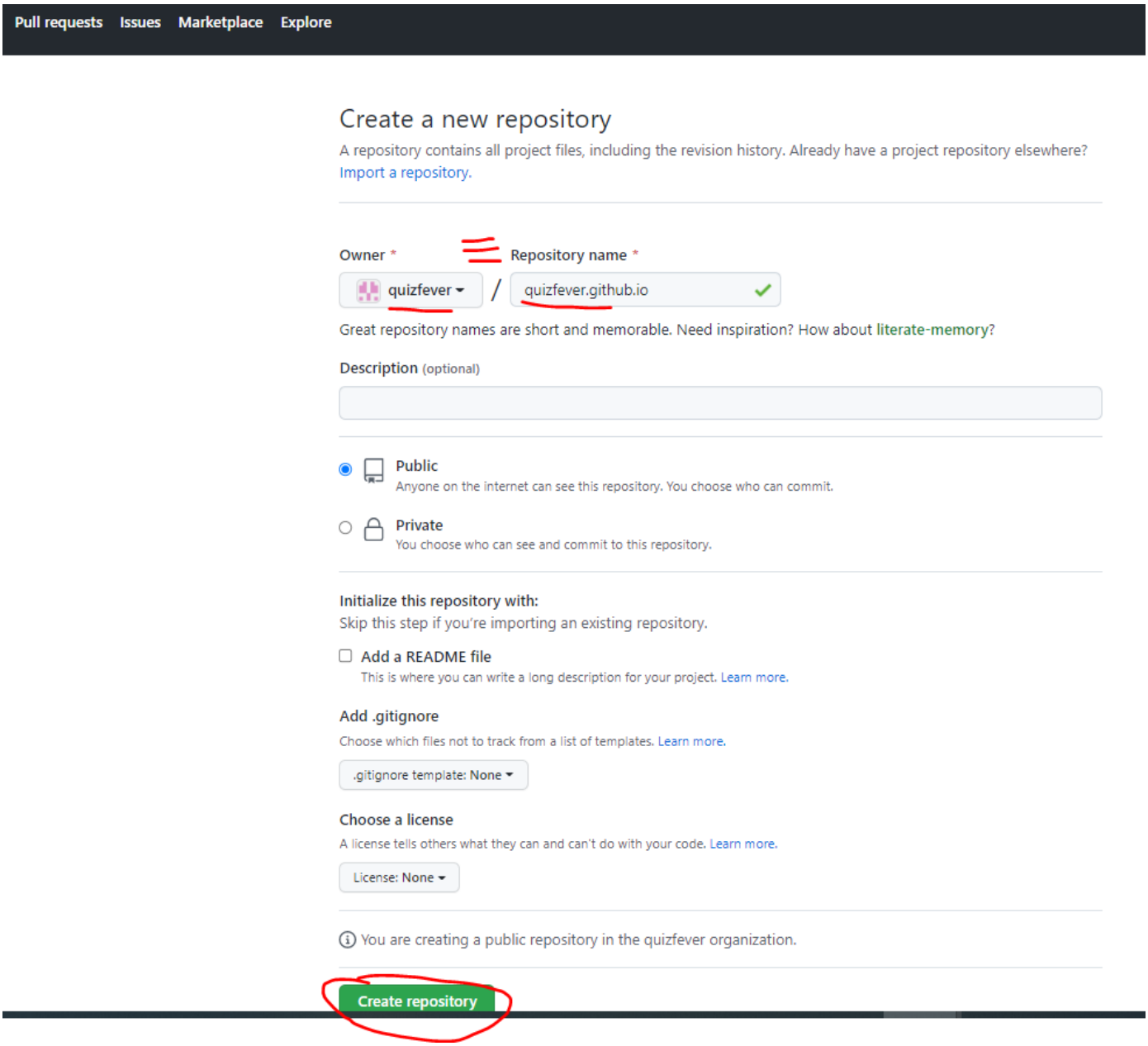


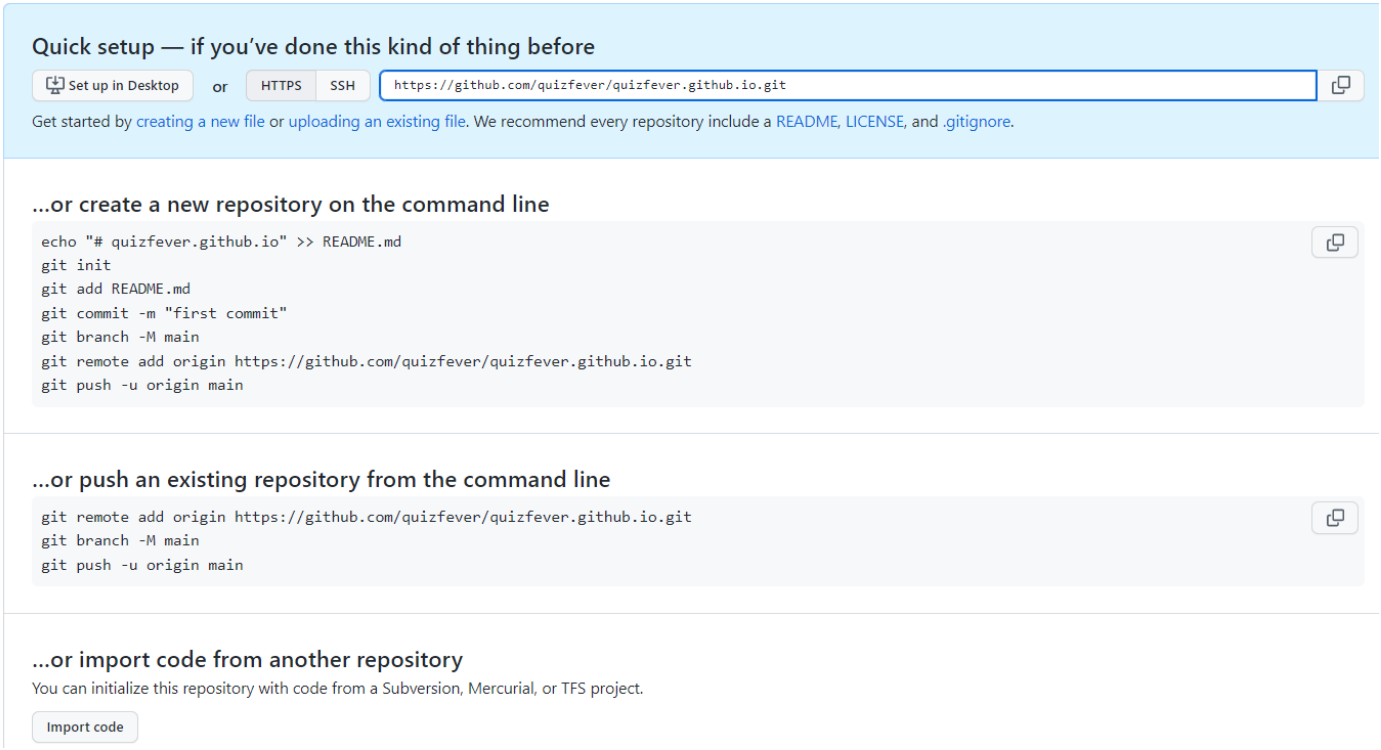




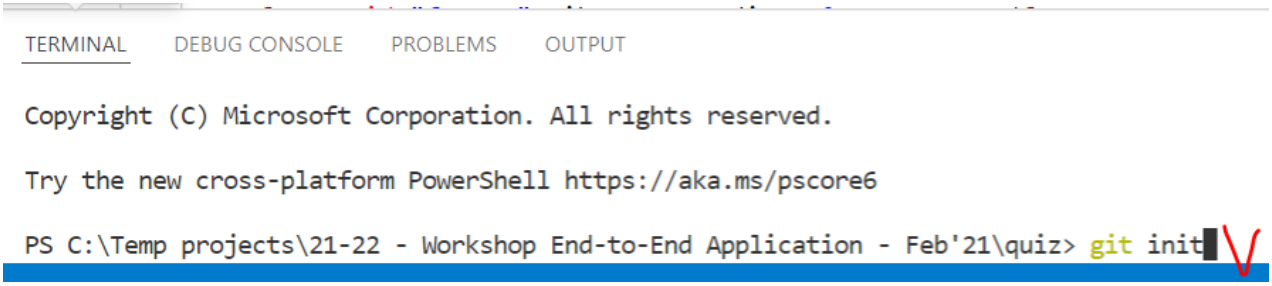

Signed in as svilkata
Working from ho...
Your profile
Your repositories
Your codespaces
Your organizations


quizfever
Overview
Repositories
Projects
Packages
Teams
People
Settings
This organization has no repositories.
Create a new repository


Pull requests
Issues
Marketplace
Explore
Create a new repository
A repository contains all project files, including the revision history. Already have a project repository elsewhere?
Import a repository.
Owner *
Repository name *
quizfever
quizfever.github.io
Great repository names are short and memorable. Need inspiration? How about literate-memory?
Description (optional)
Public
Anyone on the internet can see this repository. You choose who can commit.
Private
You choose who can see and commit to this repository.
Initialize this repository with:
Skip this step if you're importing an existing repository.
Add a README file
This is where you can write a long description for your project. Learn more.
Add .gitignore
Choose which files not to track from a list of templates. Learn more.
.gitignore template: None
Choose a license
A license tells others what they can and can't do with your code. Learn more.
License: None
You are creating a public repository in the quizfever organization.
Create repository



1.2. Инициализиране на GitHub в VSC(Node.js)



1.3. Добавяне на .gitignore файл

```
TERMINAL  DEBUG CONSOLE  PROBLEMS  OUTPUT

PS C:\Temp projects\21-22 - Workshop End-to-End Application - Feb'21\quiz> git init
Initialized empty Git repository in C:/Temp projects/21-22 - Workshop End-to-End Application - Feb'21/quiz/.git/
PS C:\Temp projects\21-22 - Workshop End-to-End Application - Feb'21\quiz> git add .gitignore
PS C:\Temp projects\21-22 - Workshop End-to-End Application - Feb'21\quiz> git commit -m "added ignore file"
[master (root-commit) f7b3c11] added ignore file
 1 file changed, 1 insertion(+)
 create mode 100644 .gitignore
```

1.4. Добавяне на readme.md файл

Ние сме си го създали вече този файл локално – описание/документация на проекта

1.5. Определяне на главна директория на repo-то и свързването й с GitHub

…or push an existing repository from the command line

```
PS C:\Temp projects\21-22 - Workshop End-to-End Application - Feb'21\quiz> git branch -M master
PS C:\Temp projects\21-22 - Workshop End-to-End Application - Feb'21\quiz> git remote add origin https://github.com/quizfever/quizfeve
o.git
```

```
git remote add origin https://github.com/movies-softuni/movies-softuni.github.io.git
```

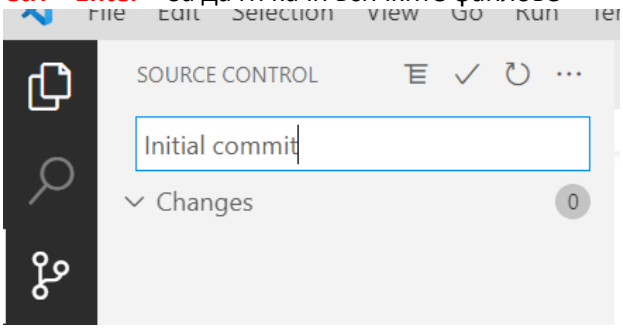
```
git branch -M main   да не го правим – да си сменим master на main
```

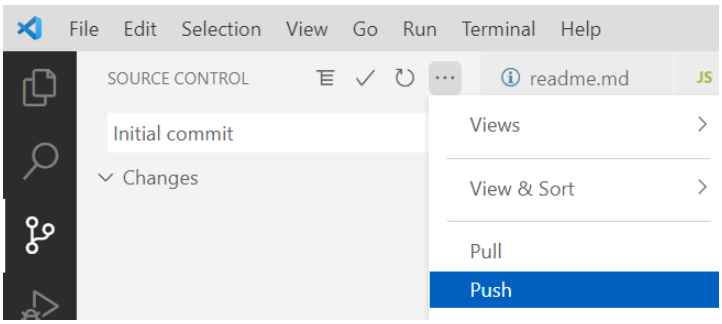
1.6. Push

```
PS C:\Temp projects\21-22 - Workshop End-to-End Application - Feb'21\quiz> git push -u origin master
info: please complete authentication in your browser...
```

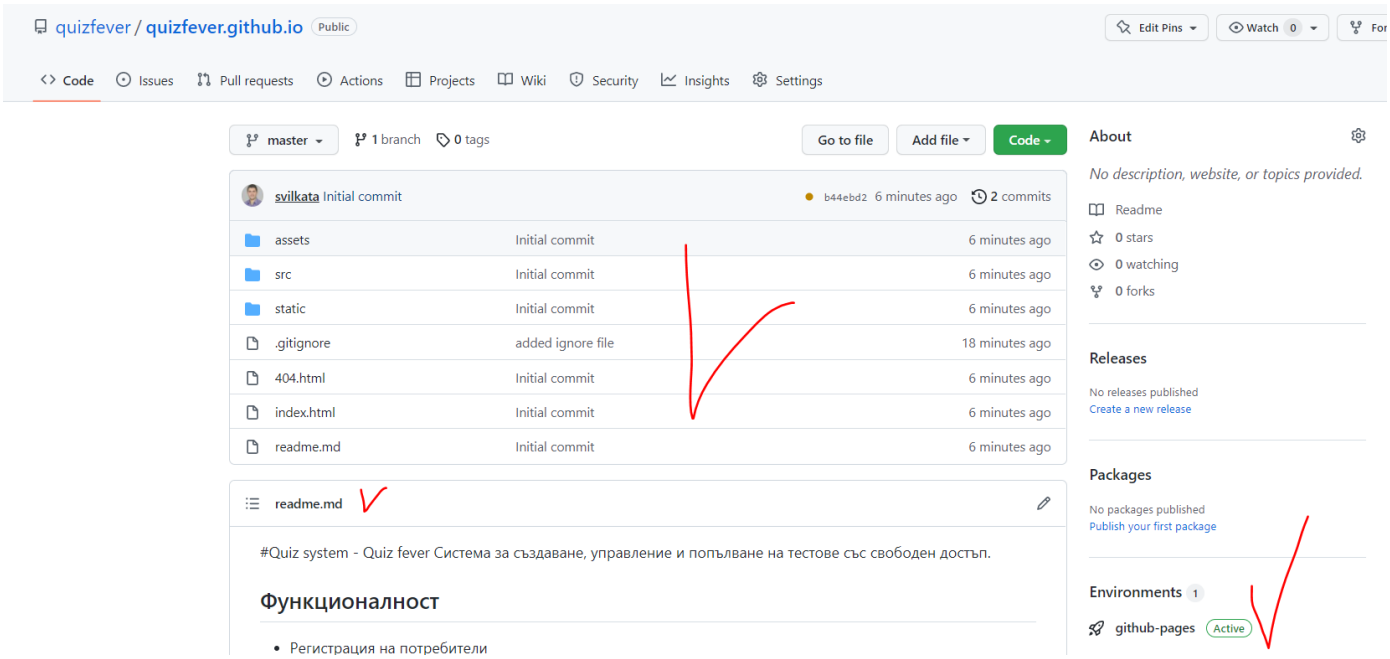
1.7. Initial commit from VSC interface

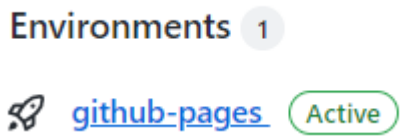
Ctrl + Enter – за да ги качи всичките файлове

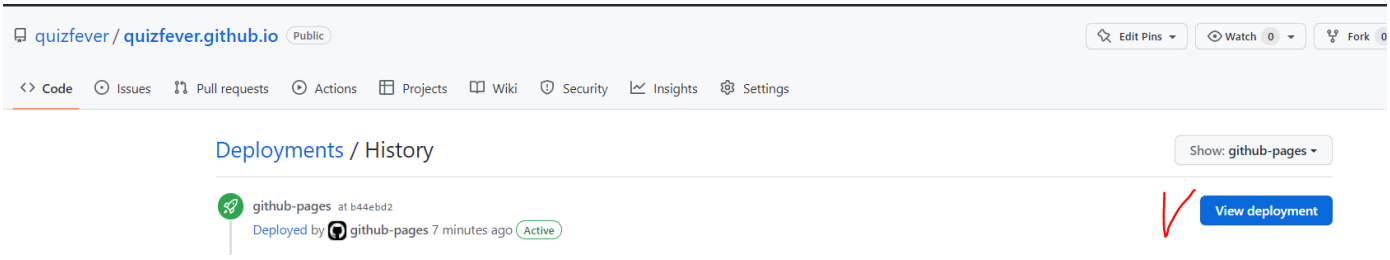




1.8. We can see the result in the web of GitHub







1.9. Back4Up или друг BaaS – тестване на http заявки

1. x Initialize project
2. x Copy / api
3. x Create Back4Up app
4. View documentation on Users
5. x Adjust api.js to include AppID, APIKey, correct headers, register/login/logout routes and bodies
6. x Test register/login/logout
7. Examine Database Browser, create Quiz collection
8. x Create CRUD functions for Quiz collection
9. x Test Quiz collection, confirm it is pubpic for read/write, NO Add field CLP
10. View documentation on security, ACL, CLP
11. x Configure public read, authenticated write, NO add field CLP
12. x Test read/write
13. x Configure owner pointer
14. x Adjust data.js to include owner pointer on create - { __type: 'Pointer', className: 'User'}

15. x Test owner protection
16. x Add query to include owner on GET
17. x Create Question collection, configure CLP, owner pointer, Quiz pointer
18. x Create CRUD functions for Question collection, with owner protection
19. x Test Question collection
(20. Proceed with implementation of views)

1.10. Generating the package.json file and installing external libraries

npm init -y
npm install -E lit-html page -E е за запазване

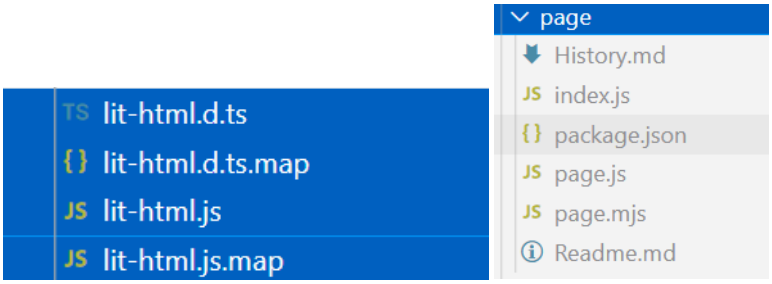
```
{
  "name": "quiz",
  "version": "1.0.0",
  "description": "Система за създаване, управление и попълване на тестове със свободен достъп.",
  "main": "index.html",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "repository": {
    "type": "git",
    "url": "git+https://github.com/quizfever/quizfever.github.io.git" //автоматично се генерира и път към git репото
  },
  "keywords": [],
  "author": "",
  "license": "ISC",
  "bugs": {
    "url": "https://github.com/quizfever/quizfever.github.io/issues"
  },
  "homepage": "https://github.com/quizfever/quizfever.github.io#readme",
  "dependencies": {
    "lit-html": "2.2.3",
    "page": "1.11.6"
  }
}
```

1.11. Re-commit from VSC interface

Ctrl + Enter – за да ги качи всичките файлове

1.12. How to deploy external libraries

Option 1) Копираме само определени файлове от node-modules



Налага се да докопираме допълнителни 2-3 файла, за да не хвърля грешка

Option 2) Вземаме директно от online CDN-а в уеб пространството

Не е добра идея защото CDN-а може да се промени

```
import page from '//unpkg.com/page/page.mjs';
import {html, render} from '//unpkg.com/lit-html?module';

export {
    page,
    html,
    render
}
```

Option 3) Най-правилния production вариант с build стъпка

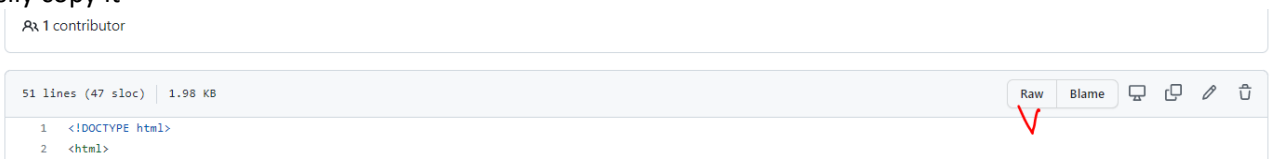
Работим си локално, и след това минава скрипт, който пакетира външните библиотеки.

- **Webpack**
- Minify.js
- Browerify
- RollUp

File 404.html - we can manually add from https://github.com/rafgraph/spa-github-pages - когато рефрешнем дадена страница на SPA, то дава грешка. И затова трябва да използваме 404.html

https://github.com/rafgraph/spa-github-pages

https://github.com/rafgraph/spa-github-pages
To easily copy it



На негово място слагаме този от https://github.com/rafgraph/spa-github-pages

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="utf-8">
    <title>Single Page Apps for GitHub Pages</title>
    <script type="text/javascript">
      // Single Page Apps for GitHub Pages
      // MIT License
      // https://github.com/rafgraph/spa-github-pages
      // This script takes the current url and converts the path and query
      // string into just a query string, and then redirects the browser
      // to the new url with only a query string and hash fragment,
      // e.g. https://www.foo.tld/one/two?a=b&c=d#qwe, becomes
      // https://www.foo.tld/?/one/two&a=b~and~c=d#qwe
      // Note: this 404.html file must be at least 512 bytes for it to work
      // with Internet Explorer (it is currently > 512 bytes)

      // If you're creating a Project Pages site and NOT using a custom domain,
      // then set pathSegmentsToKeep to 1 (enterprise users may need to set it to > 1).
      // This way the code will only replace the route part of the path, and not
      // the real directory in which the app resides, for example:
      // https://username.github.io/repo-name/one/two?a=b&c=d#qwe becomes
      // https://username.github.io/repo-name/?/one/two&a=b~and~c=d#qwe
      // Otherwise, leave pathSegmentsToKeep as 0.
      var pathSegmentsToKeep = 0;

      var l = window.location;
      l.replace(
        l.protocol + '//' + l.hostname + (l.port ? ':' + l.port : '') +
        l.pathname.split('/').slice(0, 1 + pathSegmentsToKeep).join('/') + '/?/' +
        l.pathname.slice(1).split('/').slice(pathSegmentsToKeep).join('/').replace(/&/g,
'~and~') +
        (l.search ? '&' + l.search.slice(1).replace(/&/g, '~and~') : '') +
        l.hash
      );

    </script>
  </head>
  <body>
  </body>
</html>
```

И слагаме в index.html, преди всички други script-ове, този скрипт от https://github.com/rafgraph/spa-github-pages:

1)
```
<!-- Start Single Page Apps for GitHub Pages -->
<script type="text/javascript">
    // Single Page Apps for GitHub Pages
    // MIT License
    // https://github.com/rafgraph/spa-github-pages
    // This script checks to see if a redirect is present in the query string,
    // converts it back into the correct url and adds it to the
    // browser's history using window.history.replaceState(...),
    // which won't cause the browser to attempt to load the new url.
    // When the single page app is loaded further down in this file,
    // the correct url will be waiting in the browser's history for
    // the single page app to route accordingly.
    (function(l) {
      if (l.search[1] === '/' ) {
        var decoded = l.search.slice(1).split('&').map(function(s) {
          return s.replace(/~and~/g, '&')
        }).join('?');
        window.history.replaceState(null, null,
            l.pathname.slice(0, -1) + decoded + l.hash
        );
      }
    }(window.location))
  </script>
  <!-- End Single Page Apps for GitHub Pages -->
```

2)
```
<script src="src/app.js" type="module"></script>
```

2. Deploying in Host Heroku + VSC (JS Node) – we can deploy the RestApi backend softuni server

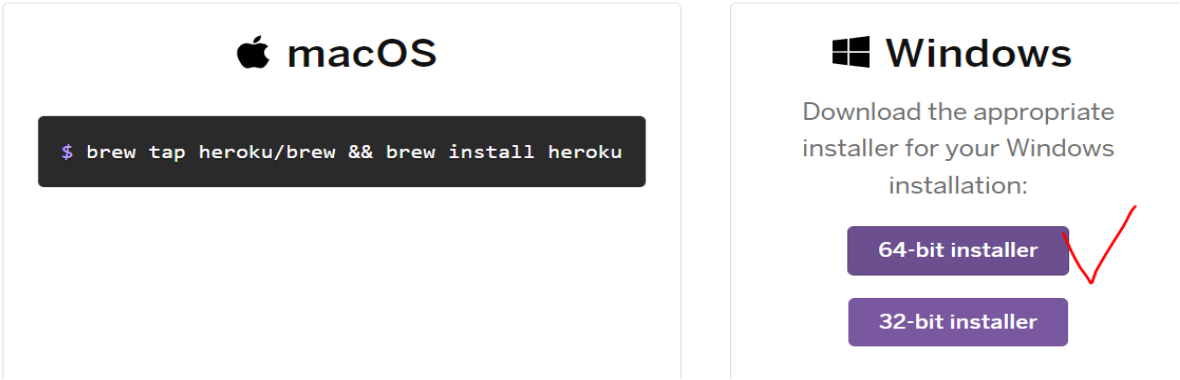
https://www.heroku.com/

2.1. Регистриране в heroku

- ➔ Register in Heroku
- ➔ Create New App

Deployment method

Download and install the Heroku CLI. - Command-Line interface



2.2. Нагласяне на SoftUni server-a

В папката apiRest_SoftUniServer

npm init -y

package.json

```
{
  "name": "apiRest_SoftUniServer",
  "version": "1.0.0",
  "description": "",
  "main": "server.js",
  "scripts": {
    "start": "node server.js"
  },
  "keywords": [],
  "author": "",
  "license": "ISC"
}
```

npm run start или npm start работи.

2.3. Да влезем в профила си в Heroku CLI

С тази команда в Shell-а, която пак ще ни отведе до login страницата на Heroku.

heroku login

```
To install heroku-repo:
heroku plugins:install heroku-repo
```

2.4. Create a new Git repository and deploy it

git init

heroku git:remote -a movies-softuni

git add .

git status

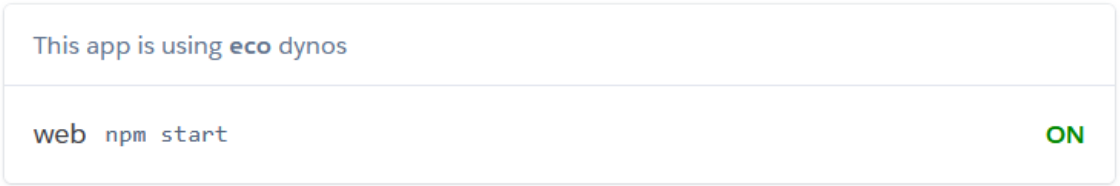
git commit -am "Initial commit" - -а означава всичко, което е модифицирано, го качвай

git push heroku master

```
svilk@SVILKATA MINGW64 ~/OneDrive/Soft Engineer/JAVA & JS path/PROJECTS/21-22 - Worskhop End to
End app - .fetch.then - heroku - firebase/apiRest_SoftUniServer (master)
$ git push heroku master
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 20 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 386 bytes | 386.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0), pack-reused 0
remote: Updated 10 paths from d037df0
remote: Compressing source files... done.
remote: Building source:
remote:
remote: -----> Building on the Heroku-20 stack
remote: -----> Using buildpack: heroku/nodejs
remote: -----> Node.js app detected
remote:
remote: -----> Creating runtime environment
remote:
remote:        NPM_CONFIG_LOGLEVEL=error
remote:        NODE_VERBOSE=false
remote:        NODE_ENV=production
remote:        NODE_MODULES_CACHE=true
remote:
remote: -----> Installing binaries
remote:        engines.node (package.json):  unspecified
remote:        engines.npm (package.json):   unspecified (use default)
remote:
remote:        Resolving node version 20.x...
remote:        Downloading and installing node 20.11.0...
remote:        Using default npm version: 10.2.4
remote:
remote: -----> Restoring cache
remote:        Cached directories were not restored due to a change in version of node, npm,
yarn or stack
remote:        Module installation may take longer for this build
remote:
remote: -----> Installing dependencies
remote:        Installing node modules (package.json)
remote:
remote:        up to date, audited 1 package in 638ms
remote:
remote:        found 0 vulnerabilities
remote:
remote: -----> Build
remote:
remote: -----> Caching build
remote:        - node_modules (nothing to cache)
remote:
remote: -----> Pruning devDependencies
remote:
remote:        up to date, audited 1 package in 300ms
remote:
remote:        found 0 vulnerabilities
remote:
remote: -----> Build succeeded!
remote: -----> Discovering process types
remote:        Procfile declares types     -> (none)
remote:        Default types for buildpack -> web
remote:
remote: -----> Compressing...
remote:        Done: 44.7M
```

```
remote: -----> Launching...
remote:        Released v5
remote:        https://movies-softuni.herokuapp.com/ deployed to Heroku
remote:
remote: This app is using the Heroku-20 stack, however a newer stack is available.
remote: To upgrade to Heroku-22, see:
remote: https://devcenter.heroku.com/articles/upgrading-to-the-latest-stack
remote:
remote: Verifying deploy... done.
To https://git.heroku.com/movies-softuni.git
   2d16b74..0ecc0b4  master -> master
```

Също така трябва и ръчно да активираме даденото приложение от Heroku:



Нашият софтУни сървър не е направен да се качва в Heroku, затова трябва да му зададем автоматичен порт, и хероку сам да си определя на кой порт да се рънва.

```
const server = http__default['default'].createServer(requestHandler(plugins, services));
```

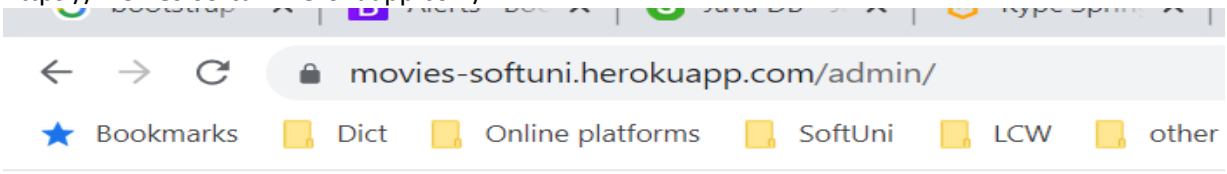
```
    const port = 3030;
    const port = process.env.PORT || 3030; //така ще тръгне в Heroku, и ще бачка и без да използваме heroku

    server.listen(port);
    console.log(`Server started on port ${port}. You can make requests to http://localhost:${port}/`);
    console.log(`Admin panel located at http://localhost:${port}/admin`);

    var softuniPracticeServer = {

    };

    return softuniPracticeServer;
```

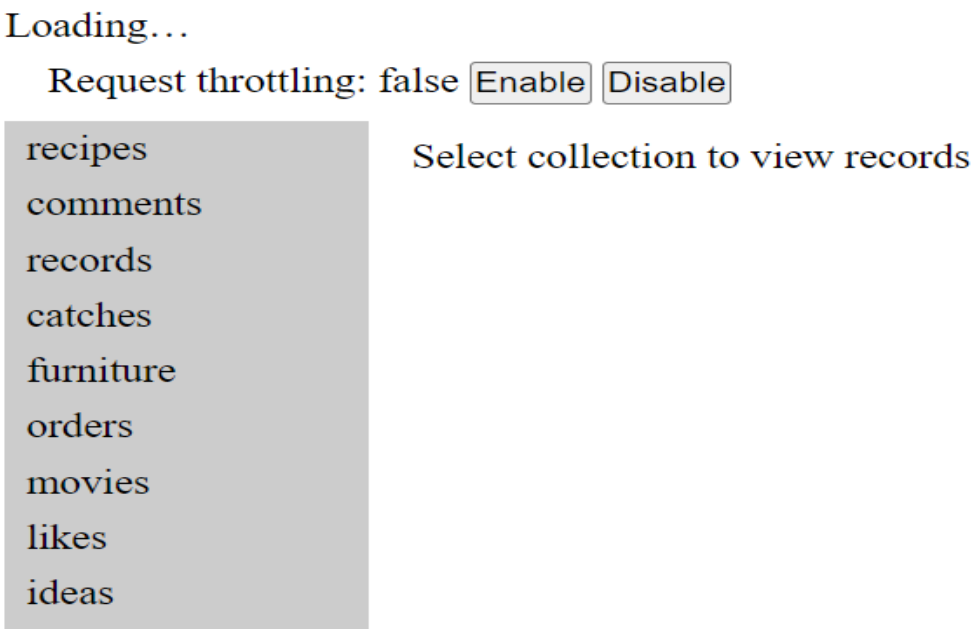
git add . може и без тази команда, защото следващата команда е -a (-a означава всичко, което е модифицирано, го качвай)

git commit -am "Add port env. variable"

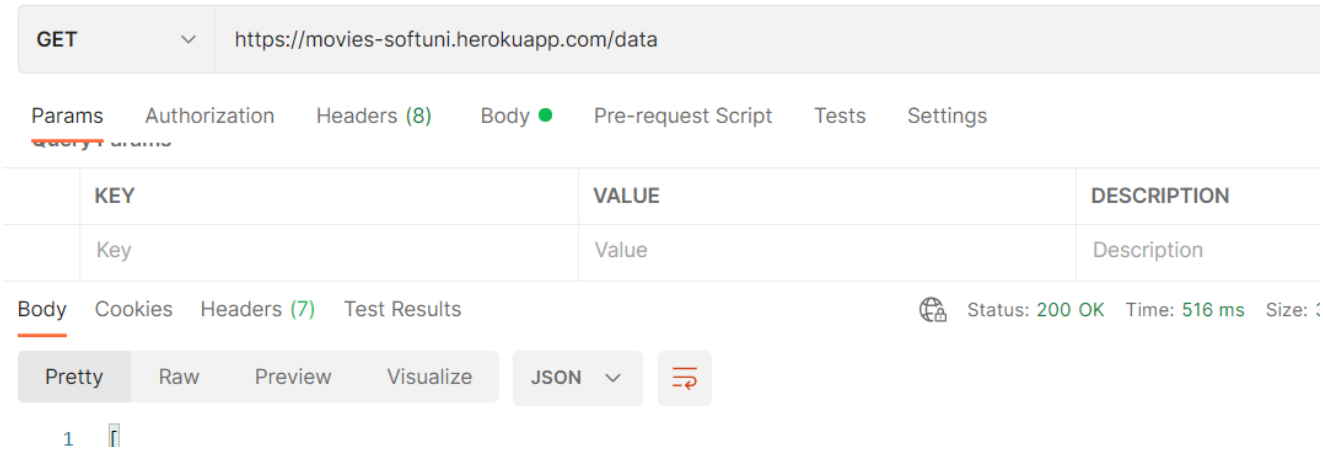
git push heroku master

https://**movies-softuni**.herokuapp.com/





И вече softUni сервър работи стартиран от интернет пространството



2.5. Front-End/Client server we make via github pages -> new organization

Сменяме и base URL адреса на backend услугата:

```
// export const baseUrl = 'http://localhost:3030';
export const baseUrl = 'https://movies-softuni.herokuapp.com';  //URL-то на SoftUni server, който качихме в Heroku.
```

CORS - Access-Control-Allow-Origin

Няма нужда

```
options.headers['Access-Control-Allow-Origin'] = '*';
```

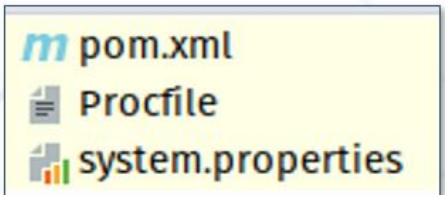
re-run on the local lite-server for example

```
Access-Control-Allow-Origin: *
Access-Control-Allow-Origin: <origin>
Access-Control-Allow-Origin: null
```

Ако имаме в requester.js console.log(response) и се чупи.

2.6. Procfile and system.properties for Java web application

- Before running our project, we should add **3 important keys** to deploy the project
- Create 2 new files in our **project folder**
  - **Procfile**
  - **system.properties**



System.properties

- system.properties
  - Holds **all of the system configuration properties** needed to run the project
  - By default, Heroku uses JDK Version 1.8
  - To specify specific version:

java.runtime.version={version}
java.runtime.version=17
java.runtime.version=11

Procfile

- Procfile
  - Holds the executed commands by the application on startup
  - Should include:

Където се намира jar-а
web: java -jar target/{name}-{version}.jar - за Maven
web: java -jar build/libs/{name}-{version}.jar - за Gradle

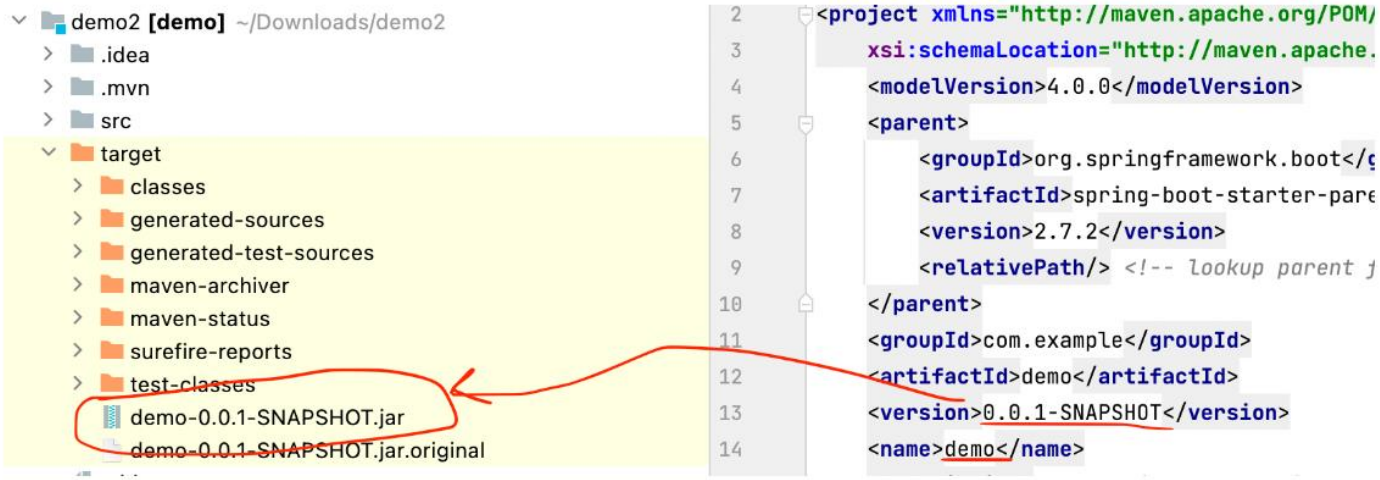
```
web: java -jar build/libs/books.jar
```

build.gradle

```
group = 'bg.softuni'
version = '0.0.1-SNAPSHOT'
sourceCompatibility = '17'
```

pom.xml

```
<version>1.0.0-SNAPSHOT</version>
<name>project_name</name>
```

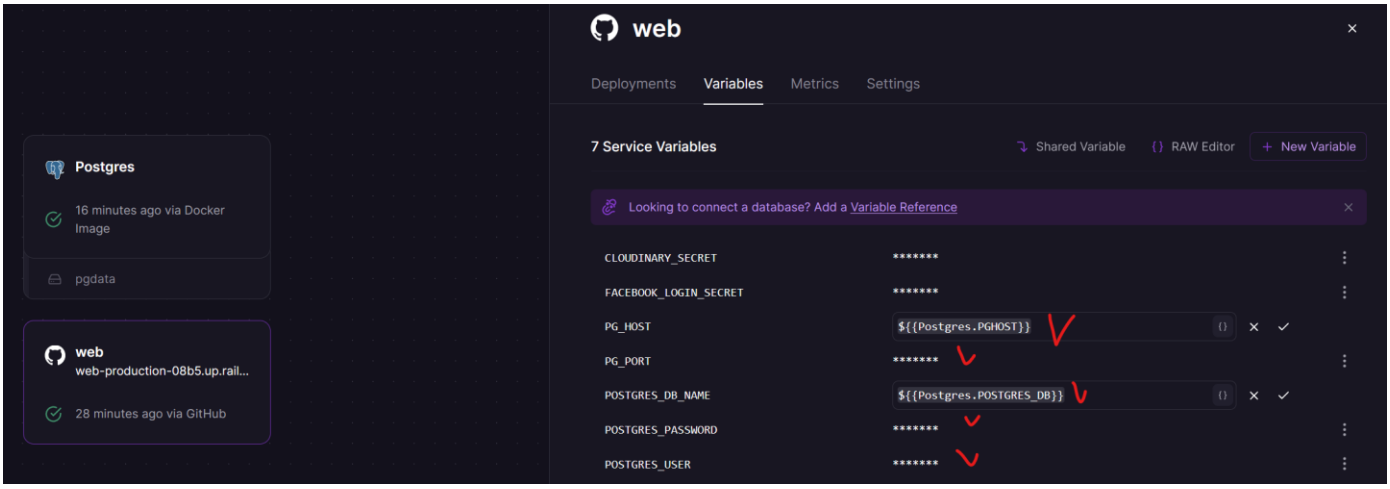


3. Deploying in Host Railway

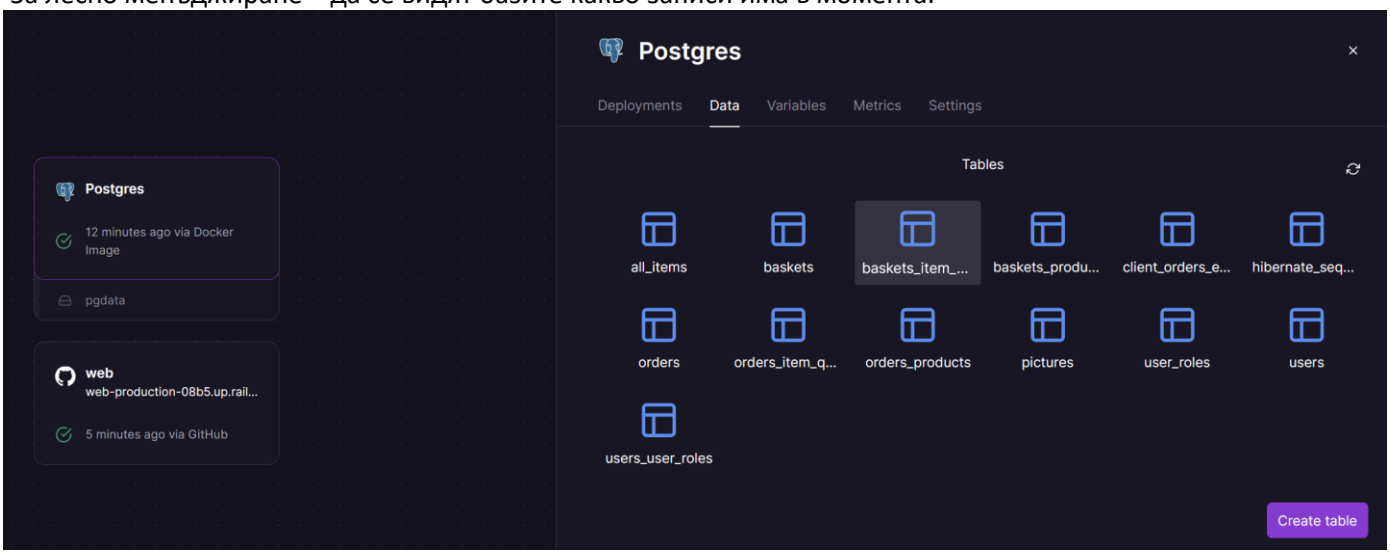
https://railway.app

application.yml

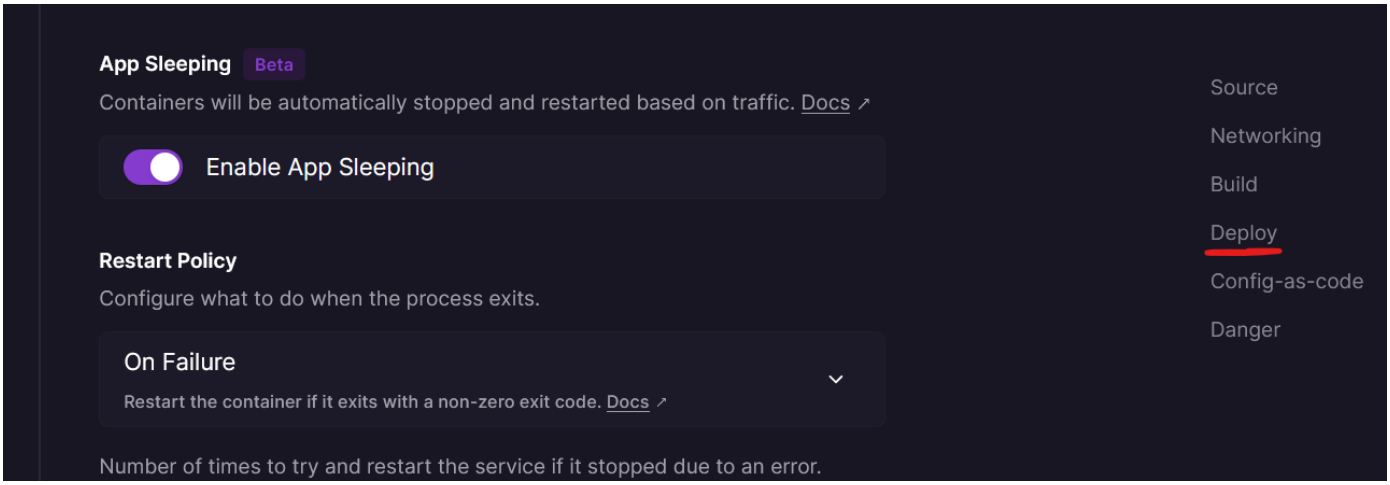
```
#    railway deployment
driverClassName: org.postgresql.Driver
url: jdbc:postgresql://${PG_HOST}:${PG_PORT}/${POSTGRES_DB_NAME}
username: ${POSTGRES_USER}
password: ${POSTGRES_PASSWORD}
hikari:
  connection-timeout: 30000
  maximum-pool-size: 10
```



За лесно менъджиране – да се видят базите какво записи има в момента.



App sleeping only for [Priority Boarding](#) members.
https://docs.railway.app/reference/app-sleeping
To become a priority boarding, you should only connect to Discord and enter that channel priority boarding.
Then, all you need to do is to activate the sleeping feature from here:



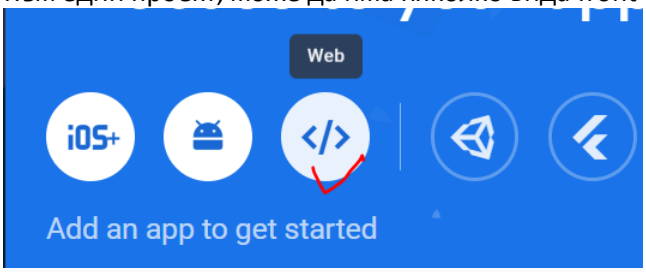
Heroku and Railway accept hosting Node JS applications, in particular a Node JS server application.

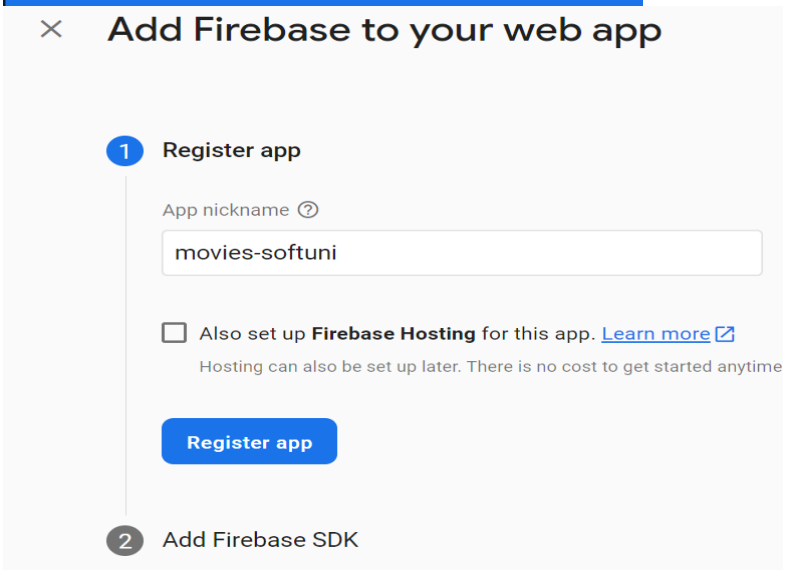
4. Deploying in Host Firebase + VSC (JS Node) – we can deploy front-end client server

https://console.firebase.google.com - login with gmail account

movies-softuni

Към един проект, може да има няколко вида front-end – за мобилно устройство Android, за web, за apple,





Set up Firebase Hosting

1 **Install Firebase CLI**

To host your site with Firebase Hosting, you need the Firebase CLI (a command line tool).

Run the following npm command to install the CLI or update to the latest CLI version.

```
$ npm install -g firebase-tools
```

Command-Line interface

✓ Install Firebase CLI

2 **Initialize your project**

Open a terminal window and navigate to or create a root director

Sign in to Google

```
$ firebase login
```

Initiate your project

Run this command from your app's root directory:

```
$ firebase init
```

Next

```
PS C:\Temp projects\21-22 - Worskhop End to End app - .fetch.then - heroku\movies> firebase init
Debugger listening on ws://127.0.0.1:58254/4ea050e9-62b6-46b5-a8f7-be6ed812412b
For help, see: https://nodejs.org/en/docs/inspector
Debugger attached.

     ######## #### ########  ######## ########     ###    ######  ########
     ##        ##  ##     ## ##       ##     ##  ##   ##  ##       ##
     ######    ##  ########  ######   ########  #########  ######  ######
     ##        ##  ##    ##  ##       ##     ## ##     ##       ## ##
     ##       #### ##     ## ######## ########  ##     ##  ######  ########

You're about to initialize a Firebase project in this directory:

  C:\Temp projects\21-22 - Worskhop End to End app - .fetch.then - heroku\movies

Before we get started, keep in mind:

  * You are currently outside your home directory

? Are you ready to proceed? Yes
? Which Firebase features do you want to set up for this directory? Press Space to select features, then Enter to confirm your c
es. (Press <space> to select, <a> to toggle all, <i> to invert selection, and <enter> to proceed)
 ( ) Realtime Database: Configure a security rules file for Realtime Database and (optionally) provision default instance
 ( ) Firestore: Configure security rules and indexes files for Firestore
 ( ) Functions: Configure a Cloud Functions directory and its files
>(*) Hosting: Configure files for Firebase Hosting and (optionally) set up GitHub Action deploys
 ( ) Hosting: Set up GitHub Action deploys
 ( ) Storage: Configure a security rules file for Cloud Storage
 ( ) Emulators: Set up local emulators for Firebase products
(Move up and down to reveal more choices)
```

Enter

```
? Please select an option:
> Use an existing project
  Create a new project
  Add Firebase to an existing Google Cloud Platform project
  Don't set up a default project
```

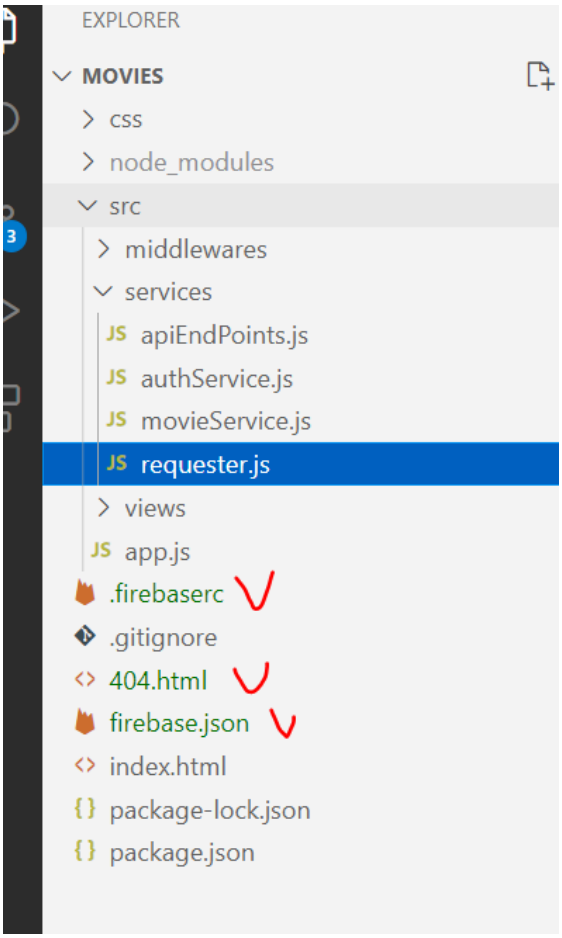
Enter

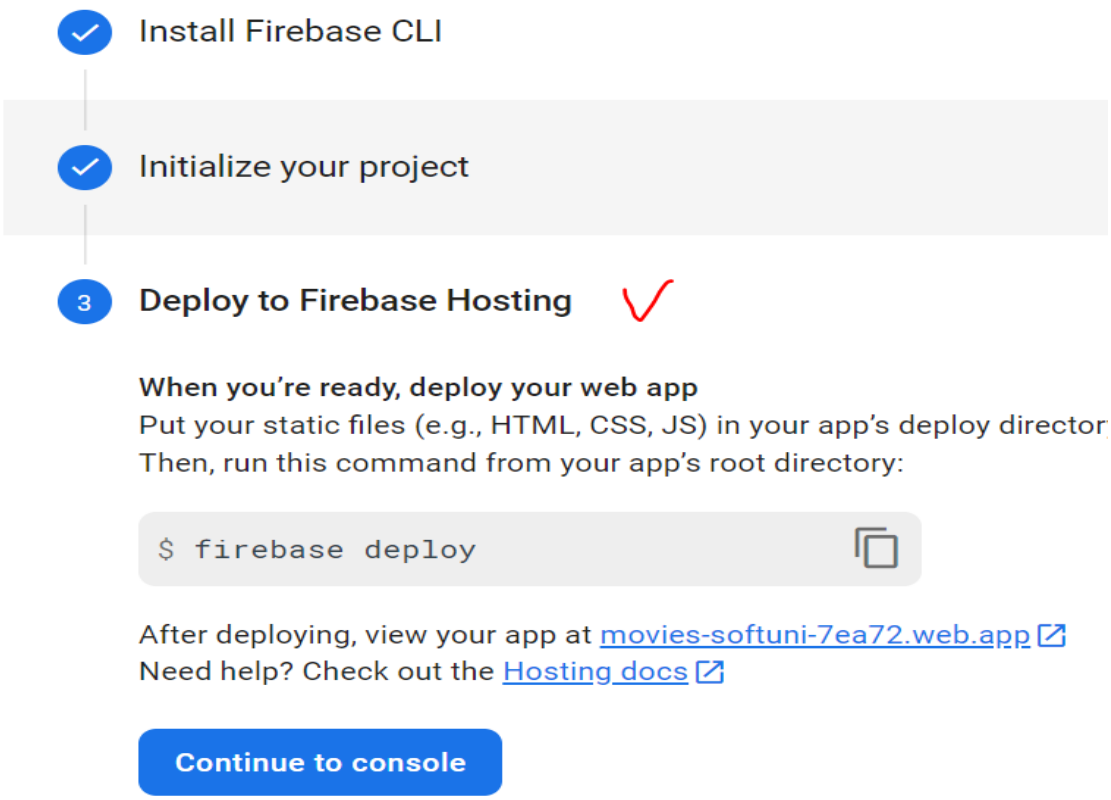
```
? Please select an option: Use an existing project
? Select a default Firebase project for this directory:
> movies-softuni-7ea72 (movies-softuni)
  svilenproject (SvilenProject)
```

Enter

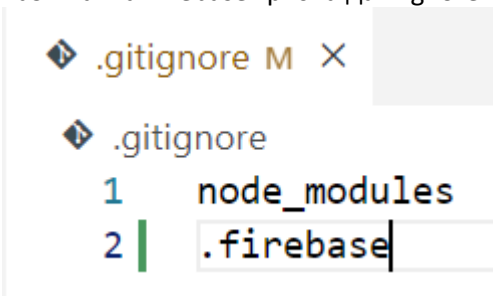
Точката представлява, че нашата public directory е текущата директория.

```
? What do you want to use as your public directory? .
? Configure as a single-page app (rewrite all urls to /index.html)? No
? Set up automatic builds and deploys with GitHub? No
+  Wrote ./404.html
? File ./index.html already exists. Overwrite? No
i  Skipping write of ./index.html

i  Writing configuration info to firebase.json...
i  Writing project information to .firebaserc...
```

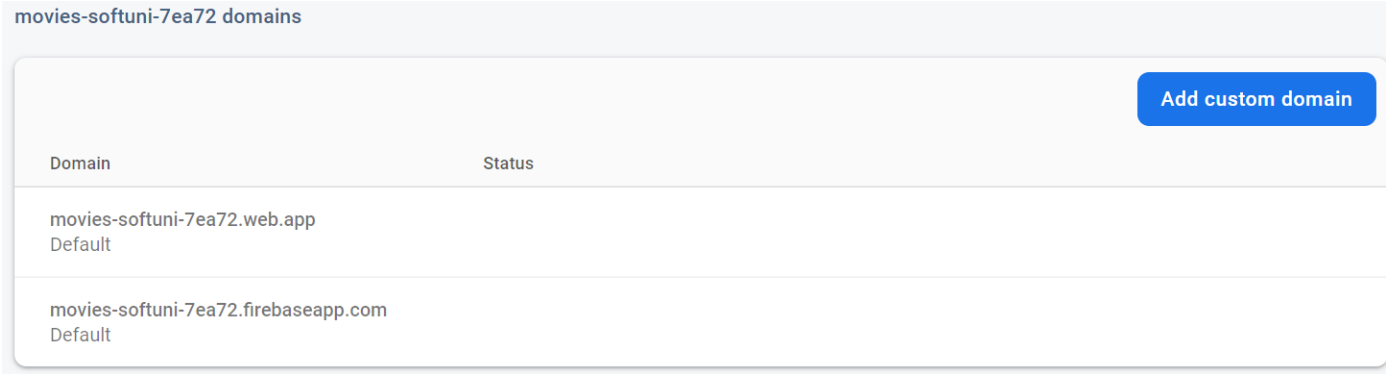




Тази папка .firebase трябва да я ignore-нем.



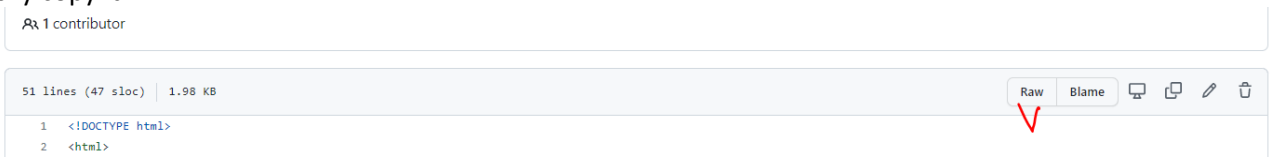
Два домейна ни прави – могат да се ползват и те



File 404.html - automatically generated by firebase – когато рефрешнем дадена страница на SPA, то дава грешка. И затова трябва да използваме 404.html

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <title>Page Not Found</title>

    <style media="screen">
      body { background: #ECEFF1; color: rgba(0,0,0,0.87); font-family: Roboto,
Helvetica, Arial, sans-serif; margin: 0; padding: 0; }
      #message { background: white; max-width: 360px; margin: 100px auto 16px; padding:
32px 24px 16px; border-radius: 3px; }
      #message h3 { color: #888; font-weight: normal; font-size: 16px; margin: 16px 0
12px; }
      #message h2 { color: #ffa100; font-weight: bold; font-size: 16px; margin: 0 0 8px;
}
      #message h1 { font-size: 22px; font-weight: 300; color: rgba(0,0,0,0.6); margin: 0
0 16px;}
      #message p { line-height: 140%; margin: 16px 0 24px; font-size: 14px; }
      #message a { display: block; text-align: center; background: #039be5; text-
transform: uppercase; text-decoration: none; color: white; padding: 16px; border-radius:
4px; }
      #message, #message a { box-shadow: 0 1px 3px rgba(0,0,0,0.12), 0 1px 2px
rgba(0,0,0,0.24); }
      #load { color: rgba(0,0,0,0.4); text-align: center; font-size: 13px; }
      @media (max-width: 600px) {
        body, #message { margin-top: 0; background: white; box-shadow: none; }
        body { border-top: 16px solid #ffa100; }
      }
    </style>
  </head>
  <body>
    <div id="message">
      <h2>404</h2>
      <h1>Page Not Found</h1>
      <p>The specified file was not found on this website. Please check the URL for
mistakes and try again.</p>
      <h3>Why am I seeing this?</h3>
      <p>This page was generated by the Firebase Command-Line Interface. To modify it,
edit the <code>404.html</code> file in your project's configured <code>public</code>
directory.</p>
    </div>
  </body>
</html>
```

https://github.com/rafgraph/spa-github-pages
To easily copy it



На негово място слагаме този от https://github.com/rafgraph/spa-github-pages

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="utf-8">
    <title>Single Page Apps for GitHub Pages</title>
    <script type="text/javascript">
      // Single Page Apps for GitHub Pages
      // MIT License
      // https://github.com/rafgraph/spa-github-pages
      // This script takes the current url and converts the path and query
      // string into just a query string, and then redirects the browser
      // to the new url with only a query string and hash fragment,
      // e.g. https://www.foo.tld/one/two?a=b&c=d#qwe, becomes
      // https://www.foo.tld/?/one/two&a=b~and~c=d#qwe
      // Note: this 404.html file must be at least 512 bytes for it to work
      // with Internet Explorer (it is currently > 512 bytes)

      // If you're creating a Project Pages site and NOT using a custom domain,
      // then set pathSegmentsToKeep to 1 (enterprise users may need to set it to > 1).
      // This way the code will only replace the route part of the path, and not
      // the real directory in which the app resides, for example:
      // https://username.github.io/repo-name/one/two?a=b&c=d#qwe becomes
      // https://username.github.io/repo-name/?/one/two&a=b~and~c=d#qwe
      // Otherwise, leave pathSegmentsToKeep as 0.
      var pathSegmentsToKeep = 0;

      var l = window.location;
      l.replace(
        l.protocol + '//' + l.hostname + (l.port ? ':' + l.port : '') +
        l.pathname.split('/').slice(0, 1 + pathSegmentsToKeep).join('/') + '/?/' +
        l.pathname.slice(1).split('/').slice(pathSegmentsToKeep).join('/').replace(/&/g,
'~and~') +
        (l.search ? '&' + l.search.slice(1).replace(/&/g, '~and~') : '') +
        l.hash
      );

    </script>
```

```
  </head>
  <body>
  </body>
</html>
```

И слагаме в index.html, преди всички други script-ове, този скрипт от https://github.com/rafgraph/spa-github-pages:

1)
```
    <!-- Start Single Page Apps for GitHub Pages -->
    <script type="text/javascript">
        // Single Page Apps for GitHub Pages
        // MIT License
        // https://github.com/rafgraph/spa-github-pages
        // This script checks to see if a redirect is present in the query string,
        // converts it back into the correct url and adds it to the
        // browser's history using window.history.replaceState(...),
        // which won't cause the browser to attempt to load the new url.
        // When the single page app is loaded further down in this file,
        // the correct url will be waiting in the browser's history for
        // the single page app to route accordingly.
        (function(l) {
          if (l.search[1] === '/' ) {
            var decoded = l.search.slice(1).split('&').map(function(s) {
              return s.replace(/~and~/g, '&')
            }).join('?');
            window.history.replaceState(null, null,
                l.pathname.slice(0, -1) + decoded + l.hash
            );
          }
        }(window.location))
      </script>
      <!-- End Single Page Apps for GitHub Pages -->
```

2)
```
    <script src="src/app.js" type="module"></script>
```

firebase deploy и готово.

5. Deploying site in Host https://www.netlify.com/