



Univerzitet u Sarajevu
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Odsjek za računarstvo i informatiku



E-learning - aplikacija za učenje online

Napredne baze podataka

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Akademski 2023/2024
Sarajevo, 2024.

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Uvod i opis informacionog sistema

E-Learning kompanija omogućava olakšan pristup obrazovanju putem elektronskog sistema, čime se olakšava proces učenja za učenike i obrazovni ansambl. Ovaj informacioni sistem nije zamjena za klasični vid obrazovanja, već se može koristiti kao dodatni alat u zajedničkom djelovanju učenika i nastavnika, čime se postiže efikasniji i lakši proces učenja i ocjenjivanja.

E-Learning informacioni sistem je dizajniran kako bi olakšao proces podučavanja i učenja, te je dostupan svim edukatorima i učenicima. Interfejs sistema je jednostavan za korištenje, što olakšava pristup svim dostupnim mogućnostima. Svaka obrazovna ustanova koja koristi ELearning ima privilegiranog korisnika koji upravlja korisnicima i brine se o informacionom sistemu, a ovaj sistem nudi mnoge mogućnosti za unapređenje procesa učenja i podučavanja.

Osnovni procesi sistema

● ADMIN

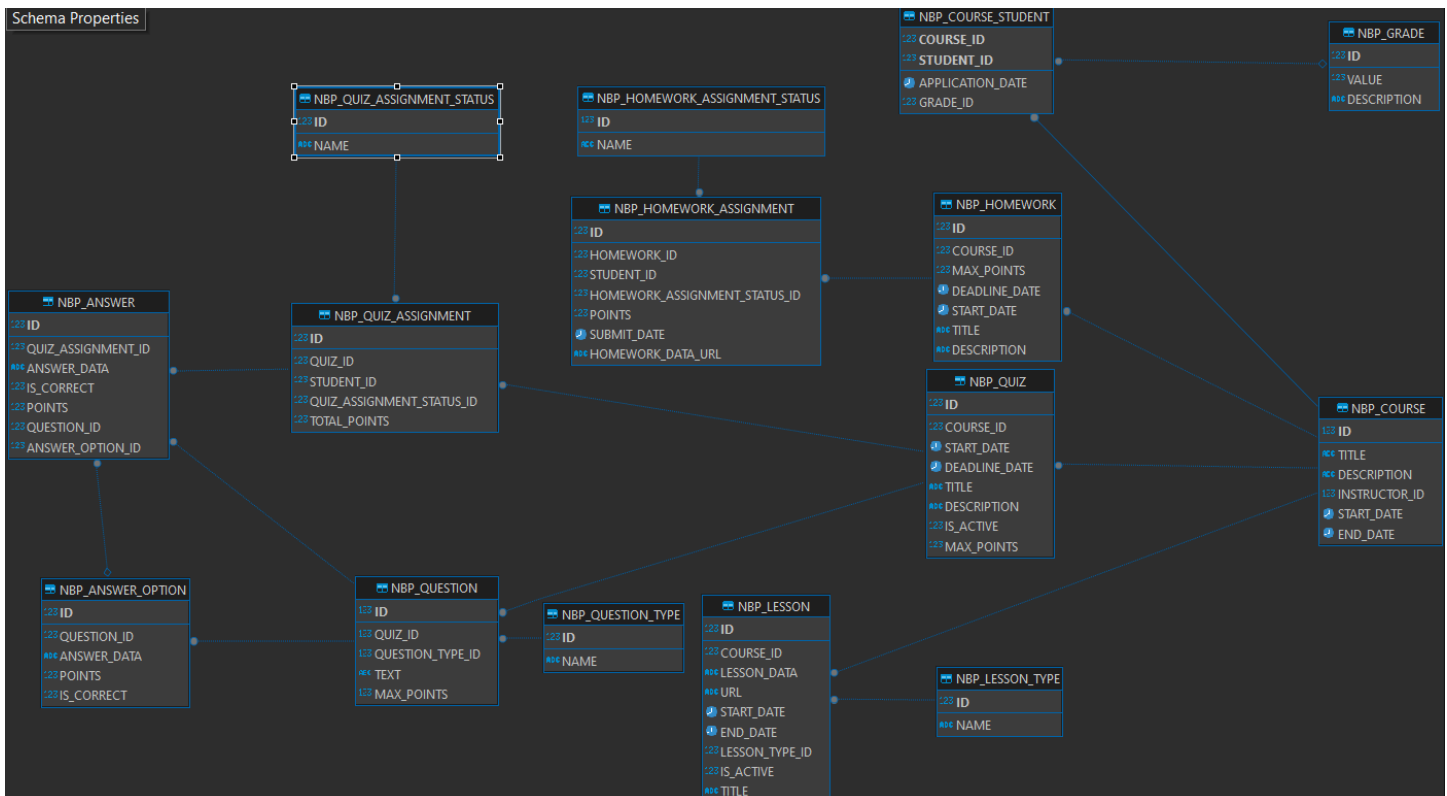
- Administator kreira kurs s popratnim podacima, pri čemu također određuje instruktora na kursu
- Privilegovani korisnik ima mogućnost manipulacije podacima kursa kao i eventualno brisanje samog kursa
- Ima uvid u sve radnje na aplikaciji štampanjem izvještaja iz log tabele.

● PROFESOR

- Nakon što korisnik profesor kreira svoj račun, omogućava mu se prijavljivanje na aplikaciju. Sve dok privilegovani korisnik ne dodijeli profesora predmetu, profesor nema mogućnost nikakvih radnji.
- Kada profesor bude postavljen kao nadležni za neki kurs on dobiva niz funkcionalnosti.
- Profesor ima mogućnost dodavanja obrazovnog materijala na kurs, dodavanje zadataka kao i dodavanje kvizova.
- Kada student preda zadatak, profesor dobiva pristup zadaci i mogućnost ocjenjivanja iste. Omogućeno mu je i da eventualno ažurira bodove.

- **STUDENT**

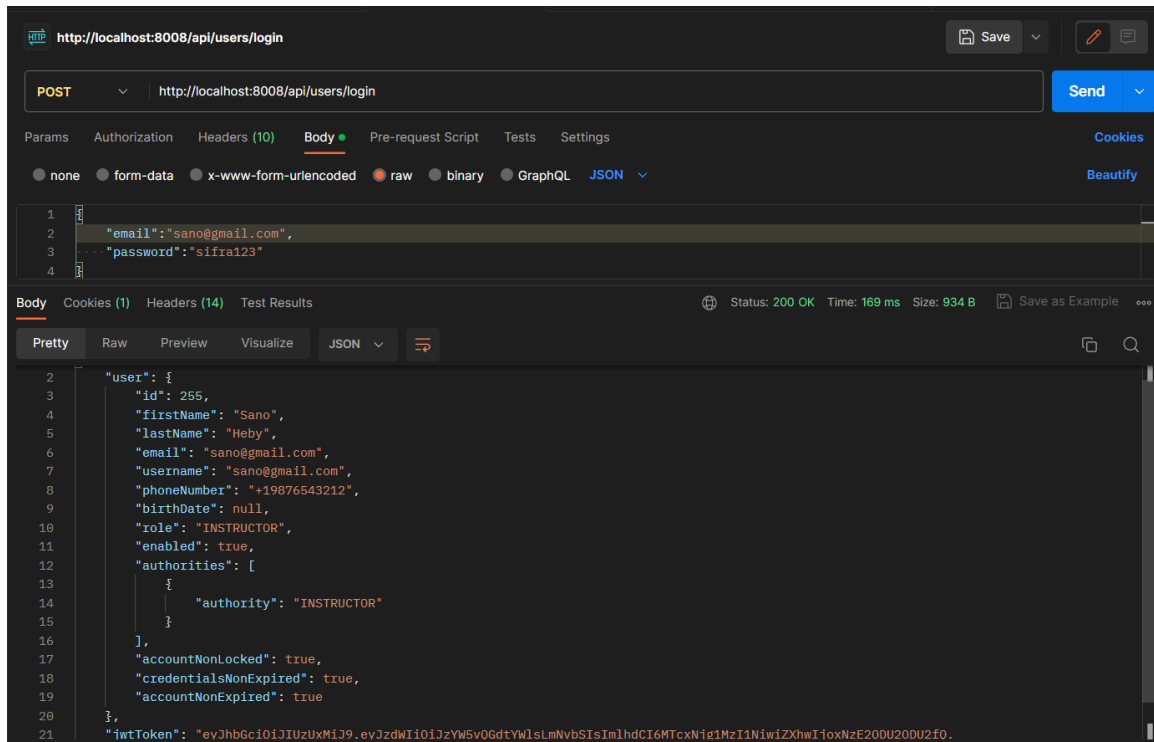
- ## ER Diagram



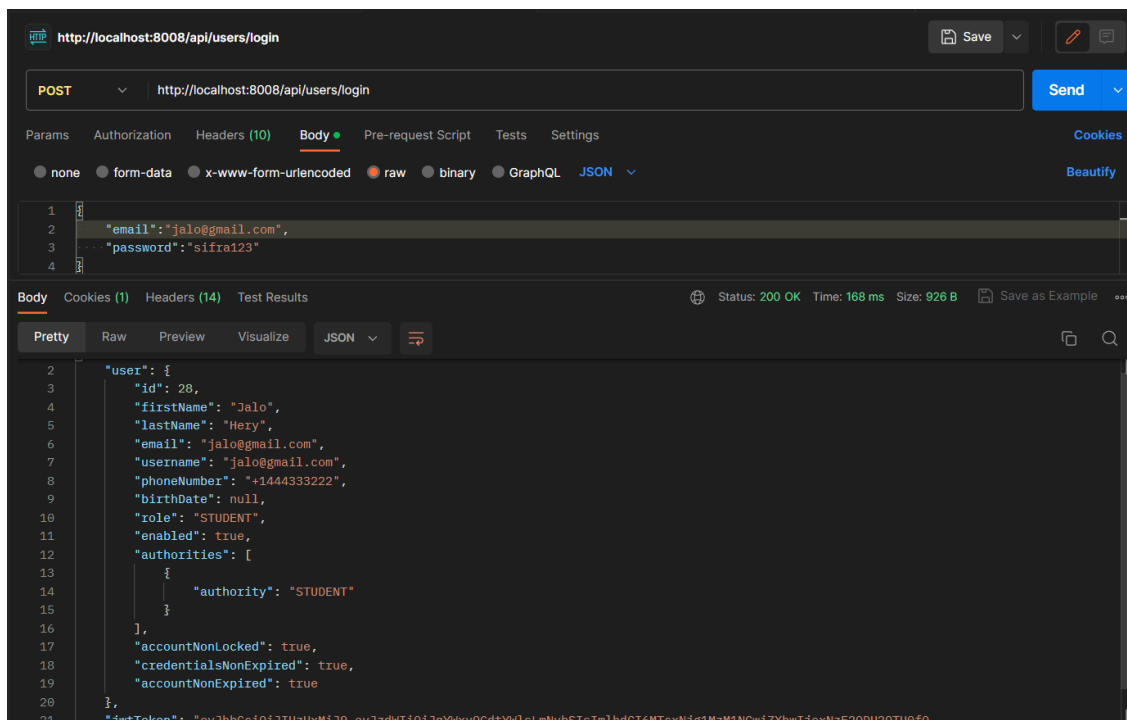
Postman testiranje

- /api/users

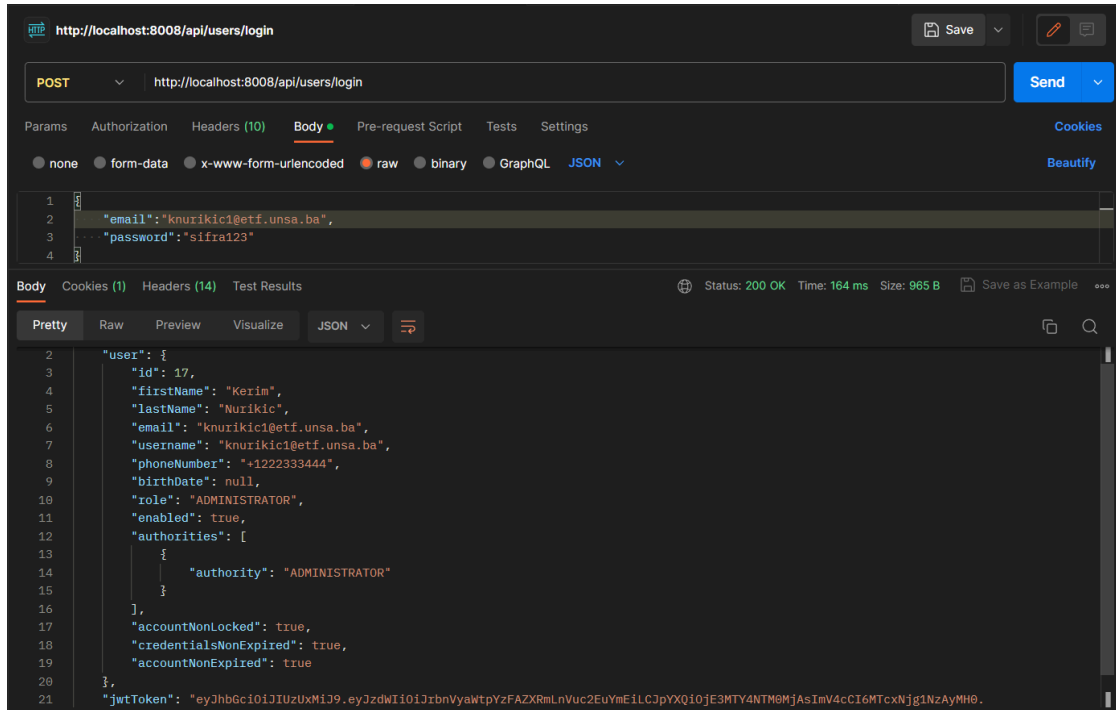
Instructor



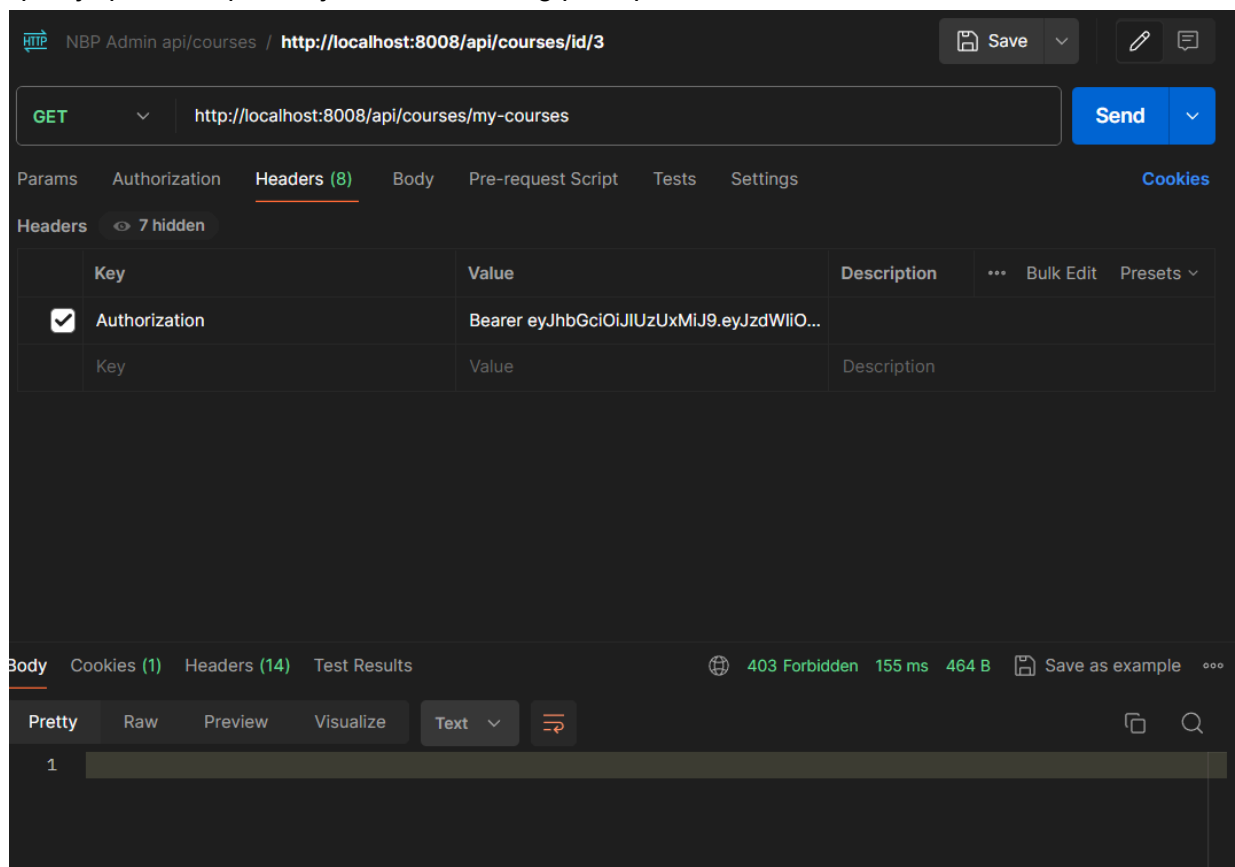
Student



Administrator



- `api/courses` :
- Ispod je prikazan pokušaj neautorizovanog pristupa ruti



HTTP

http://localhost:8008/api/courses/all

Save

GET

http://localhost:8008/api/courses/all

Send

Params

Authorization

Headers (8)

Body

Pre-request Script

Tests

Settings

Cookies

Headers

7 hidden

	Key	Value	Description	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer eyJhbGciOiJIUzUxMiJ9.eyJzdWIiOiJrbnVyaWtp...				
	Key	Value	Description			

Body

Cookies (1)

Headers (14)

Test Results

Status: 200 OK

Time: 403 ms

Size: 7.83 KB

Save as Example

Pretty

Raw

Preview

Visualize

JSON

```
177     "id": 2,
178     "title": "Real-time systems",
179     "description": "Introduction to basic principles, methodologies, and techniques of real-time operating systems, common hardware and
180                   software, real-time operating system, common interfaces, as well as the design and evaluation.",
181     "instructor": {
182       "id": 255,
183       "firstName": "Sano",
184       "lastName": "Heby",
185       "email": "sano@gmail.com",
186       "username": "sano@gmail.com",
187       "phoneNumber": "+19876543212",
188       "birthDate": null,
189       "role": "INSTRUCTOR",
190       "enabled": true,
191       "authorities": [
192         {
193           "authority": "INSTRUCTOR"
194         }
195       ],
196       "accountNonLocked": true
```


HTTP

http://localhost:8008/api/courses/id/3

Save

GET

http://localhost:8008/api/courses/id/3

Send

ParamsAuthorizationHeaders (8)BodyPre-request ScriptTestsSettingsCookies

Headers

7 hidden

	Key	Value	Description	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer eyJhbGciOiJIUzUxMiJ9.eyJzdWIiOiJrbnVyaWtp...				
	Key	Value	Description			

BodyCookies (1)Headers (14)Test Results

Status: 200 OKTime: 206 msSize: 2.86 KB

Save as Example

PrettyRawPreviewVisualizeJSON

```
2  "id": 3,
3  "title": "Computer networks",
4  "description": "On the computer networks course, students learn about connecting devices and ensuring communication through addressing,
5  "instructor": {
6    "id": 255,
7    "firstName": "Sano",
8    "lastName": "Heby",
9    "email": "sano@gmail.com",
10   "username": "sano@gmail.com",
11   "phoneNumber": "+19876543212",
12   "birthDate": null,
13   "role": "INSTRUCTOR",
14   "enabled": true,
15   "authorities": [
16     {
17       "authority": "INSTRUCTOR"
18     }
19   ],
20   "accountNonLocked": true,
```

HTTP

http://localhost:8008/api/courses/add-professor/3/26

Save

POST

http://localhost:8008/api/courses/add-professor/3/26

Send

ParamsAuthorizationHeaders (9)BodyPre-request ScriptTestsSettingsCookies

Headers

8 hidden

	Key	Value	Description	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer eyJhbGciOiJIUzUxMiJ9.eyJzdWIiOiJzYW5vQGdt...				
	Key	Value	Description			

BodyCookies (1)Headers (13)Test Results

Status: 200 OKTime: 91 msSize: 382 B

Save as Example

Student

HTTP

http://localhost:8008/api/courses/apply-to-course/2

Save

POST

http://localhost:8008/api/courses/apply-to-course/2

Send

Params

Authorization

Headers (9)

Body

Pre-request Script

Tests

Settings

Cookies

Headers

8 hidden

	Key	Value	Description	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer eyJhbGciOiJIUzUxMiJ9.eyJzdWIiOiJqYWxvQGdt...				
	Key	Value	Description			

Body

Cookies (1)

Headers (13)

Test Results

Status: 200 OK

Time: 441 ms

Size: 382 B

Save as Example

...

HTTP

http://localhost:8008/api/courses/quit-course/2

Save

POST

http://localhost:8008/api/courses/quit-course/2

Send

Params

Authorization

Headers (9)

Body

Pre-request Script

Tests

Settings

Cookies

Headers

8 hidden

	Key	Value	Description	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer eyJhbGciOiJIUzUxMiJ9.eyJzdWIiOiJqYWxvQGdt...				
	Key	Value	Description			

Body

Cookies (1)

Headers (13)

Test Results

Status: 200 OK

Time: 457 ms

Size: 382 B

Save as Example

...

HTTP

http://localhost:8008/api/courses/my-courses

Save

GET

http://localhost:8008/api/courses/my-courses

Send

Params

Authorization

Headers (8)

Body

Pre-request Script

Tests

Settings

Cookies

Headers

7 hidden

	Key	Value	Description	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer eyJhbGciOiJIUzUxMiJ9.eyJzdWIiOiJqYWxvQGdt...				
	Key	Value	Description			

Body

Cookies (1)

Headers (14)

Test Results

Status: 200 OK

Time: 160 ms

Size: 2.86 KB

Save as Example

...

Pretty

Raw

Preview

Visualize

JSON

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

{

"id": 3,

"title": "Computer networks",

"description": "On the computer networks course, students learn about connecting devices and ensuring communication through addressing, protocols, security, and troubleshooting, gaining skills for network planning and maintenance through practical exercises.",

"instructor": {

"id": 255,

"firstName": "Sano",

"lastName": "Heby",

"email": "sano@gmail.com",

"username": "sano@gmail.com",

"phoneNumber": "+19876543212",

"birthDate": null,

"role": "INSTRUCTOR",

"enabled": true,

"authorities": [

HTTP <http://localhost:8008/api/courses/free-courses> Save

GET <http://localhost:8008/api/courses/free-courses> Send

Params Authorization **Headers (8)** Body Pre-request Script Tests Settings Cookies

Headers 7 hidden

	Key	Value	Description	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer eyJhbGciOiJIUzUxMiJ9.eyJzdWIiOiJqYWxvQGdt...				
	Key	Value	Description			

Body Cookies (1) Headers (14) Test Results Status: 200 OK Time: 158 ms Size: 3.1 KB Save as Example ...

Pretty Raw Preview Visualize **JSON**

```
1 {
2   "id": 2,
3   "title": "Real-time systems",
4   "description": "Introduction to basic principles, methodologies, and techniques of real-time operating systems, common hardware and
5     software, real-time operating system, common interfaces, as well as the design and evaluation.",
6   "instructor": {
7     "id": 255,
8     "firstName": "Sano",
9     "lastName": "Heby",
10    "email": "sano@gmail.com",
11    "username": "sano@gmail.com",
12    "phoneNumber": "+19876543212",
13    "birthDate": null,
14    "role": "INSTRUCTOR",
15    "enabled": true,
16    "authorities": [
17      s
```

Instructor

HTTP <http://localhost:8008/api/courses/instructor> Save

GET <http://localhost:8008/api/courses/instructor> Send

Params Authorization **Headers (8)** Body Pre-request Script Tests Settings Cookies

Headers 7 hidden

	Key	Value	Description	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer eyJhbGciOiJIUzUxMiJ9.eyJzdWIiOiJqYWxvQGdt...				
	Key	Value	Description			

Body Cookies (1) Headers (14) Test Results Status: 200 OK Time: 389 ms Size: 6.46 KB Save as Example ...

Pretty Raw Preview Visualize **JSON**

```
1 {
2   "id": 2,
3   "title": "Real-time systems",
4   "description": "Introduction to basic principles, methodologies, and techniques of real-time operating systems, common hardware and
5     software, real-time operating system, common interfaces, as well as the design and evaluation.",
6   "instructor": {
7     "id": 255,
8     "firstName": "Sano",
9     "lastName": "Heby",
10    "email": "sano@gmail.com",
11    "username": "sano@gmail.com",
12    "phoneNumber": "+19876543212",
13    "birthDate": null,
14    "role": "INSTRUCTOR",
15    "enabled": true,
16    "authorities": [
17      s
```

- api/grades

HTTP

http://localhost:8008/api/grades/all

Save

GET

http://localhost:8008/api/grades/all

Send

Params

Authorization

Headers (8)

Body

Pre-request Script

Tests

Settings

Cookies

Headers

7 hidden

	Key	Value	Description	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer eyJhbGciOiJIUzUxMiJ9.eyJzdWIiOiJrbnVyaWtpY...				
	Key	Value	Description			

Body

Cookies (1)

Headers (14)

Test Results

Status: 200 OK Time: 86 ms Size: 891 B Save as Example

Pretty

Raw

Preview

Visualize

JSON

```
1 {
2   {
3     "id": 1,
4     "value": 6,
5     "description": "Meets minimum criteria",
6     "courseStudent": null
7   },
8   {
9     "id": 2,
10    "value": 7,
11    "description": "Generally good, but with significant deficiencies.",
12    "courseStudent": null
13  },
14  {
15    "id": 3,
16    "value": 8,
17    "description": "Average with a number of specific errors.",
18    "courseStudent": null
19  }
20 }
```

HTTP

http://localhost:8008/api/grades/description/Meets minimum criteria

Save

GET

http://localhost:8008/api/grades/description/Meets minimum criteria

Send

Params

Authorization

Headers (8)

Body

Pre-request Script

Tests

Settings

Cookies

Headers

7 hidden

	Key	Value	Description	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer eyJhbGciOiJIUzUxMiJ9.eyJzdWIiOiJrbnVyaWtpY...				
	Key	Value	Description			

Body

Cookies (1)

Headers (14)

Test Results

Status: 200 OK Time: 65 ms Size: 501 B Save as Example

Pretty

Raw

Preview

Visualize

JSON

```
1 {
2   "id": 1,
3   "value": 6,
4   "description": "Meets minimum criteria",
5   "courseStudent": null
6 }
```

HTTP <http://localhost:8008/api/grades/value/8> Save

GET <http://localhost:8008/api/grades/value/8> Send

Params Authorization **Headers (8)** Body Pre-request Script Tests Settings Cookies

Headers 7 hidden

	Key	Value	Description	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer eyJhbGciOiJIUzUxMiJ9.eyJzdWl0OiJrbnVyaWtpY...				
	Key	Value	Description			

Body Cookies (1) Headers (14) Test Results Status: 200 OK Time: 72 ms Size: 520 B Save as Example

Pretty Raw Preview Visualize JSON

```
1 {
2   "id": 3,
3   "value": 8,
4   "description": "Average with a number of specific errors.",
5   "courseStudent": null
6 }
```

- api/homework-assignment

HTTP <http://localhost:8008/api/homework-assignment/3> Save

GET <http://localhost:8008/api/homework-assignment/3> Send

Params Authorization **Headers (8)** Body Pre-request Script Tests Settings Cookies

Headers 7 hidden


	Key	Value	Description	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer eyJhbGciOiJIUzUxMiJ9.eyJzdWl0OiJqYWxvQGdt...				
	Key	Value	Description			

Body Cookies (1) Headers (14) Test Results Status: 200 OK Time: 88 ms Size: 557 B Save as Example

Pretty Raw Preview Visualize JSON

```
1 {
2   "id": 42,
3   "homeworkId": 3,
4   "studentId": 28,
5   "homeworkAssignmentStatus": "NOT_SUBMITTED",
6   "points": 0,
7   "submitDate": null,
8   "homeworkDataUrl": null
9 }
```

- api/homework

 http://localhost:8008/api/homework/all

GET

http://localhost:8008/api/homework/all

Send

ParamsAuthorizationHeaders (8)BodyPre-request ScriptTestsSettingsCookies

Headers

7 hidden


	Key	Value	Description	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer eyJhbGciOiJIUzUxMiJ9.eyJzdWllOiJqYWxvQGdt...				
	Key	Value	Description			

BodyCookies (1)Headers (14)Test Results

Status: 200 OKTime: 74 msSize: 1.35 KBSave as Example

PrettyRawPreviewVisualizeJSON

```
1 {
2   "id": 23,
3   "courseId": 3,
4   "maxPoints": 1,
5   "deadlineDate": "2024-05-31",
6   "startDate": "2024-05-28",
7   "title": "proba",
8   "description": "proba"
9 },
10 {
11   "id": 1,
12   "courseId": 2,
13   "maxPoints": 5,
14   "deadlineDate": "2024-03-02",
15   "startDate": "2025-03-02",
16   "title": "C++ measure program duration",
17   "description": "Research the existence of other libraries for measuring the passage of time in the C++ programming language and
```

 http://localhost:8008/api/homework/id/23

GET

http://localhost:8008/api/homework/id/23

Send

ParamsAuthorizationHeaders (8)BodyPre-request ScriptTestsSettingsCookies

none

form-data

x-www-form-urlencoded

raw

binary

GraphQL

This request does not have a body

BodyCookies (1)Headers (14)Test Results

Status: 200 OKTime: 73 msSize: 550 BSave as Example

PrettyRawPreviewVisualizeJSON

```
1 {
2   "id": 23,
3   "courseId": 3,
4   "maxPoints": 1,
5   "deadlineDate": "2024-05-31",
6   "startDate": "2024-05-28",
7   "title": "proba",
8   "description": "proba"
9 }
```

- /api/lesson

http://localhost:8008/api/lesson/all

GET http://localhost:8008/api/lesson/all

Params Authorization Headers (8) **Body** Pre-request Script Tests Settings Cookies

none form-data x-www-form-urlencoded raw binary GraphQL

This request does not have a body

Status: 200 OK Time: 82 ms Size: 1.94 KB Save as Example

Body Cookies (1) Headers (14) Test Results

Pretty Raw Preview Visualize JSON

```
1 {
2   {
3     "id": 42,
4     "lessonData": null,
5     "tittle": "proba",
6     "url": "proba",
7     "startDate": "2024-05-23",
8     "endDate": "2024-05-31",
9     "lessonType": "EXTERNAL",
10    "courseId": 3,
11    "active": false
12  },
13  {
14    "id": 1,
15    "lessonData": null,
16    "tittle": "Real Time Systems Intro Lesson",
17    "url": "https://www.youtube.com/watch?v=-DQtDL5evhQ&pp=ygURcmVhbCB0eW11IHNPc3RlbXM%3D",
18    "startDate": "2024-03-05"
```

POST http://localhost:8008/ap GET http://localhost:8008/e GET http://localhost:8008/e GET http://localhost:8008/e + ... No Environment

http://localhost:8008/api/lesson/lessons/3

GET http://localhost:8008/api/lesson/lessons/3

Params Authorization Headers (8) **Body** Pre-request Script Tests Settings Cookies

none form-data x-www-form-urlencoded raw binary GraphQL

This request does not have a body

Status: 200 OK Time: 67 ms Size: 963 B Save as Example

Body Cookies (1) Headers (14) Test Results

Pretty Raw Preview Visualize JSON

```
1 {
2   {
3     "id": 42,
4     "lessonData": null,
5     "tittle": "proba",
6     "url": "proba",
7     "startDate": "2024-05-23",
8     "endDate": "2024-05-31",
9     "lessonType": "EXTERNAL",
10    "courseId": 3,
11    "active": false
12  },
13  {
14    "id": 2,
15    "lessonData": null,
16    "tittle": "Networking Intro Lesson",
17    "url": "https://aws.amazon.com/what-is/computer-networking/",
18    "startDate": "2024-03-05"
```

http://localhost:8008/api/lesson/id/1

Save

GET

http://localhost:8008/api/lesson/id/1

Send

ParamsAuthorizationHeaders (8)BodyPre-request ScriptTestsSettingsCookies

none

form-data

x-www-form-urlencoded

raw

binary

GraphQL

This request does not have a body

Body

Cookies (1)

Headers (14)

Test Results

Status: 200 OK

Time: 72 ms

Size: 676 B

Save as Example

Pretty

Raw

Preview

Visualize

JSON

1

2

3

4

5

6

7

8

9

10

11

"id": 1,

"lessonData": null,

"title": "Real Time Systems Intro Lesson",

"url": "https://www.youtube.com/watch?v=-DQtDL5evhQ&pp=ygURcmVhbCB0eW11IHNpc3R1bXM%3D",

"startDate": "2024-03-05",

"endDate": "2025-03-02",

"lessonType": "EXTERNAL",

"courseId": 2,

"active": true

http://localhost:8008/api/lesson/delete/1

Save

DELETE

http://localhost:8008/api/lesson/delete/1

Send

ParamsAuthorizationHeaders (8)BodyPre-request ScriptTestsSettingsCookies

Headers

7 hidden

	Key	Value	Description	...	Bulk Edit	Presets
<input checked="" type="checkbox"/>	Authorization	Bearer eyJhbGciOiJIUzUxMiJ9.eyJzdWIiOiJqYXVxvQGdt...				
	Key	Value	Description			

Body

Cookies (1)

Headers (14)

Test Results

Status: 200 OK

Time: 80 ms

Size: 427 B

Save as Example

Pretty

Raw

Preview

Visualize

JSON

1

true

http://localhost:8008/api/lesson/create-lesson

Save

POST

http://localhost:8008/api/lesson/create-lesson

Send

ParamsAuthorizationHeaders (11)BodyPre-request ScriptTestsSettingsCookies

none

form-data

x-www-form-urlencoded

raw

binary

GraphQL

JSON

1

2

3

4

5

6

"id": 1,

"lessonData": null,

"title": "Real Time Systems Intro Lesson",

"url": "https://www.youtube.com/watch?v=-DQtDL5evhQ&pp=ygURcmVhbCB0eW11IHNpc3R1bXM%3D",

"startDate": "2024-03-05T00:00:00.000+00:00",

"endDate": "2025-03-02T00:00:00.000+00:00",

"lessonType": "EXTERNAL",

"courseId": 2,

"active": true

Body

Cookies (1)

Headers (14)

Test Results

Status: 200 OK

Time: 173 ms

Size: 714 B

Save as Example

Pretty

Raw

Preview

Visualize

JSON

1

2

3

4

5

6

7

8

9

10

11

"id": 1,

"lessonData": null,

"title": "Real Time Systems Intro Lesson",

"url": "https://www.youtube.com/watch?v=-DQtDL5evhQ&pp=ygURcmVhbCB0eW11IHNpc3R1bXM%3D",

"startDate": "2024-03-05T00:00:00.000+00:00",

"endDate": "2025-03-02T00:00:00.000+00:00",

"lessonType": "EXTERNAL",

"courseId": 2,

"active": true

Frontend testiranje

- `api/users/login`

The screenshot shows the 'Exam-Portal' login interface. A user profile card displays the following information:

Name	Jalo Hery
Username	jalo@gmail.com
Phone	+1444333222
Role	STUDENT
Account Status	true

Below the card is a button labeled 'Enroll in courses'.

The adjacent network tool shows a POST request to `http://localhost:8008/api/users/login` with a status of 200 OK. The response headers include:

- Access-Control-Allow-Origin: *
- Cache-Control: no-cache, no-store, max-age=0, must-revalidate
- Connection: keep-alive
- Content-Type: application/json
- Date: Tue, 28 May 2024 17:46:06 GMT
- Expires: 0
- Keep-Alive: timeout=60
- Pragma: no-cache
- Transfer-Encoding: chunked
- Vary: Origin
- Access-Control-Request-Method
- Access-Control-Request-Headers
- X-Content-Type-Options: nosniff

- `api/courses/id`

The screenshot shows the 'Exam-Portal' course page for 'Computer networks'. The page includes a 'Quit course' button and a description: 'On the computer networks course, students learn about connecting devices and ensuring communication through addressing, protocols, security, and troubleshooting, gaining skills for network planning and maintenance through practical exercises.'

Lessons

- proba [Open lesson](#)
- Networking Intro Lesson [Open lesson](#)
- hdhd [Open lesson](#)

Assignments

- proba
proba
Max points: 1
Available: 2024-05-28 - 2024-05-31
[Open assignment](#)

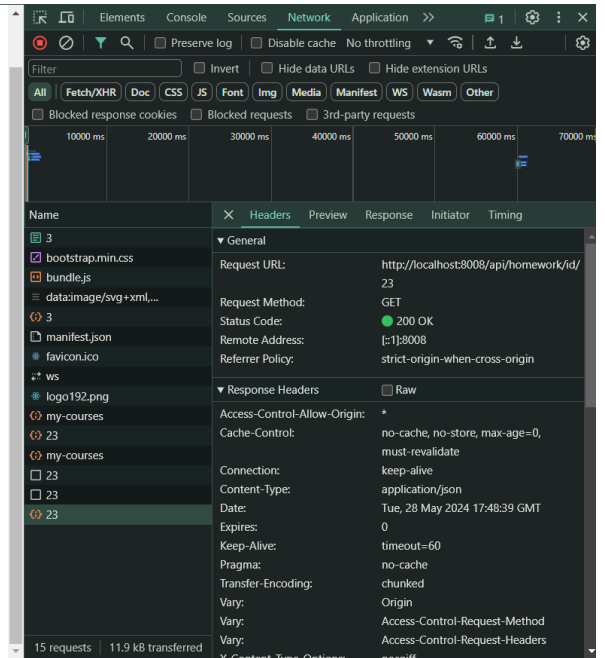
The adjacent network tool shows a GET request to `http://localhost:8008/api/courses/id/3` with a status of 200 OK. The response headers include:

- Access-Control-Allow-Origin: *
- Cache-Control: no-cache, no-store, max-age=0, must-revalidate
- Connection: keep-alive
- Content-Type: application/json
- Date: Tue, 28 May 2024 17:47:40 GMT
- Expires: 0
- Keep-Alive: timeout=60
- Pragma: no-cache
- Transfer-Encoding: chunked
- Vary: Origin
- Access-Control-Request-Method
- Access-Control-Request-Headers
- X-Content-Type-Options: nosniff

- `api/homework/id`

Name	Jalo Hery
Homework	proba
Description	proba
Deadline	2024-05-31 00:00
Maximum points	1

COMPLETED



- `api/question/quiz/id`

Exam-Portal

Quiz 1

Deadline Date: 2025-03-02

This quiz aims to assess your understanding of the fundamental concepts and principles of computer networking. Computer networks play a crucial role in facilitating communication and resource sharing among devices.

Discuss computer networks

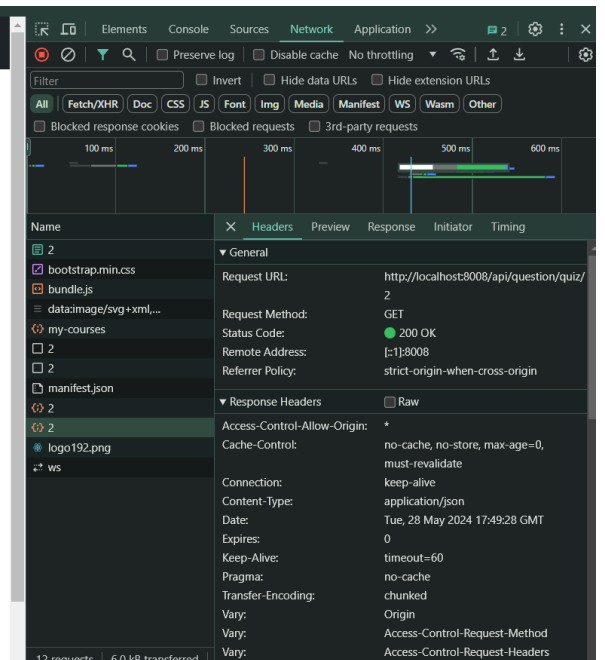
Enter your answer here

Max Points: 5

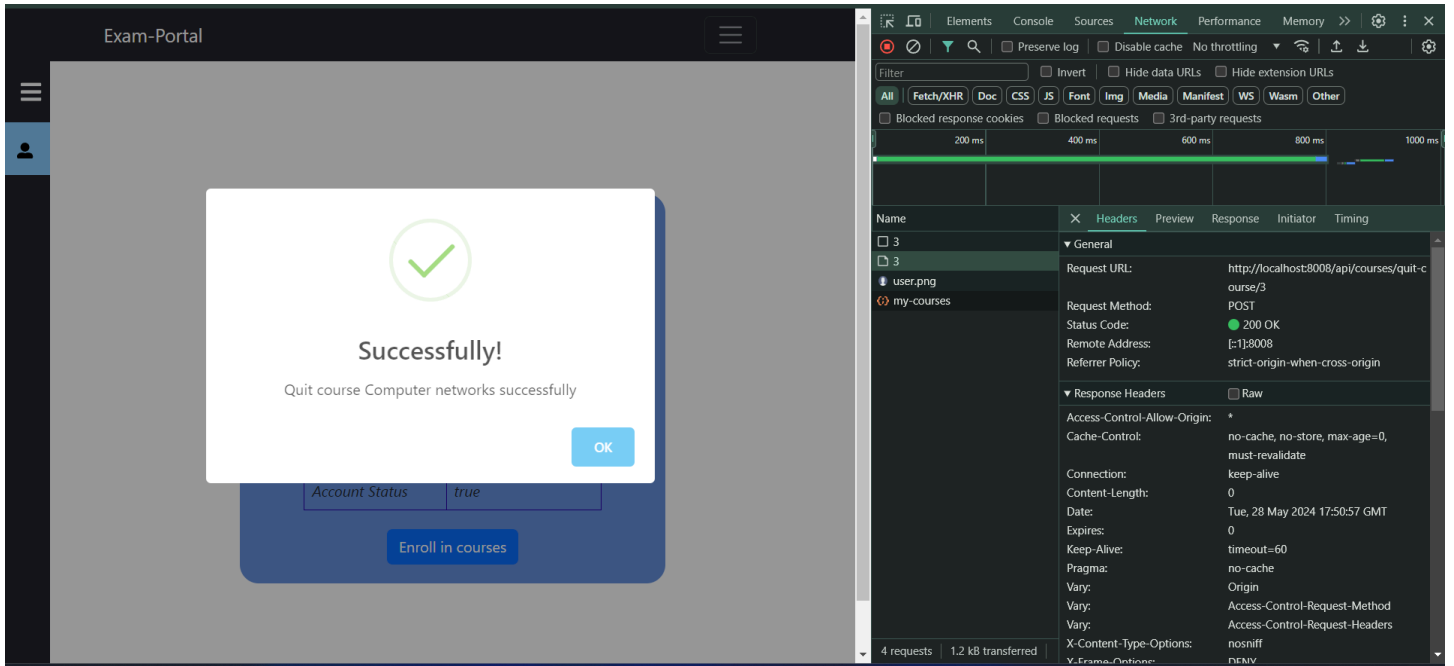
Probni

Enter your answer here

Max Points: 5

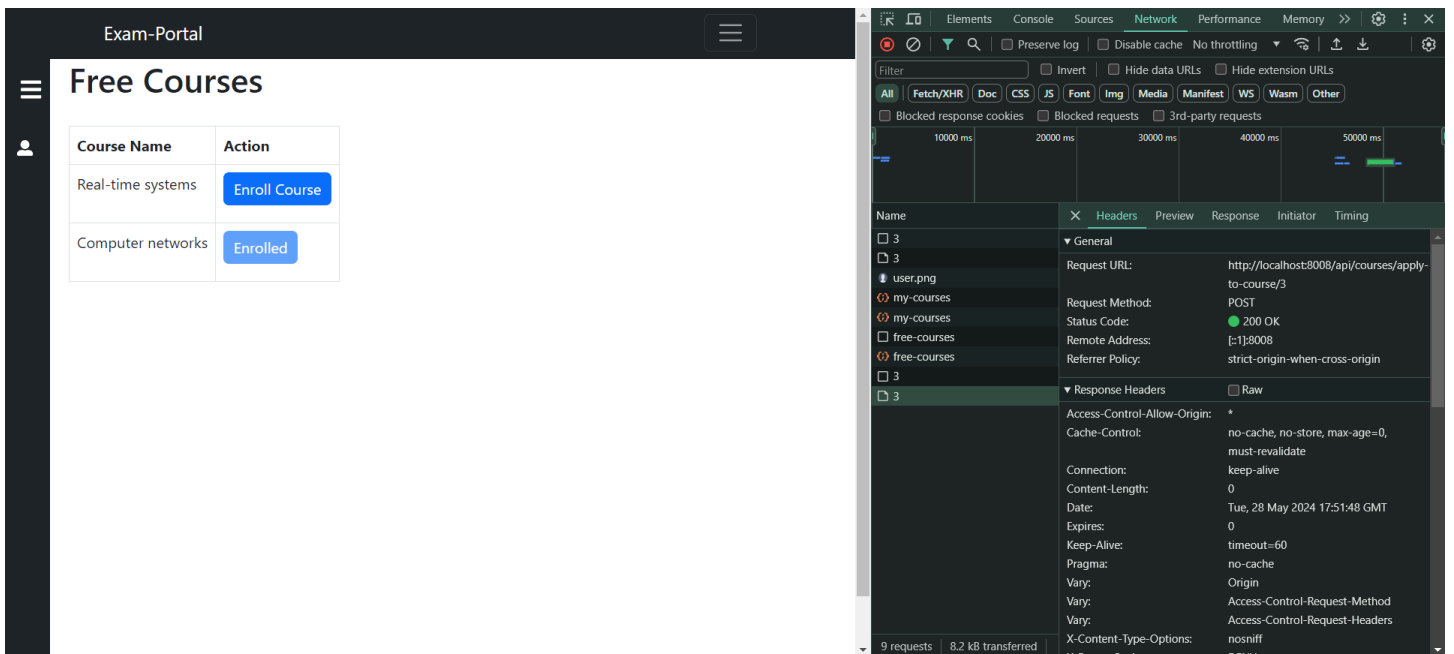


- `api/courses/quit-course/id`



The screenshot shows the Exam-Portal interface with a success message: "Successfully! Quit course Computer networks successfully". Below the message, there is a table with "Account Status" and "true", and a button "Enroll in courses". To the right, the browser's developer tools are open, showing a network request to `http://localhost:8008/api/courses/quit-course/3` with a status code of 200 OK. The response headers are visible, including `Access-Control-Allow-Origin: *`, `Cache-Control: no-cache, no-store, max-age=0, must-revalidate`, `Connection: keep-alive`, `Content-Length: 0`, `Date: Tue, 28 May 2024 17:50:57 GMT`, `Expires: 0`, `Keep-Alive: timeout=60`, `Pragma: no-cache`, `Vary: Origin`, `Vary: Access-Control-Request-Method`, `Vary: Access-Control-Request-Headers`, `X-Content-Type-Options: nosniff`, and `X-Frame-Options: DENY`.

- `api/quiz/apply-to-course/id`



The screenshot shows the Exam-Portal interface with a section titled "Free Courses". It contains a table with two rows: "Real-time systems" with an "Enroll Course" button, and "Computer networks" with an "Enrolled" button. To the right, the browser's developer tools are open, showing a network request to `http://localhost:8008/api/courses/apply-to-course/3` with a status code of 200 OK. The response headers are visible, including `Access-Control-Allow-Origin: *`, `Cache-Control: no-cache, no-store, max-age=0, must-revalidate`, `Connection: keep-alive`, `Content-Length: 0`, `Date: Tue, 28 May 2024 17:51:48 GMT`, `Expires: 0`, `Keep-Alive: timeout=60`, `Pragma: no-cache`, `Vary: Origin`, `Vary: Access-Control-Request-Method`, `Vary: Access-Control-Request-Headers`, `X-Content-Type-Options: nosniff`, and `X-Frame-Options: DENY`.

- `api/users/instructors`

Exam-Portal

Add Course

Title

Description

Select Professor

- Sano
- John
- Alice
- Michael
- Emily
- David
- Sarah
- Chris
- Jessica**
- Ryan
- Emma

Select Professor

Add

Network

Request URL: `http://localhost:8008/api/users/instructors`

Request Method: `GET`

Status Code: `200 OK`

Remote Address: `[::1]:8008`

Referrer Policy: `strict-origin-when-cross-origin`

Response Headers

Access-Control-Allow-Origin: `*`

Cache-Control: `no-cache, no-store, max-age=0, must-revalidate`

Connection: `keep-alive`

Content-Type: `application/json`

Date: `Tue, 28 May 2024 17:53:36 GMT`

Expires: `0`

Keep-Alive: `timeout=60`

Pragma: `no-cache`

Transfer-Encoding: `chunked`

Vary: `Origin`

Vary: `Access-Control-Request-Method`

Vary: `Access-Control-Request-Headers`

X-Content-Type-Options: `nosniff`

X-Frame-Options: `DENY`

- `api/courses/all`

Exam-Portal

Courses

Add Course

title opis	Delete	Novi predmet opis
hghg hgzg	Delete	novi kurs desc
nana nanan	Delete	test test
Real-time systems Introduction to basic principles, methodologies, and techniques of real-time operating systems, common hardware and software, real-time operating system, common interfaces, as well as the design and evaluation.	Delete	Computer networks On the computer networks course, stud about connecting devices and ensuring communication through addressing, pro security, and troubleshooting, gaining s network planning and maintenance thro exercises.

Network

Request URL: `http://localhost:8008/api/courses/all`

Request Method: `GET`

Status Code: `200 OK`

Remote Address: `[::1]:8008`

Referrer Policy: `strict-origin-when-cross-origin`

Response Headers

Access-Control-Allow-Origin: `*`

Cache-Control: `no-cache, no-store, max-age=0, must-revalidate`

Connection: `keep-alive`

Content-Type: `application/json`

Date: `Tue, 28 May 2024 17:54:58 GMT`

Expires: `0`

Keep-Alive: `timeout=60`

Pragma: `no-cache`

Transfer-Encoding: `chunked`

Vary: `Origin`

Vary: `Access-Control-Request-Method`

Vary: `Access-Control-Request-Headers`

X-Content-Type-Options: `nosniff`

X-Frame-Options: `DENY`

- `api/homework/create-homework`

The screenshot shows the 'Exam-Portal' interface with a sidebar menu and a main content area. A modal dialog is displayed in the center with a green checkmark and the text 'Assignment Added!' and 'fdghj successfully added'. The background shows a list of lessons and assignments. To the right, a network tool shows a POST request to 'http://localhost:8008/api/homework/create-homework' with a status code of 200 OK. The request headers include 'Content-Type: application/json' and 'Referer: http://localhost:8008'. The response headers include 'Access-Control-Allow-Origin: *' and 'Content-Type: application/json'.

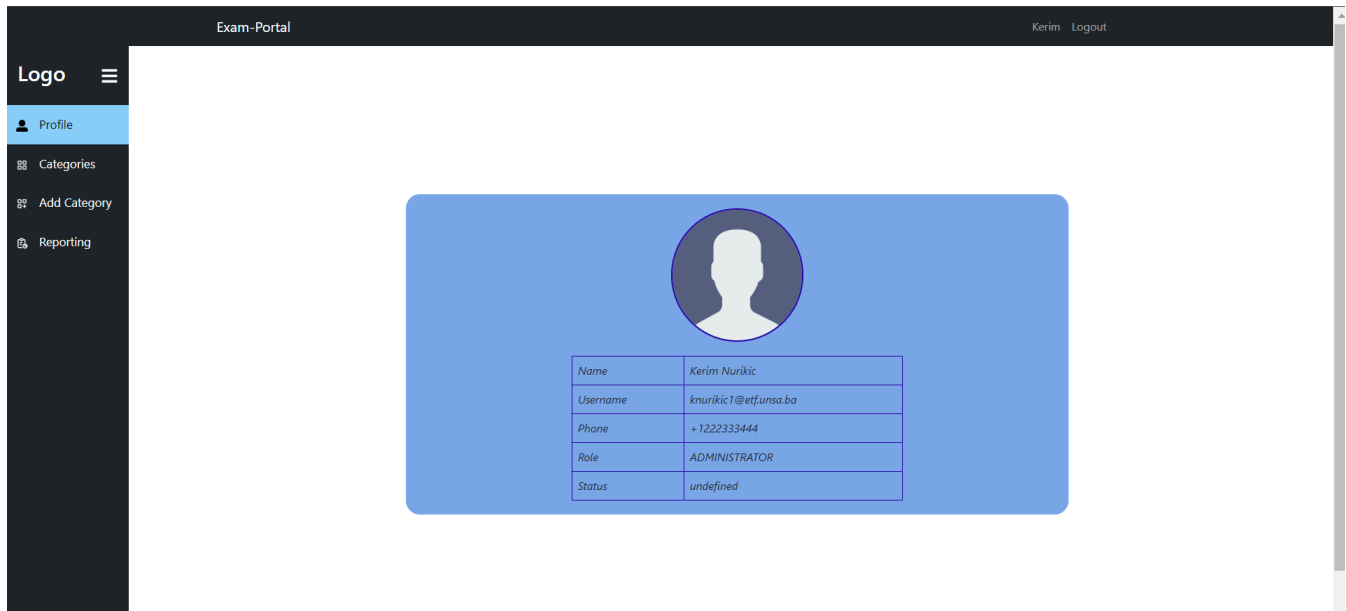
- `api/lesson/create-lesson`

The screenshot shows the 'Exam-Portal' interface with a sidebar menu and a main content area. A modal dialog is displayed in the center with a green checkmark and the text 'Lesson Added!' and 'undefined successfully added'. The background shows a list of lessons and assignments. To the right, a network tool shows a POST request to 'http://localhost:8008/api/lesson/create-lesson' with a status code of 200 OK. The request headers include 'Content-Type: application/json' and 'Referer: http://localhost:8008'. The response headers include 'Access-Control-Allow-Origin: *' and 'Content-Type: application/json'.

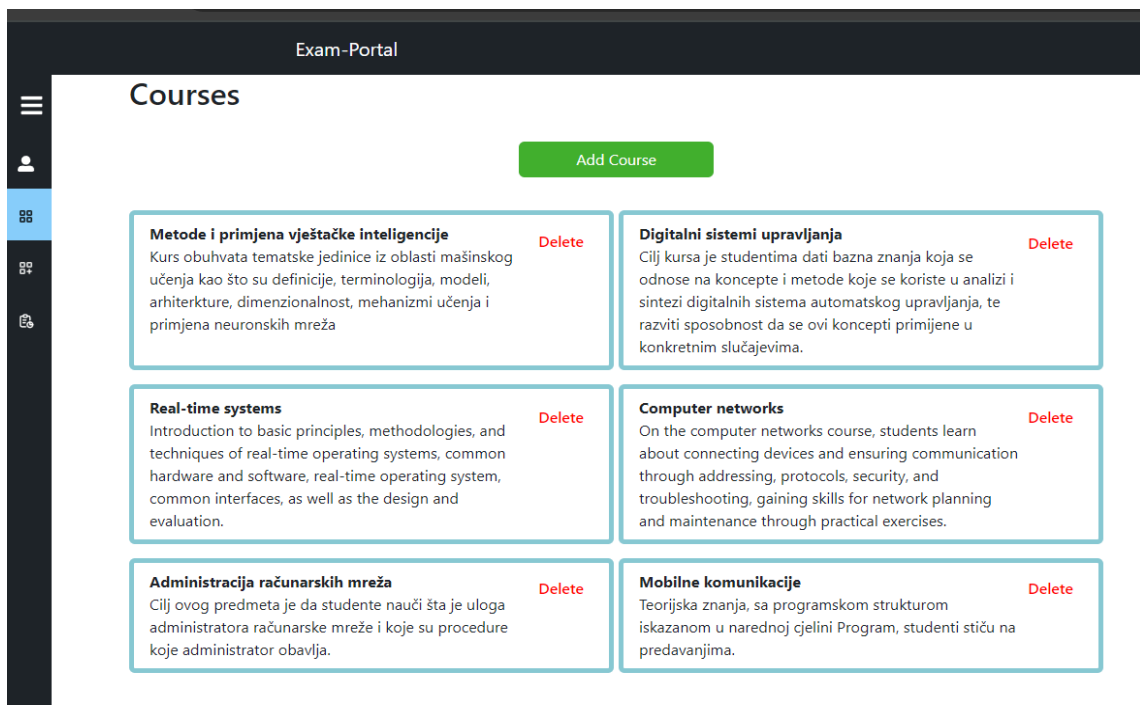
UI komponente

Administrator:

- Pregled profila administratora:



- Pregled kurseva i dodavanje novog kursa



- Dodavanje novog kursa

Add Course

Title

Description

Enter Course Description

Start Date

mm/dd/yyyy

End Date

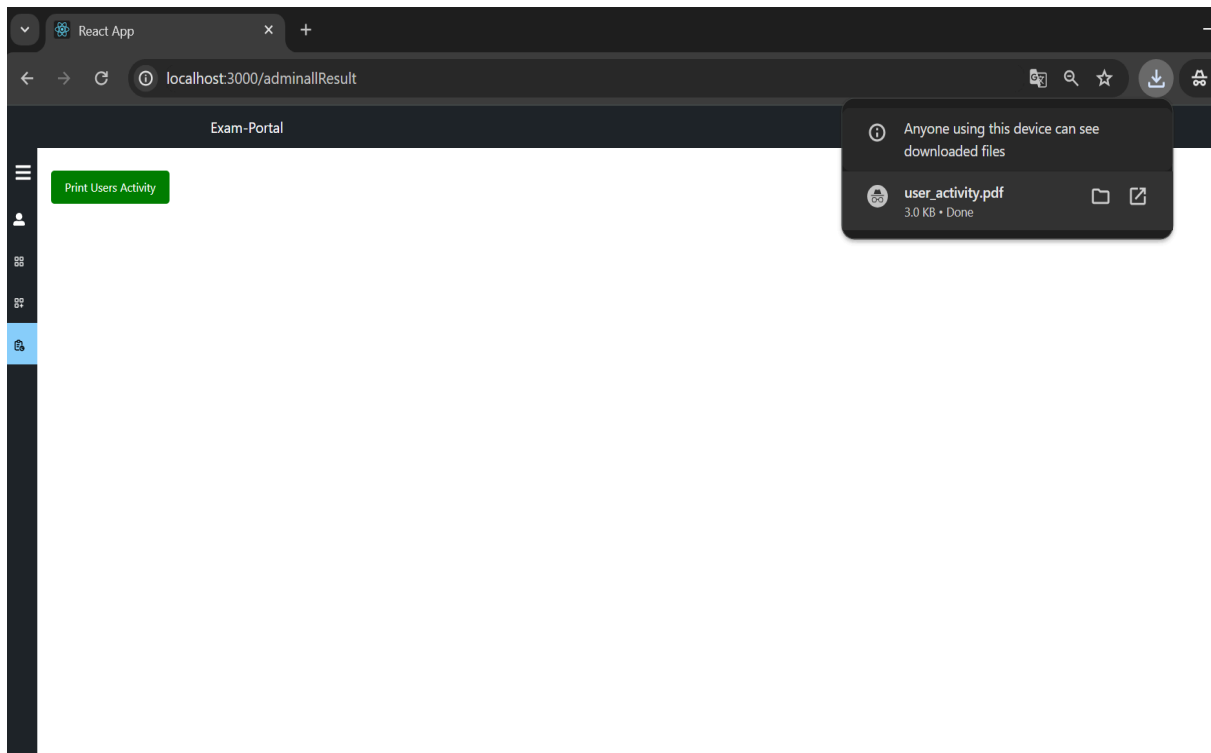
mm/dd/yyyy

Professor

Select Professor

Add

- Pdf izvještaj logovanja



- Pregled profila profesora

Exam-Portal

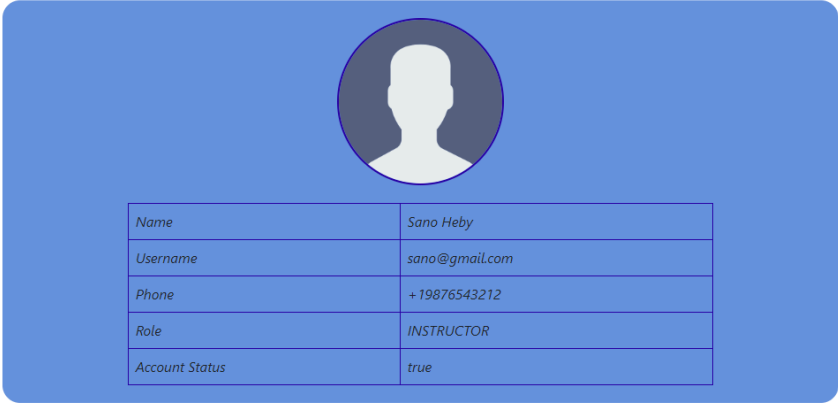
Sano Logout

≡

👤

⚙️

⚙️



Name	Sano Heby
Username	sano@gmail.com
Phone	+19876543212
Role	INSTRUCTOR
Account Status	true

- Pregled kurseva koje profesor predaje

localhost:3000/instructor/course/2

≡

👤 Profile

⚙️ Real-time systems

⚙️ Administracija računarskih mreža

[Open lesson](#)

[Open lesson](#)

Assignments

Implementing and Analyzing Sorting Algorithms
 This assignment involves implementing several sorting algorithms, including Bubble Sort, Merge Sort, and Quick Sort, in a programming language of your choice (e.g., Python, Java, C++).
[Open assignment](#)

Creating a Simple Machine Learning Model for Predictive Analysis
 In this assignment, you will build a simple machine learning model to perform predictive analysis on a dataset of your choice (e.g., predicting house prices, classifying types of flowers).
[Open assignment](#)

C++ measure program duration
 Research the existence of other libraries for measuring the passage of time in the C++ programming language, and then, using the library of your choice, make changes to the program so that the time measurement is done in the chosen way.
[Open assignment](#)

Quizzes

Programming Languages
 Assess your familiarity with various programming languages and their key features.
[Open quiz](#)

Print results

Quiz 2
 This quiz is designed to evaluate your understanding of fundamental concepts and principles related to real-time systems.
[Open quiz](#)

Print results

Software Engineering Principles
 Quiz yourself on software development methodologies, such as Agile and Waterfall.
[Open quiz](#)

Print results

Cloud Computing
 Test your knowledge of cloud services, including IaaS, PaaS, and SaaS.
[Open quiz](#)

Print results

- Dodavanje kviza,pitanja i odgovora

Add Quiz

Title

Description

☐ Publish Quiz

Choose a Category:

Start Date

Deadline Date

Question 1

☐ Correct

☐ Correct

Add Answer

Add Question

Add

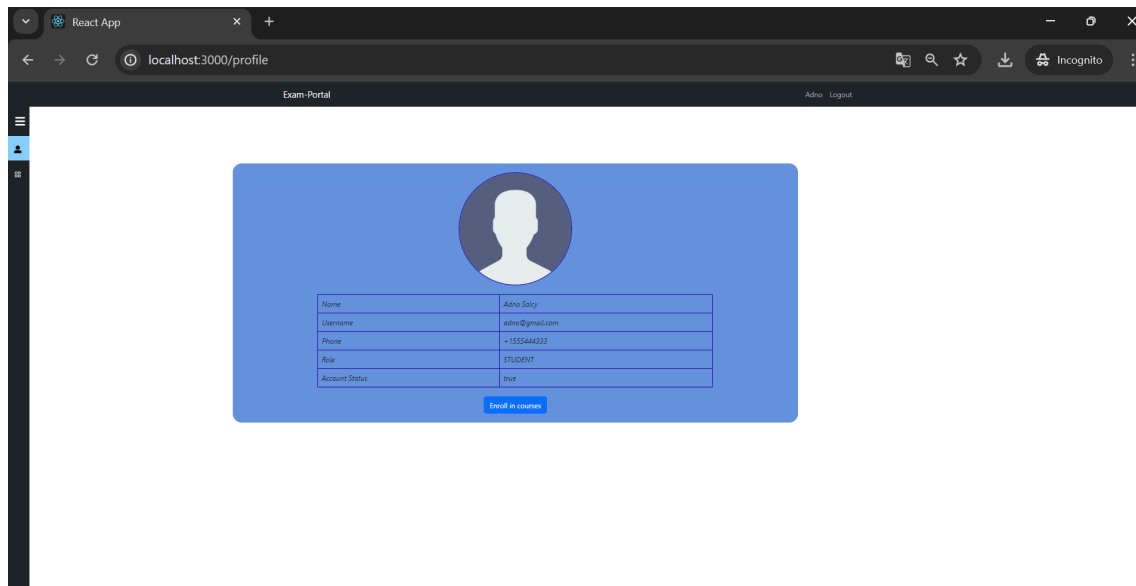
- Prikaz zadaća koje su studenti predali na ocjenjivanje i ocjenjena i neocjenjena zadaća:

- Prikaz studenata i njihovi rezultati kviza

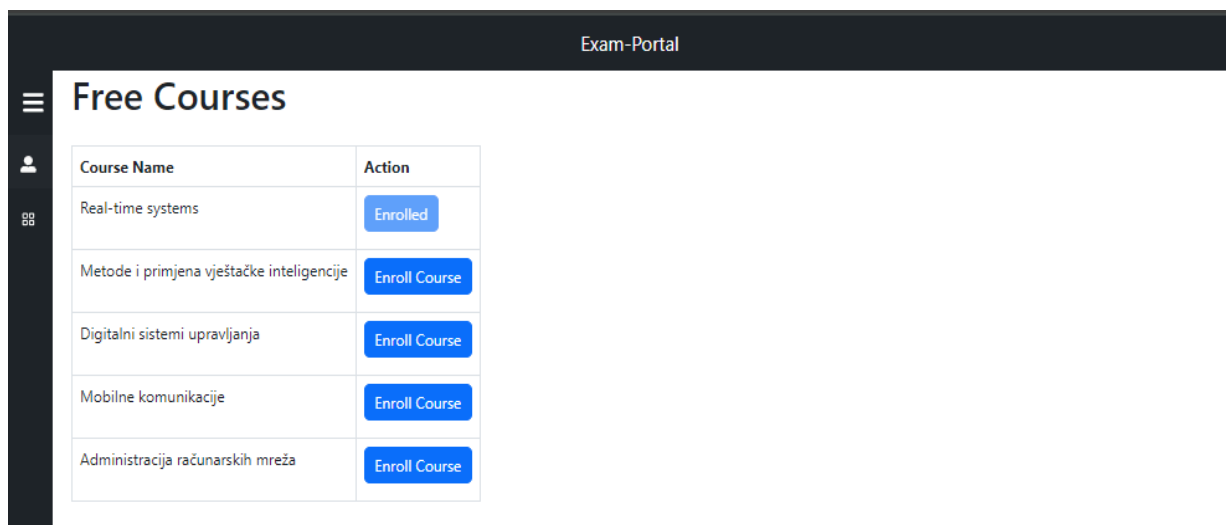
React App			
localhost:3000/quiz/result/82			
Quiz: Artificial Intelligence			
Info: Explore your understanding of AI concepts, including machine learning and neural networks.			
Student quizz achievements			
First Name	Last Name	Email	Total Points
Nedo	Mury	nedo@gmail.com	0

Student

- Prikaz profila



- Dostupni kursevi za prijavu



- Prikaz detalja kursa na koji je student prijavljen

Exam-Portal

Real-time systems

Introduction to basic principles, methodologies, and techniques of real-time operating systems, common hardware and software, real-time operating system, common interfaces, as well as the design and evaluation.

Lessons

Real Time Systems Intro Lesson
[Open lesson](#)

Agile Methodologies
[Open lesson](#)

Computer Architecture and Organization
[Open lesson](#)

Functional Programming Principles
[Open lesson](#)

Mobile Application Development
[Open lesson](#)

Real Time Systems Intro Lesson
[Open lesson](#)

Assignments

Implementing and Analyzing Sorting Algorithms
 This assignment involves implementing several sorting algorithms, including Bubble Sort, Merge Sort, and Quick Sort, in a programming language of your choice (e.g., Python, Java, C++).
 Max points: 1
Available: 2024-05-31 - 2024-06-02
[Open assignment](#)

Creating a Simple Machine Learning Model for Predictive Analysis
 In this assignment, you will build a simple machine learning model to perform predictive analysis on a dataset of your choice (e.g., predicting house prices, classifying types of flowers).
 Max points: 1
Available: 2024-05-23 - 2024-06-01
[Open assignment](#)

C++ measure program duration
 Research the existence of other libraries for measuring the passage of time in the C++ programming language, and then, using the library of your choice, make changes to the program so that the time measurement is done in the chosen way.
 Max points: 5
Available: 2025-03-02 - 2024-03-02
[Open assignment](#)

Quizzes

Programming Languages
 Assess your familiarity with various programming languages and their key features.
 Max points: 0
Available: 2024-05-29 - 2024-05-31
[Open quiz](#)

Quiz 2
 This quiz is designed to evaluate your understanding of fundamental concepts and principles related to real-time systems.
 Max points: 10
Available: 2024-03-02 - 2025-03-02
[Open quiz](#)

- Stranica za prikaz i predaju zadaće:

React App

localhost:3000/homework/42

Incognito

Exam-Portal

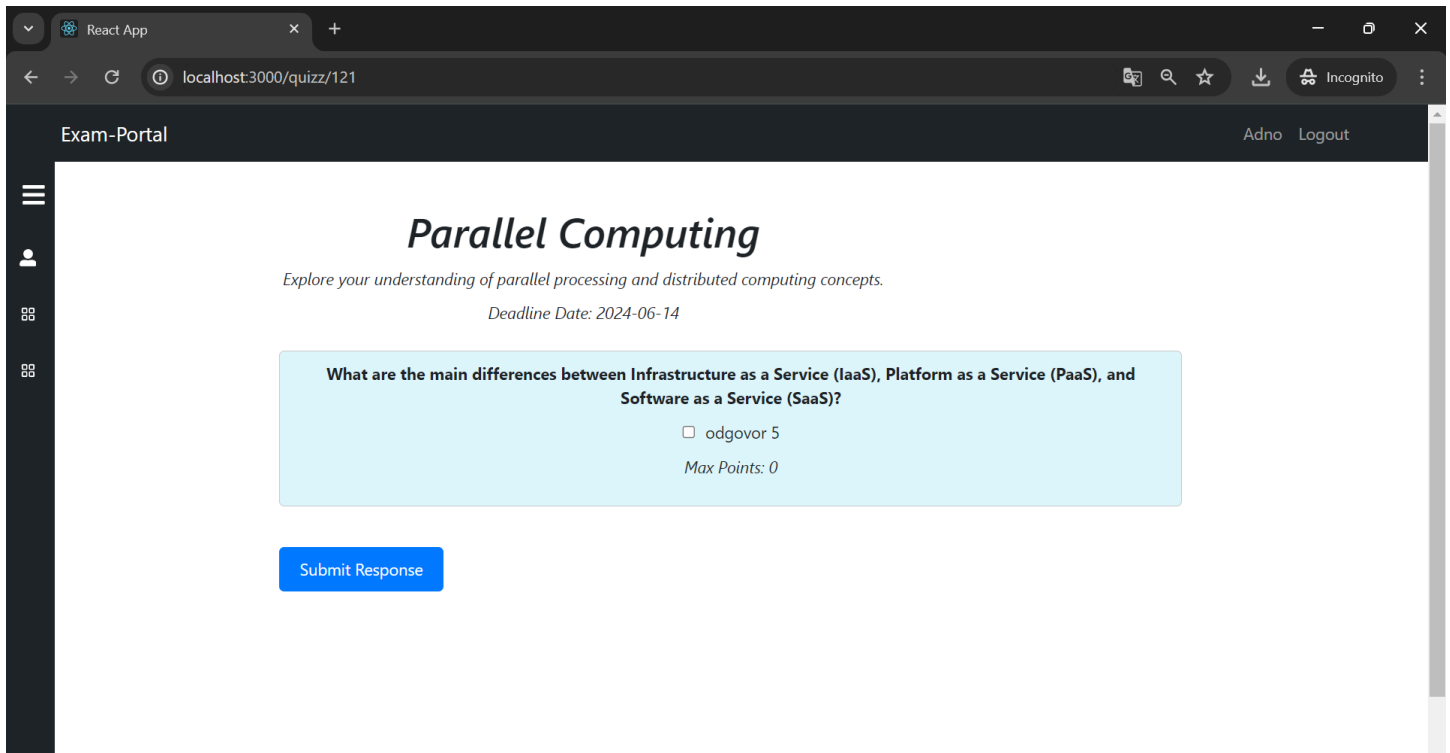
Adno Logout

Name	Adno Salcy
Homework	Implementing and Analyzing Sorting Algorithms
Description	This assignment involves implementing several sorting algorithms, including Bubble Sort, Merge Sort, and Quick Sort, in a programming language of your choice (e.g., Python, Java, C++).
Deadline	2024-06-02 00:00
Maximum points	1

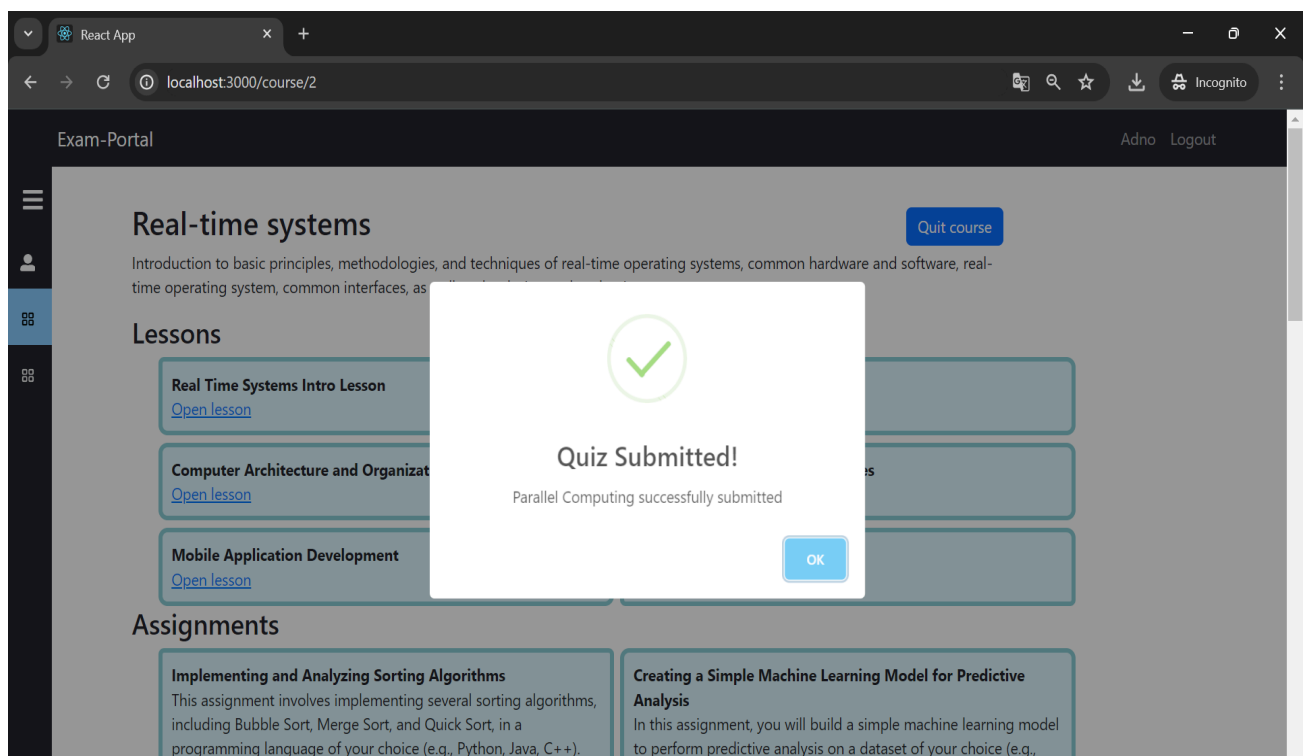
Link to homework:

Submit Homework

- Prikaz kviza



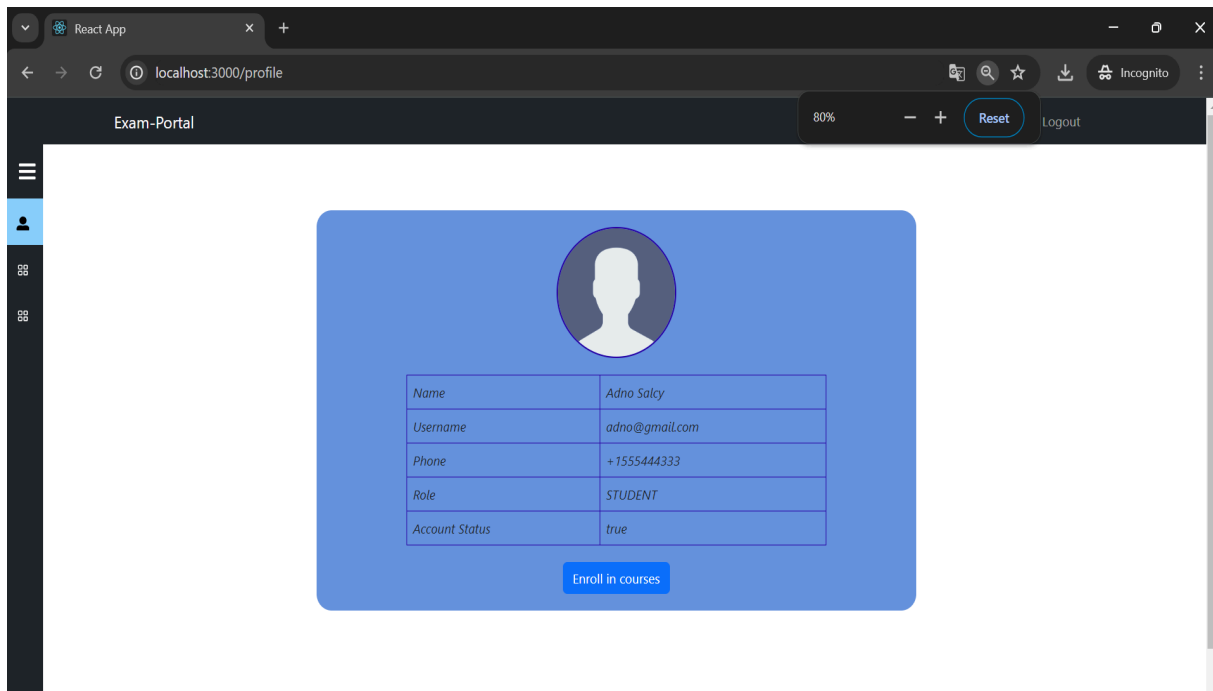
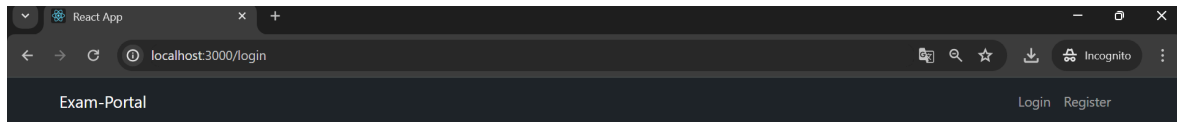
- Predaja kviza



Workflow

Izrada kviza

1. Logiranje u sistem kao student



2. Prikaz dostupnih kvizova za odabrani predmet

The screenshot shows a web browser window with three tabs labeled 'React App'. The address bar displays 'localhost:3000/course/2'. The page has a dark sidebar on the left with a hamburger menu icon and a user profile icon. The main content area is titled 'Quizzes' and features a grid of eight quiz cards. Each card contains the quiz title, a brief description, the maximum points, the availability period, and a link to 'Open quiz'.

Quiz Title	Description	Max points	Available	Open quiz
Programming Languages	Assess your familiarity with various programming languages and their key features.	0	2024-05-29 - 2024-05-31	Open quiz
Quiz 2	This quiz is designed to evaluate your understanding of fundamental concepts and principles related to real-time systems.	10	2024-03-02 - 2025-03-02	Open quiz
Software Engineering Principles	Quiz yourself on software development methodologies, such as Agile and Waterfall.	0	2024-05-30 - 2024-05-31	Open quiz
Cloud Computing	Test your knowledge of cloud services, including IaaS, PaaS, and SaaS.	20	2024-06-07 - 2024-06-08	Open quiz
Artificial Intelligence	Explore your understanding of AI concepts, including machine learning and neural networks.	0	2024-05-30 - 2024-05-31	Open quiz
Computer Architecture	Assess your knowledge of computer hardware components and architecture.	0	2024-05-23 - 2024-05-30	Open quiz
Functional Programming	Evaluate your grasp of functional programming principles and languages like Haskell and Lisp.			
Mobile App Development	Quiz yourself on the basics of developing apps for Android and iOS platforms.			

3. Ulazak na izradu kviza

The screenshot shows a web browser window with three tabs labeled 'React App'. The address bar displays 'localhost:3000/quizz/91'. The page has a dark sidebar on the left with a hamburger menu icon and a user profile icon. The main content area is titled 'Exam-Portal' and features a large heading 'Cloud Computing' with a subtitle 'Test your knowledge of cloud services, including IaaS, PaaS, and SaaS.' and a 'Deadline Date: 2024-06-08'. Below this, there is a quiz question: 'What is Agile methodology, and how does it differ from the Waterfall model in software development?'. The question is marked as 'odgovor1' and has a 'Max Points: 20'. A 'Submit Response' button is located at the bottom of the quiz area.

Exam-Portal Adno Logout

Cloud Computing

Test your knowledge of cloud services, including IaaS, PaaS, and SaaS.

Deadline Date: 2024-06-08

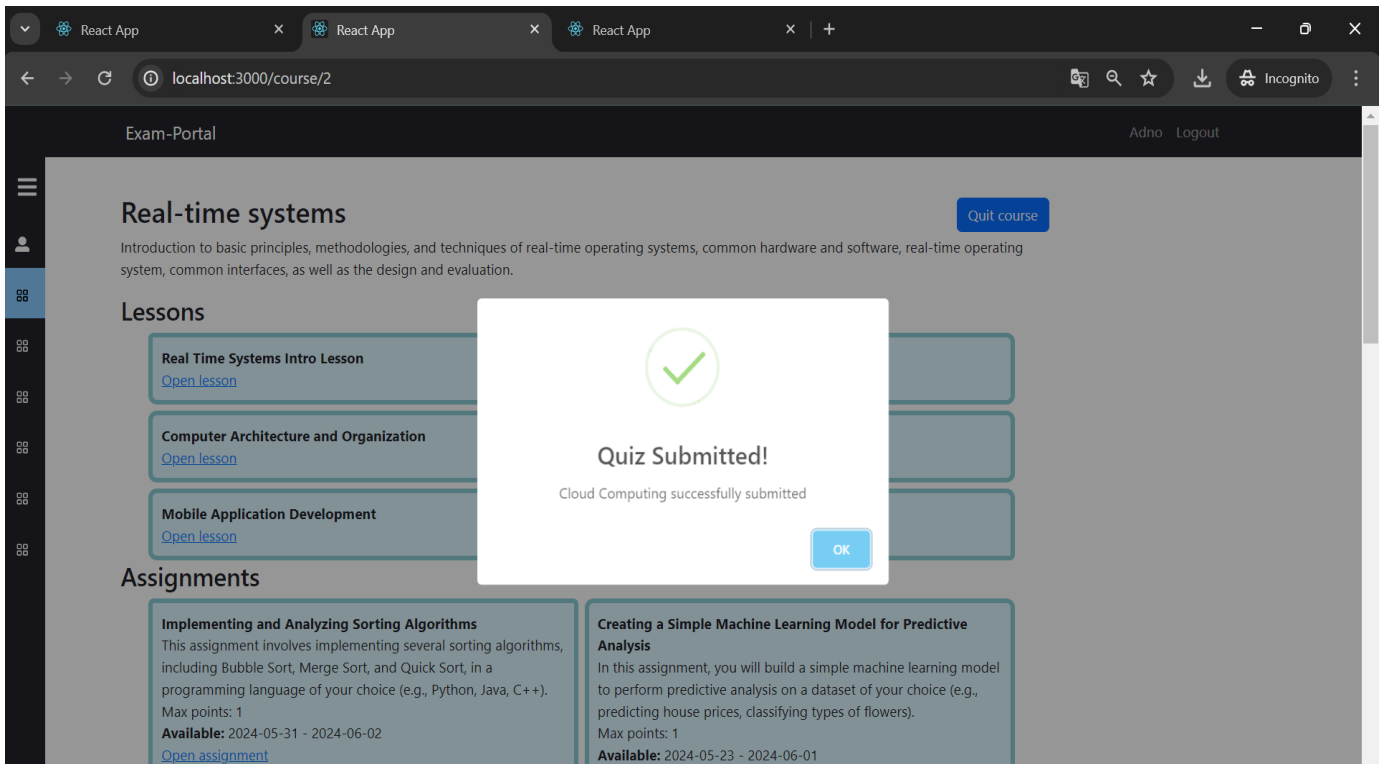
What is Agile methodology, and how does it differ from the Waterfall model in software development?

☒ odgovor1

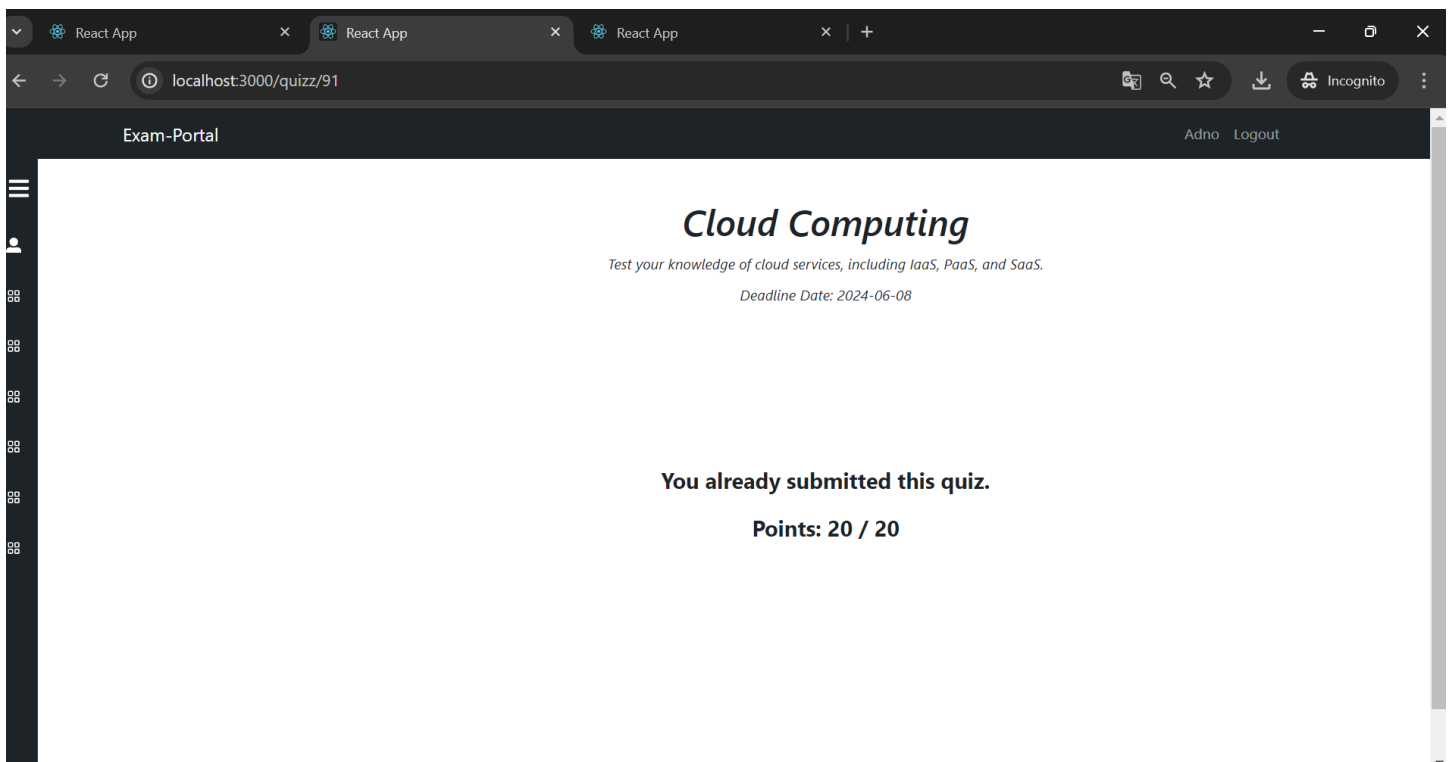
Max Points: 20

Submit Response

4. Predaja kviza

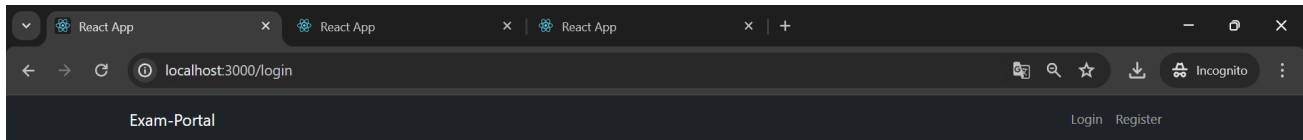


5. Prikaz ponovnog pokušaja ulaska na izradu kviza nakon što je kviz već odrađen i osvojeni poeni



Pregledanje zadaće

1. Logiranje u sistem kao profesor i prikaz profila



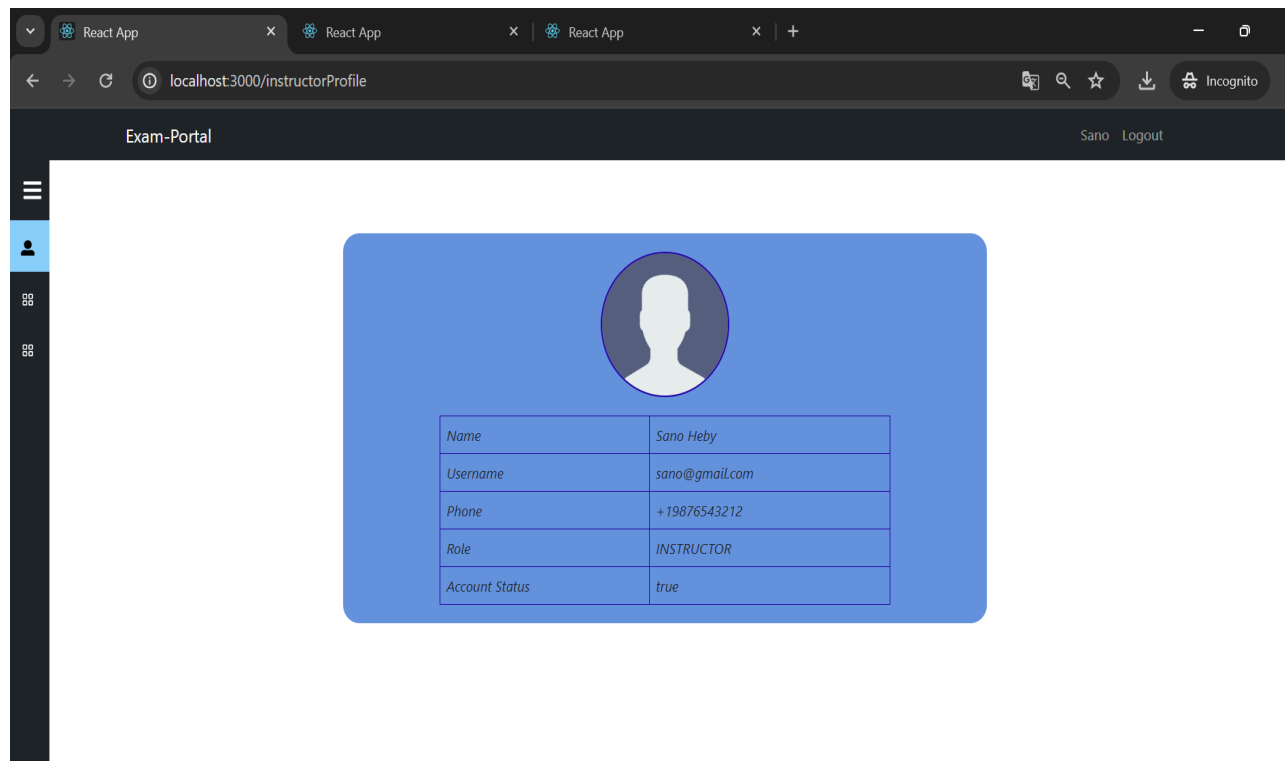
Sign In


User Name

Password

[Login](#)

New User? [Register](#)



	
Name	Sano Heby
Username	sano@gmail.com
Phone	+19876543212
Role	INSTRUCTOR
Account Status	true

2. Pregled detalja zadatke klikom na "Open assignment" otvara novu stranicu sa listom studenata koji su predali zadatak i mogućnosti ocjenjivanja iste

Exam-Portal Sano Logout

Student Assignments

Student Name	Email	Assignment Link	Points
najnovijeime najnovijeprezime	imeprezime@gmail.com	View Assignment	<input type="text"/> Evaluate
Nero Hosy	nero@gmail.com	View Assignment	<input type="text"/> Evaluate
Adno Salcy	adno@gmail.com	View Assignment	<input type="text"/> Evaluate
Nedo Mury	nedo@gmail.com	View Assignment	<input type="text"/> Evaluate

3. Dodavanje poena

Exam-Portal Sano Logout

Student Assignments

Student Name	Email	Assignment Link	Points
najnovijeime najnovijeprezime	imeprezime@gmail.com	View Assignment	10 Delete Points
Nero Hosy	nero@gmail.com	View Assignment	<input type="text"/> Evaluate
Adno Salcy	adno@gmail.com	View Assignment	<input type="text"/> Evaluate
Nedo Mury	nedo@gmail.com	View Assignment	<input type="text"/> Evaluate

4. Izmjena poena i slanje praznog polja

The screenshot shows a web application titled "Exam-Portal" running on localhost:3000. A modal dialog is displayed in the center, titled "localhost:3000 says" with the message "Please enter points before evaluating." and an "OK" button. The background shows a table titled "Student Assignments" with columns for Student Name, Email, and Points. The table lists four students: najnovijeime najnovijeprezime, Nero Hosi, Adno Salcy, and Nedo Mury. Each student has a "View Assignment" link and an "Evaluate" button. The "Points" column is currently empty for all students.

Student Name	Email	Points
najnovijeime najnovijeprezime	imeprezime@gmail.com	
Nero Hosi	nero@gmail.com	
Adno Salcy	adno@gmail.com	
Nedo Mury	nedo@gmail.com	

Dodavanje vrijednosti

The screenshot shows the same "Exam-Portal" application, but now the "Points" column has been updated. The first student, najnovijeime najnovijeprezime, has a value of 3 in the Points column and a "Delete Points" button. The other three students (Nero Hosi, Adno Salcy, and Nedo Mury) still have empty Points columns and "Evaluate" buttons.

Student Name	Email	Assignment Link	Points
najnovijeime najnovijeprezime	imeprezime@gmail.com	View Assignment	3 Delete Points
Nero Hosi	nero@gmail.com	View Assignment	<input type="text"/> Evaluate
Adno Salcy	adno@gmail.com	View Assignment	<input type="text"/> Evaluate
Nedo Mury	nedo@gmail.com	View Assignment	<input type="text"/> Evaluate

ZAKLJUČAK

Implementacija E-Learning informacionog sistema značajno unapređuje obrazovni proces, omogućavajući lakši pristup obrazovnim resursima i bolju komunikaciju između studenta i profesora.. Sistem služi kao komplementarni alat uz klasično obrazovanje, pružajući jednostavan i intuitivan interfejs za sve korisnike.

Iako smo ostvarili mnoge funkcionalnosti, nisu sve planirane opcije implementirane. Kvizovi su ograničeni na pitanja sa ponuđenim odgovorima jer je logičniji izbor uzimajući u obzir standardizaciju i ocjenjivanje. Također, umjesto da administrator dodaje korisnike, svaki korisnik se sam registruje, što je pametniji izbor kada su u pitanju veći sistemi sa mnogo korisnika. Nažalost, nismo imali vremena za integraciju notifikacija.

Sistem već sada pruža čvrstu osnovu za poboljšanje efikasnosti obrazovanja. Korištenjem E-Learning sistema, obrazovne ustanove mogu unaprijediti kvalitetu nastave i prilagoditi se modernim obrazovnim trendovima.