Міністерство освіти і науки України Національний технічний університет України «Київський політехнічний інститут імені Ігоря Сікорського» Інститут прикладного системного аналізу Кафедра математичних методів системного аналізу

3BIT

про виконання практикуму №1 з дисципліни «Високонавантажені розподілені обчислювальні системи»

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Перевірив:

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Завдання 1 Hello-world

docker-compose.yaml

```
version: "3.9"
services:
  hello_world:
   image: hello-world
```

Результат роботи

```
khomy@DESKTOP-LSQFTM1 MINGW64 /d/BPOC/HDCS_Lab_1_Docker/task-1 (master)
$ docker-compose up
Creating network "task-1_default" with the default driver
Creating task-1_hello_world_1 ... done
Attaching to task-1_hello_world_1
hello_world_1 |
hello_world_1
                    Hello from Docker!
hello_world_1
                    This message shows that your installation appears to be working
correctly. hello_world
hello_world_1
                    To generate this message, Docker took the following steps:

    The Docker client contacted the Docker daemon.
    The Docker daemon pulled the "hello-world" image from the Docker

hello_world_1
hello_world_1
Hub.
hello_world_1
                     (amd64) 
 3. The Docker daemon created a new container from that image which
hello_world_1
runs the
hello_world_1
                         executable that produces the output you are currently reading.
hello_world_1 sent it
                     4. The Docker daemon streamed that output to the Docker client, which
hello_world_1
                         to your terminal.
hello_world_1
hello_world_1
                    To try something more ambitious, you can run an Ubuntu container with:
hello_world_1
hello_world_1
                      $ docker run -it ubuntu bash
                    Share images, automate workflows, and more with a free Docker ID:
hello_world_1
hello_world_1
                     https://hub.docker.com/
hello_world_1
hello_world_1
hello_world_1
                    For more examples and ideas, visit:
  https://docs.docker.com/get-started/
hello_world_1
task-1_hello_world_1 exited with code 0
```

Завдання 2 Lite-server

docker-compose.yaml

```
version: "3.9"

services:
    lite_server:
    image: node
    working_dir: /lite_server
    volumes:
    - ./:/lite_server
    ports:
    - 8000:3000
    command: bash script.sh
```

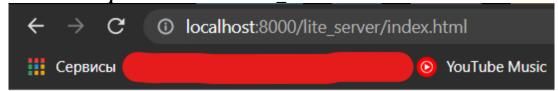
```
Результати роботи
```

```
khomy@DESKTOP-LSQFTM1 MINGW64 /d/BPOC/HDCS_Lab_1_Docker/task-2 (master)
$ docker-compose up
Recreating task-2_lite_server_1 ... done
Attaching to task-2_lite_server_1
lite_server_1 | npm WARN deprecated debug@4.1.1: Debug versions >=3.2.0 <3.2.7 || >=4 <</pre>
```

```
recommended you upgrade to 3.2.7 or 4.3.1.
(https://github.com/visionmedia/debug/issues/797
lite_server_1 | npm WARN deprecated debug@4.1.1: Debug versions >=3.2.0 <3.2.7 || >=
4.3.1 have a low-severity ReDos regression when used in a Node.js environment. It is
recommended you upgrade to 3.2.7 or 4.3.1.
                     \mid npm WARN deprecated debug@4.1.1: Debug versions >=3.2.0 <3.2.7 \mid >=4 <
(https://github.com/visionmedia/debug/issues/797
ite_server_1 | npm WARN deprecated debug@4.1.1: Debug versions >=3.2.0 <3.2.7 || >= 4.3.1 have a low-severity ReDos regression when used in a Node.js environment. It is recommended you upgrade to 3.2.7 or 4.3.1.
                      \mid npm WARN deprecated debug@4.1.1: Debug versions >=3.2.0 <3.2.7 \mid >=4 <
(https://github.com/visionmedia/debug/issues/797
lite_server_1
                          added 193 packages, and audited 194 packages in 10s
lite_server_
lite_server_1
                         6 packages are looking for funding run `npm fund` for details
lite_server_
lite server
lite_server_1
lite_server_
                          found 0 vulnerabilities
lite_server_1
                          npm notice
                         npm notice New patch version of npm available! 8.1.0 -> 8.1.1 npm notice Changelog: <a href="https://github.com/npm/cli/releases/tag/v8.1.1">https://github.com/npm/cli/releases/tag/v8.1.1</a>
lite_server_
lite server 1
lite_server_1
                          npm notice Run `npm`install -g npm@8.1.1` to update!
lite_server_
lite_server_1
                          Did not detect a `bs-config.json` or `bs-config.js` override file. Usin
g lite-server defaults...
lite_server_1 | ** brows
                          ** browser-sync config **
lite_server_1
                            injectChanges: false,
files: [ './**/*.{html,htm,css,js}' ],
watchOptions: { ignored: 'node_modules' },
lite_server_
lite_server_1
lite_server_
lite_server_
                            server:
                                baseDir: './
lite_server_1
                               middleware: [[Function (anonymous)], [Function (anonymous)]]
lite_server_
lite_server_1
lite_server_
                          [Browsersync] Access URLs:
lite server
lite_server_1
                               Local: http://localhost:3000
External: http://172.19.0.2:3000
lite_server_
lite server
lite_server_
                           UI: http://localhost:3001
UI External: http://localhost:3001
lite_server
lite_server_1
lite_server_
lite_server
                          [Browsersync] Serving files from: ./
lite_server_1 | [Browsersync] watching files...
lite_server_1 | [Browsersync] Couldn't open browser (if you are using BrowserSync in a headless environment, you might want to set the open option to false)
lite_server_1 | 21.10.24 12:03:54 200 GET /lite_server/index.html
Gracefully stopping... (press Ctrl+C again to force) Stopping task-2_lite_server_1 ... done
```

4.3.1 have a low-severity ReDos regression when used in a Node.js environment. It is

3anum do http://localhost:8000/lite_server/index.html



Hello from Lite-server!

Завдання 3 JSON-server

docker-compose.yaml

```
version: "3.9"

services:
    lite_server:
        image: node
        working_dir: /json_server
        volumes:
        - ./:/json_server
        ports:
        - 8000:3000
        command: bash script.sh
```

Результати роботи

```
khomy@DESKTOP-LSQFTM1 MINGW64 /d/BPOC/HDCS_Lab_1_Docker/task-3 (master)
docker-compose up
Creating task-3_lite_server_1 ... done
Attaching to task-3_lite_server_1
lite_server_1
lite_server_1
                       added 173 packages, and audited 174 packages in 8s
lite_server_1
                      13 packages are looking for funding run `npm fund` for details
lite_server_
lite_server_1
lite_server_1
lite_server_1
                       found 0 vulnerabilities
lite_server_1
                       npm notice
lite_server_
                       npm notice New patch version of npm available! 8.1.0 -> 8.1.1
                      npm notice Changelog: <a href="https://github.com/npm/cli/releases/tag/v8.1.1">https://github.com/npm/cli/releases/tag/v8.1.1</a>> npm notice Run npm install -g npm@8.1.1 to update! npm notice
lite_server_1
lite_server_
lite_server_
lite_server_1
                         \{^_^}/ hi!
lite_server_
lite_server_1
lite_server_
lite_server_
                         Loading example.json
                         Done
lite_server_1
                         Resources
lite_server_
lite_server_1
                         http://0.0.0.0:3000/employees
lite_server_
lite_server_
                         http://0.0.0.0:3000
lite_server_1
lite_server_
lite_server_1
                         Type s + enter at any time to create a snapshot of the database
lite_server_1
lite_server_1
                         watching...
lite_server_1
                            GET /db 200 1.883 ms - 233
                        GET /_rules 404 2.069 ms - 2
GET /employees 200 4.763 ms - 188
GET /employees 304 4.009 ms - -
lite_server_1
lite_server_1
lite_server_1
Gracefully stopping... (press Ctrl+C again to force)
Stopping task-3_lite_server_1 ...
Killing task-3_lite_server_1 ... done
```

3anum do https:localhost:8000/

JSON Server

GitHub Sponsors

♦ My JSON Server

Supporters

Congrats!

You're successfully running JSON Server $\diamond *. 9(' \Box ` *)_9 \diamond *.$

Resources

/employees ^{3x}

To access and modify resources, you can use any HTTP method:



Documentation

README

3anum do http://localhost:8000/employees

Завдання 4 Nginx + Lite-server's + JSON-server's

docker-compose.yaml

```
version: '3.9'
services:
   lite server:
      image: node
     working_dir: /lite_server
     volumes:
      - ./lite_server:/lite_server
     command: bash script.sh
     expose:
      - 3000
    json_server:
     image: node
     working_dir: /json_server
     volumes:
      - ./json_server:/json_server
     command: bash script.sh
      - 8080
   nginx:
      image: nginx
     volumes:
      - "./config:/etc/nginx"
     ports:
      - "3000:3000"
      - "8000:8080"
     environment:
      - NGINX_HOST=0.0.0.0
      - NGINX_PORT=80
      links:
      json_server
      - lite_server
```

Результати роботи

```
khomy@DESKTOP-LSQFTM1 MINGW64 /d/BPOC/HDCS_Lab_1_Docker/task-4 (master)
$ docker-compose up
Starting task-4_lite_server_1 ... done
Recreating task-4_json_server_1 ... done
Recreating task-4_nginx_1 ... done
Attaching to task-4_lite_server_1, task-4_json_server_1, task-4_nginx_1
lite_server_1 | npm WARN deprecated debug@4.1.1: Debug versions >=3.2.0 <3.2.7 || >=4
<4.3.1 have a low-severity ReDos regression when used in a Node.js environment. It is
recommended you upgrade to 3.2.7 or 4
.3.1. (https://github.com/visionmedia/debug/issues/797)
lite_server_1 | npm WARN deprecated debug@4.1.1: Debug versions >=3.2.0 <3.2.7 || >=4
<4.3.1 have a low-severity ReDos regression when used in a Node.js environment. It is
recommended you upgrade to 3.2.7 or 4
.3.1. (https://github.com/visionmedia/debug/issues/797)
lite_server_1 | npm WARN deprecated debug@4.1.1: Debug versions >=3.2.0 <3.2.7 || >=4
<4.3.1 have a low-severity ReDos regression when used in a Node.js environment. It is
recommended you upgrade to 3.2.7 or 4
```

```
.3.1. (https://github.com/visionmedia/debug/issues/797)
                     /docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt
to perform configuration
                     /docker-entrypoint.sh: Looking for shell scripts in /docker-
nainx 1
entrypoint.d/
                      /docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-
nginx_1
ipv6-by-default.sh
                     10-listen-on-ipv6-by-default.sh: info: /etc/nginx/conf.d/default.conf
nginx_1
is not a file or does not exist
                   | /docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-
nginx_1
templates.sh
                   /docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-
nginx_1
processes.sh
                      /docker-entrypoint.sh: Configuration complete; ready for start up
nginx_1
lite_server_
                      changed 193 packages, and audited 194 packages in 5s
lite_server_1
lite_server_1
                      6 packages are looking for funding run `npm fund` for details
lite_server_1
lite_server_1
lite_server_1
lite_server_1
                      found 0 vulnerabilities
                      Did not detect a `bs-config.json` or `bs-config.js` override file.
Using lite-server defaults...
                      ** browser-sync config **
lite_server_1
lite_server_1
                        injectChanges: false,
files: [ './**/*.{html,htm,css,js}' ],
watchOptions: { ignored: 'node_modules' },
lite_server_1
lite_server_1
lite_server_1
lite_server_1
                        server: {
                           baseDir: './
lite_server_1
                           middleware: [ [Function (anonymous)], [Function (anonymous)] ]
lite_server_1
lite_server_1
lite_server_1
                      [Browsersync] Access URLs:
lite_server_
lite_server_1
                           Local: http://localhost:3000
External: http://172.21.0.2:3000
lite_server_1
lite_server_1
lite_server_1
                       UI: http://localhost:3001
UI External: http://localhost:3001
lite_server_
lite_server_1
lite_server_1
                      [Browsersync] Serving files from: ./
[Browsersync] Watching files...
[Browsersync] Couldn't open browser (if you are using BrowserSync in a
lite_server_1
lite_server_1
      server
headless environment, you might want to set the open option to false)
json_server_1
ison_server_
                      added 173 packages, and audited 174 packages in 8s
json_server_1
                      13 packages are looking for funding
  run `npm fund` for details
json_server_
json_server_1
json_server
ison_server_
                      found 0 vulnerabilities
                      npm notice
json_server_1
                      npm notice New patch version of npm available! 8.1.0 -> 8.1.1
json_server_
                      npm notice Changelog: <a href="https://github.com/npm/cli/releases/tag/v8.1.1">https://github.com/npm/cli/releases/tag/v8.1.1</a>> npm notice Run `npm install -g npm@8.1.1 `to update!
json_server_1
json_server
json_server
                      npm notice
json_server_1
json_server_
                        \{^_^}/ hi!
json_server_1
json_server
json_server
                        Loading example.json
                        Done
json_server_1
json_server_
                        http://0.0.0.0:3000/employees
json_server_1
json_server
json_server
                        Home
                        http://0.0.0.0:3000
json_server_1
json_server_
json_server_1
                        Type s + enter at any time to create a snapshot of the database
json_server_
                        Watching...
json_server_
nginx_1 | 172.21.0.1 - - [24/oct/2021:15:45:33 +0000] "GET / HTTP/1.1" 200 808 "- " "Mozilla/5.0 (Windows NT 10.0; Win64; x64) Applewebкit/537.36 (КНТМL, like Gecko) Chrome/94.0.4606.81 Safari/537.36"
nginx_1 | 172.21.0.1 - - [24/Oct/2021:15:45:33 +0000] "GET /script.js HTTP/1.1" 200 580 "http://localhost:8000/" "Mozilla/5.0 (windows NT 10.0; win64; x64) ApplewebKit/537.36 (KHTML, like Gecko) Chrome/9 4.0.4606.81 Safari/537.36"
```

```
nginx_1 | 172.21.0.1 - - [24/Oct/2021:15:45:33 +0000] "GET /style.css HTTP/1.1" 200 669 "http://localhost:8000/" "Mozilla/5.0 (windows NT 10.0; win64; x64) ApplewebKit/537.36 (KHTML, like Gecko) Chrome/9 4.0.4606.81 Safari/537.36"
  nginx_1 | 172.21.0.1 - - [24/oct/2021:15:45:33 +0000] "GET /db HTTP/1.1" 304 0 "http://localhost:8000/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) ApplewebKit/537.36
   (KHTML, like Gecko) Chrome/94.0.4606.
 4606.81 Safari/537.36"
 nginx_1 | 172.21.0.1 - - [24/Oct/2021:15:46:06 +0000] "GET /browser-sync/socket.io/?EIO=3&transport=polling&t=Noo-lwV&sid=4dY-BonoiwpBBLznAAAA HTTP/1.1" 200 1908 "http://localhost:3000/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) ApplewebKit/537.36 (KHTML, like Gecko) Chrome/94.0.4606.81 Safari/537.36"
 nginx_1 | 172.21.0.1 - - [24/Oct/2021:15:46:10 +0000] "GET / HTTP/1.1" 304 0 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) ApplewebKit/537.36 (KHTML, like Gecko) Chrome/94.0.4606.81 Safari/537.36"
                                                          172.21.0.1 - - [24/Oct/2021:15:46:10 +0000] "GET /browser-
  sync/socket.io/?EIO=3&transport=websocket&sid=4dY-BonoiwpBBLznAAAA HTTP/1.1" 101 8 "-"
"Mozilla/5.0 (Windows NT 10.0; which (527, 26") | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 1
 WebKit/537.36 (KHTML, like Gecko) Chrome/94.0.4606.81 Safari/537.36"

nginx_1 | 172.21.0.1 - - [24/oct/2021:15:46:10 +0000] "GET /style.css HTTP/1.1"

304_0 "http://localhost:8000/" "Mozilla/5.0 (windows NT 10.0; win64; x64)
  ApplewebKit/537.36 (KHTML, like Gecko) Chrome/94. 0.4606.81 Safari/537.36"
  nginx_1 | 172.21.0.1 - - [24/Oct/2021:15:46:10 +0000] "GET /script.js HTTP/1.1" 304 0 "http://localhost:8000/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64)
  ApplewebKit/537.36 (KHTML, like Gecko) Chrome/94. 0.4606.81 Safari/537.36"
 json_server_1 | GET /db 304 0.442 ms - -
nginx_1 | 172.21.0.1 - - [24/Oct/2021:15:46:11 +0000] "GET /db HTTP/1.1"
304 0 "http://localhost:8000/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64)
ApplewebKit/537.36 (KHTML, like Gecko) Chrome/94.0.4606.
81 Safari/537.36"
nginy 1
 nginx_1 | 172.21.0.1 - - [24/Oct/2021:15:46:11 +0000] "GET /__rules HTTP/1.1" 404 2 "http://localhost:8000/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) ApplewebKit/537.36 (KHTML, like Gecko) Chrome/94.0. 4606.81 Safari/537.36"
json_server_1 | GET /__rules 404 2.020 ms - 2
nginx_1 | 172.21.0.1 - - [24/oct/2021:15:46:16 +0000] "GET / HTTP/1.1"
304 0 "-" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/94.0.4606.81 Safari/537.36"
nginx_1 | 172.21.0.1 - - [24/oct/2021:15:46:16 +0000] "GET /script.js
HTTP/1.1" 304 0 "http://localhost:8000/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/94.
0.4606.81 Safari/537.36"
nginx_1 | 172.21.0.1 - - [24/oct/2021:15:46:16 +0000] "GET /script.js
 nginx_1 | 172.21.0.1 - - [24/Oct/2021:15:46:16 +0000] "GET /style.css HTTP/1.1" 304 0 "http://localhost:8000/" "Mozilla/5.0 (Windows NT 10.0; Win64; x64) ApplewebKit/537.36 (KHTML, like Gecko) Chrome/94. 0.4606.81 Safari/537.36"
```

Скейлинг контейнерів

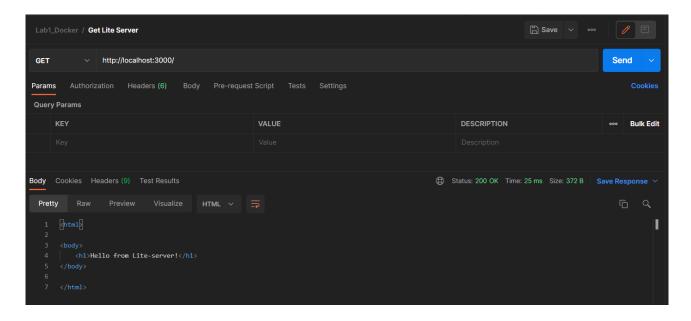
khomy@DESKTOP-LSQFTM1 MINGW64 /d/BPOC/HDCS_Lab_1_Docker/task-4 (master)
\$ docker-compose up --scale lite_server=3 --scale json_server=3

khomy@DESKTOP-LSQFTM1 MINGW64 /d/BPOC/HDCS_Lab_1_Docker/task-2/lite_server (master) \$ docker ns

\$ docker ps					
CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS
NAMES					
39458b844126	node	"docker-entrypoint.s"	5 minutes ago	Up 5 minutes	
3000/tcp			_	·	
task-4_lite_server_2					
0703673fbee2	node	"docker-entrypoint.s"	5 minutes ago	Up 5 minutes	
8080/tcp		• •	_	•	
task-4_json_server_2					
4f1a027498b9	node	"docker-entrypoint.s"	5 minutes ago	Up 5 minutes	
8080/tcp			_	-	
task-4_json_server_3					
fb5e43e5d4ad	node	"docker-entrypoint.s"	5 minutes ago	Up 5 minutes	
3000/tcp					
task-4_lite_server_3					
64645179df05	nginx	"/docker-entrypoint"	8 minutes ago	Up 5 minutes	
80/tcp, 0.0.0.0:3000->3000/tcp, :::3000->3000/tcp,					
0.0.0.0:8000->8080/tcp, :::8000->8080/tcp task-4_nginx_1					
98cf0c91054d	node	"docker-entrypoint.s"	8 minutes ago	Up 5 minutes	
8080/tcp					
task-4_json_se	rver_1				
05351d7cf41e	node	"docker-entrypoint.s"	45 minutes ago	Up 5 minutes	
3000/tcp					
task-4_lite_server_1					

Завдання 5 Postman

3anum do http://localhost:3000/

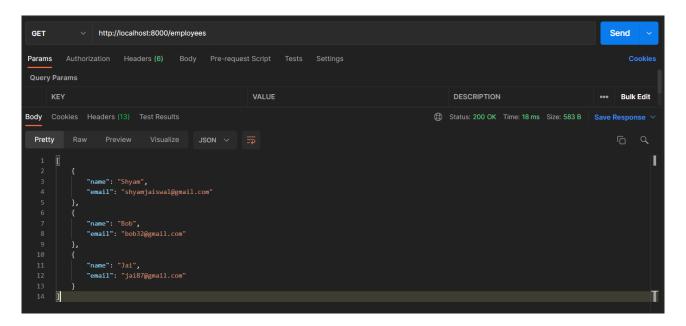


3anum do http://localhost:8000/

```
| Capt | Save | Capt |
```

```
integrity="sha384-
oS3vJWv+0UjzBfQzYUhtDYW+Pj2yciDJxpsK10YPAYjqT085Qq/1cq5FLXAZQ7Ay" crossorigin="anonymous"
   <link rel="stylesheet" href="style.css" />
   <title>JSON Server</title>
       <div class="container">
                   JSON Server
                       <a href="https://github.com/users/typicode/sponsorship">
                           <i class="fas fa-heart"></i>GitHub Sponsors
                       <a href="https://my-json-server.typicode.com">
                           <i class="fas fa-burn"></i>My JSON Server
                       <a href="https://thanks.typicode.com">
                           <i class="far fa-laugh"></i>Supporters
                   </div>
       <div class="container">
           <h1>Congrats!</h1>
               You're successfully running JSON Server
         ♦*。٩(´Ū`*)و
               <div id="resources"></div>
                   To access and modify resources, you can use any HTTP method:
                   <code>GET</code>
                   <code>POST</code>
                   <code>PUT</code>
                   <code>PATCH</code>
```

3anum do http://localhost:8000/employees



3anum do http://localhost:8000/cars

