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Enroll no: 21162101019
Sem: 5 Batch: 51 Branch: CBA

Sub: Microservices

Practical 9

AIM: **Demonstrate the secured HTTP through SSL. Symbiosis Pvt Ltd makes NodeJS-based websites and deploys as well. At the time of deployment, websites require some authentication, and encryption policy for security purposes. Apply the following technique and secure said company's website while deploying:**

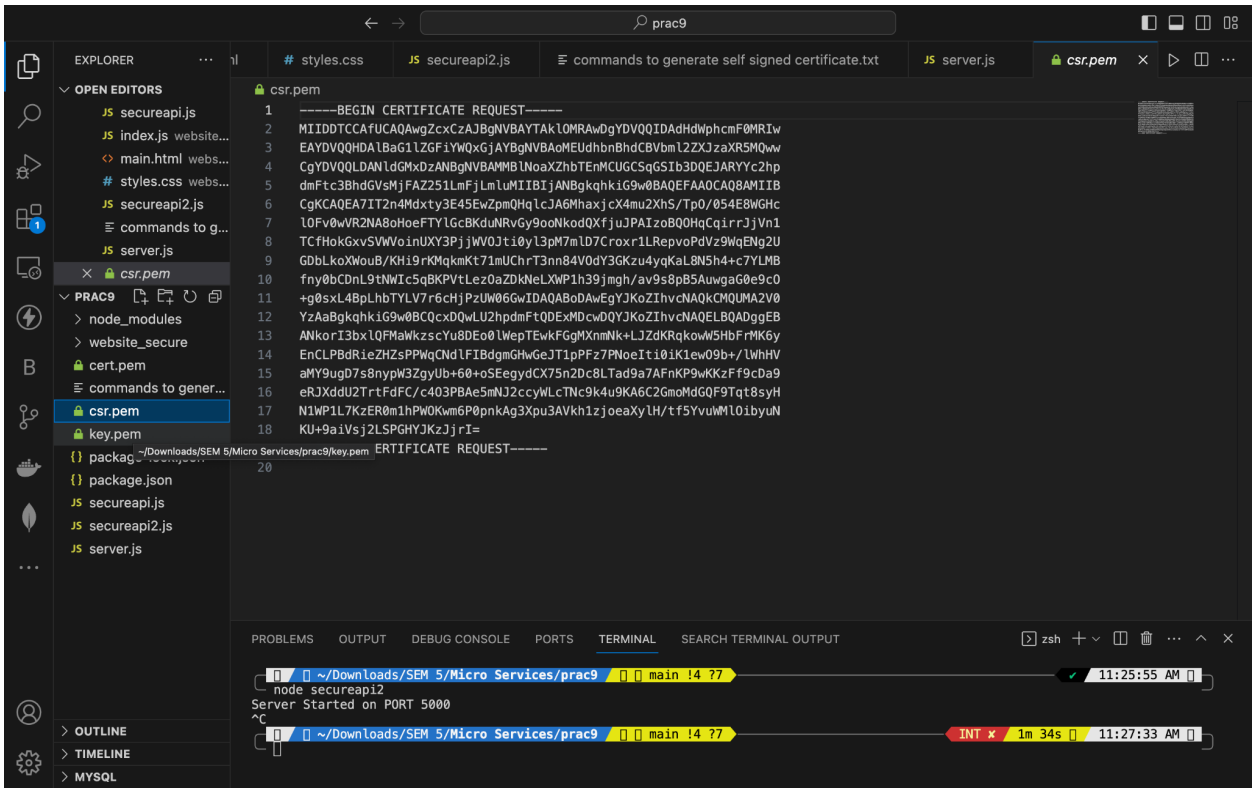
1. **Generate a Public certificate with a public key and certificate**
2. **Connect it with the website using the HTTPS library**
3. **Secure application using Username and password.**
4. **Secure your REST APIs using the Bearer token technique.**
5. **Secure your REST APIs created in previous practicals using username and password**

GITHUB LINK:
https://github.com/Shivam3783/microservice_practicals/tree/main/prac9

Practical 9.1: Generate a Public certificate with a public key and certificate

```
openssl genrsa -out key.pem
openssl req -new -key key.pem -out csr.pem
openssl x509 -req -days 365 -in csr.pem -signkey key.pem -out cert.pem
```

After run this code we will get public key and certificate.


prac9
EXPLORER
styles.css
secureapi2.js
commands to generate self signed certificate.txt
server.js
csr.pem
OPEN EDITORS
secureapi.js
index.js website...
main.html webs...
styles.css webs...
secureapi2.js
commands to g...
server.js
csr.pem
PRAC9
node_modules
website_secure
cert.pem
commands to gener...
csr.pem
key.pem
package.json
secureapi.js
secureapi2.js
server.js
-----BEGIN CERTIFICATE REQUEST-----
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+g0sxL4BpLhbTYLV7r6cHjPzUW06GwIDAQABoDAwEgYJKoZIhvcNAQkCMQUMA2V0
YzAaBgkqhkiG9w0BCQcxDQwLU2hpdmFtQDExMDcwDQYJKoZIhvcNAQELBQADggEB
ANkorI3bxlQFMaWkzscYu8DEo0lWepTEwkFGgMXnmNk+LJZdKRqkowW5HbFrMK6y
EnCLPBdRieZHZsPPWqCNdlFIBdgmGHwGeJT1pPFz7PNoeIti0iK1ewO9b+/lWhHV
aMY9ugD7s8nypW3ZgyUb+60+oSEegydCX75n2Dc8LTad9a7AFnKP9wKKzFf9cDa9
eRJXddU2TrtFdFC/c4O3PBAe5mNJ2ccyWLcTNc9k4u9KA6C2GmoMdGQF9Tqt8syH
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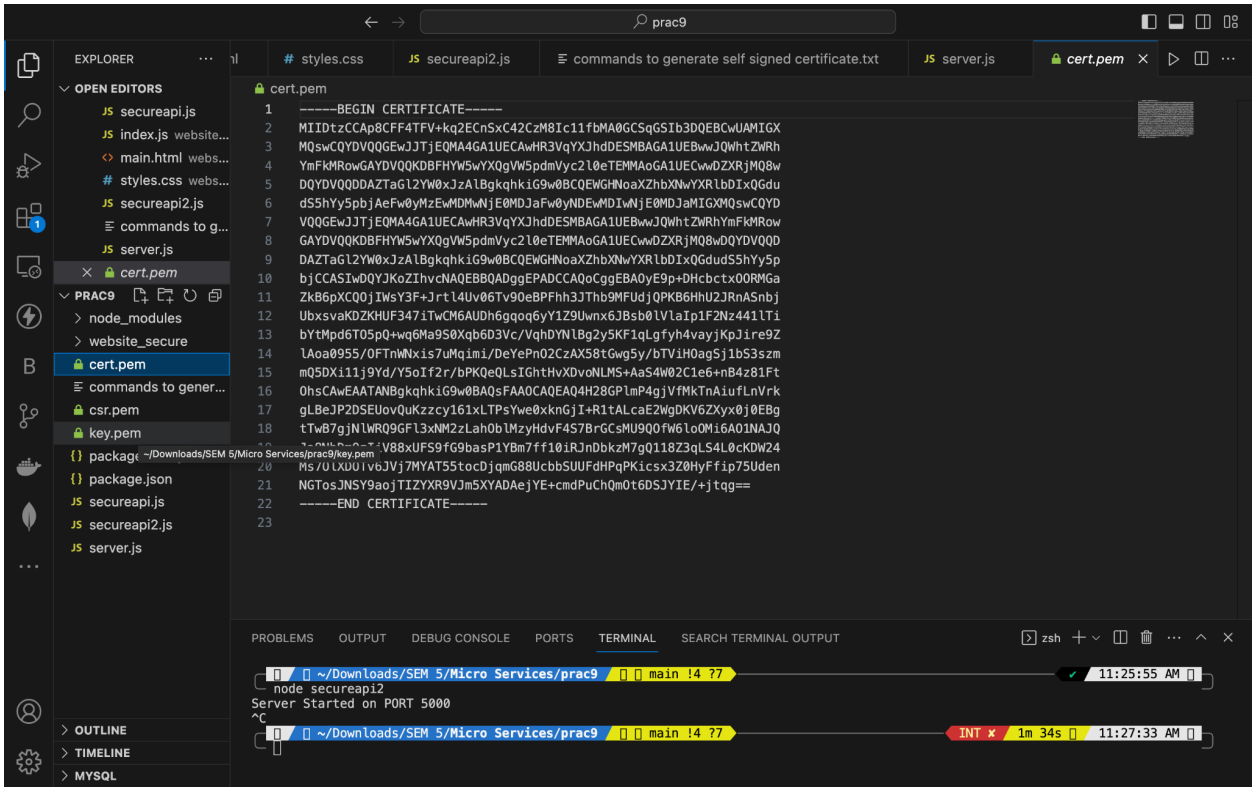
KU+9aiVsj2LSPGHYJKzJjrI=
-----END CERTIFICATE REQUEST-----
~/Downloads/SEM 5/Micro Services/prac9/key.pem
PROBLEMS
OUTPUT
DEBUG CONSOLE
PORTS
TERMINAL
SEARCH TERMINAL OUTPUT
zsh
~/Downloads/SEM 5/Micro Services/prac9
main !4 ?7
11:25:55 AM
node secureapi2
Server Started on PORT 5000
^C
INT
1m 34s
11:27:33 AM
OUTLINE
TIMELINE
MYSQL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server.js
cert.pem
PRAC9
node_modules
website_secure
cert.pem
commands to gener...
csr.pem
key.pem
package.json
secureapi.js
secureapi2.js
server.js
-----BEGIN CERTIFICATE-----
MIIDtzCCAp8CFF4TFV+kq2ECnSxC42CzM8Ic11fbMA0GCSqGSIb3DQEBCwUAMIGX
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DQYDVQQDDAZTaGl2YW0xJzAlBgkqhkiG9w0BCQEWGHNoaXZhbXNwYXRlbDIxQGdu
dS5hYy5pbjAeFw0yMzEwMDMwNjE0MDJaFw0yNDEwMDIwNjE0MDJaMIGXMQswCQYD
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gLBeJP2DSEUovQuKzzcy161xLTPsYwe0xknGjI+R1tALcaE2WgDKV6ZXyx0j0EBg
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Ms/OlXUUIv6JVj7MYAT55tocDjqmG88UcbbSUUFdHPqPKicsx3Z0HyFfip75Uden
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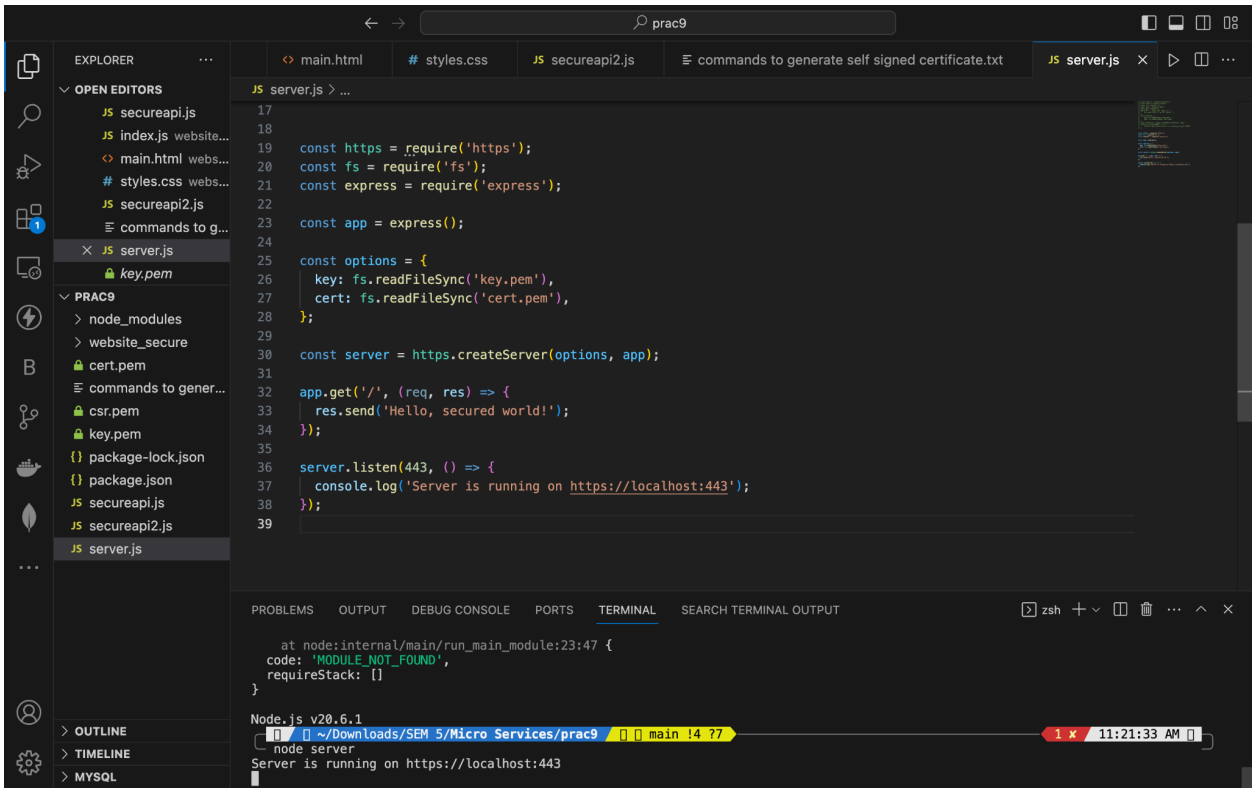
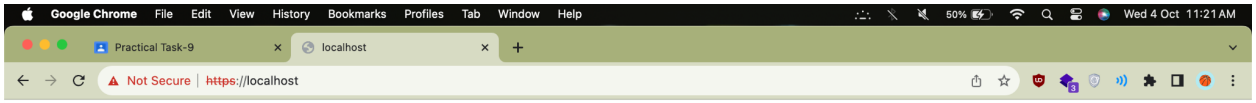
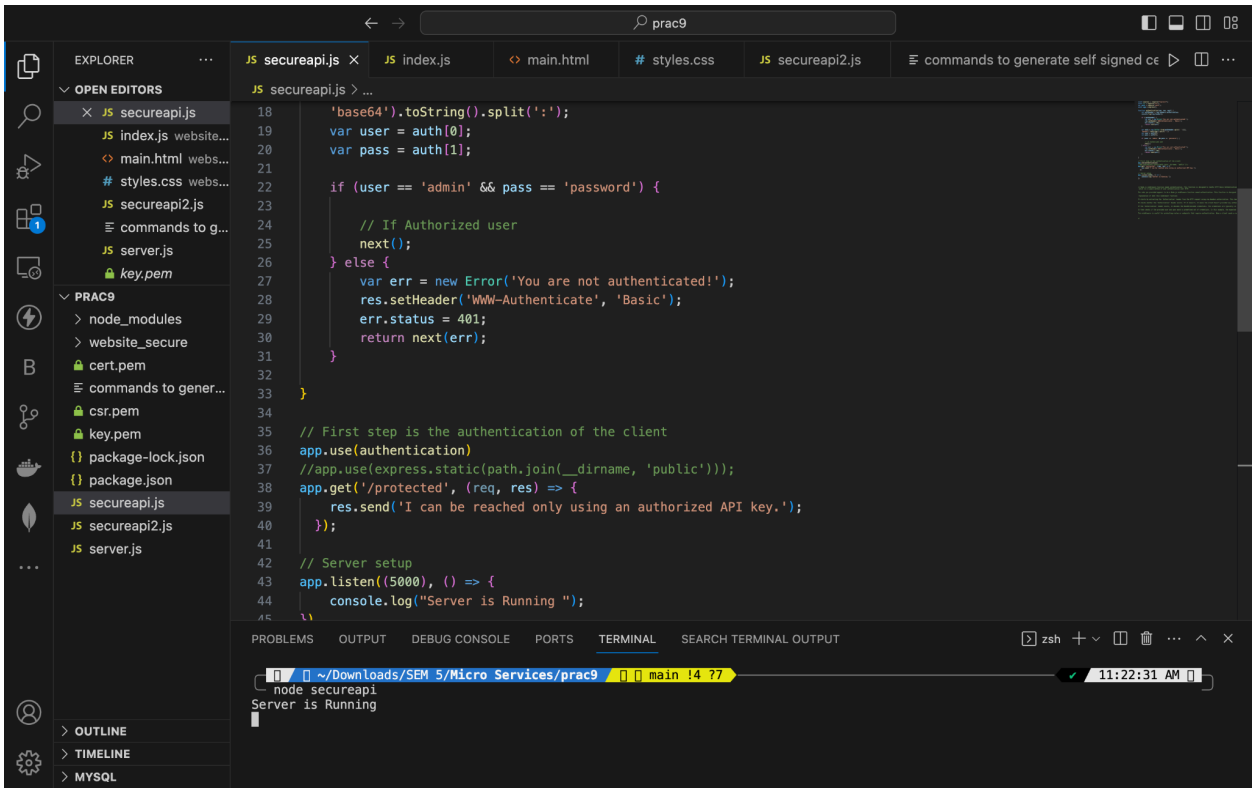
-----END CERTIFICATE-----
~/Downloads/SEM 5/Micro Services/prac9/key.pem
PROBLEMS
OUTPUT
DEBUG CONSOLE
PORTS
TERMINAL
SEARCH TERMINAL OUTPUT
zsh
~/Downloads/SEM 5/Micro Services/prac9
main !4 ?7
11:25:55 AM
node secureapi2
Server Started on PORT 5000
^C
INT
1m 34s
11:27:33 AM
OUTLINE
TIMELINE
MYSQL

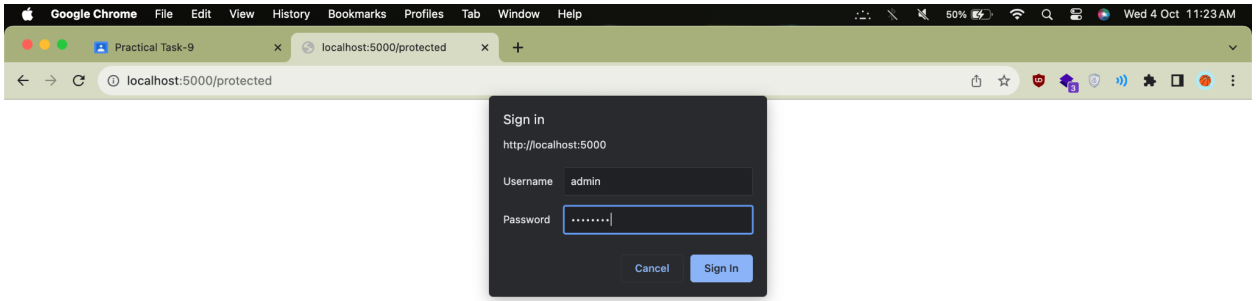
Practical 9.2: Connect it with the website using the HTTPS library

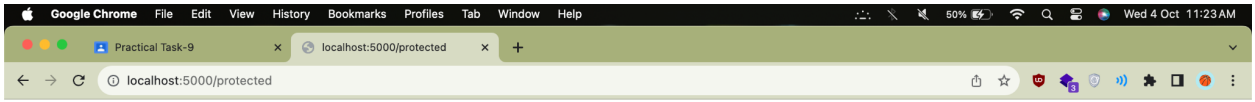




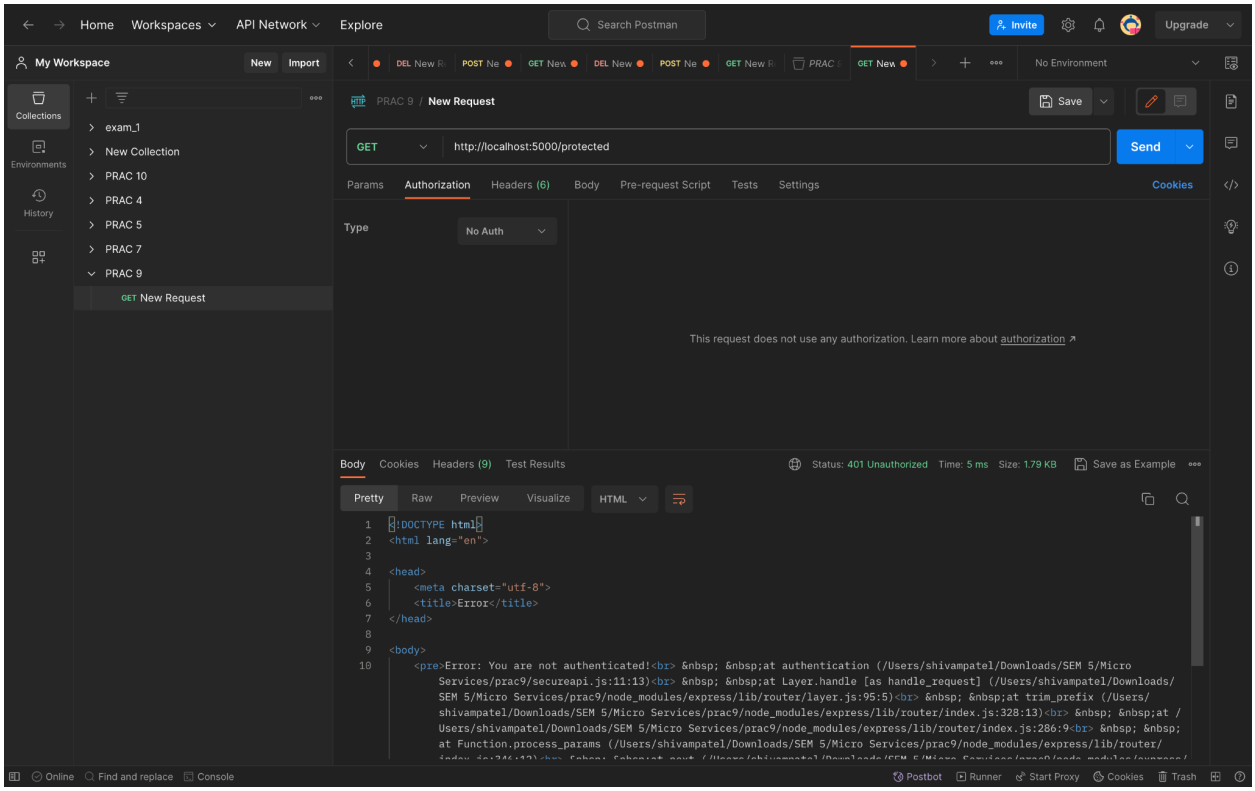
Practical 9.3: Secure application using Username and password.

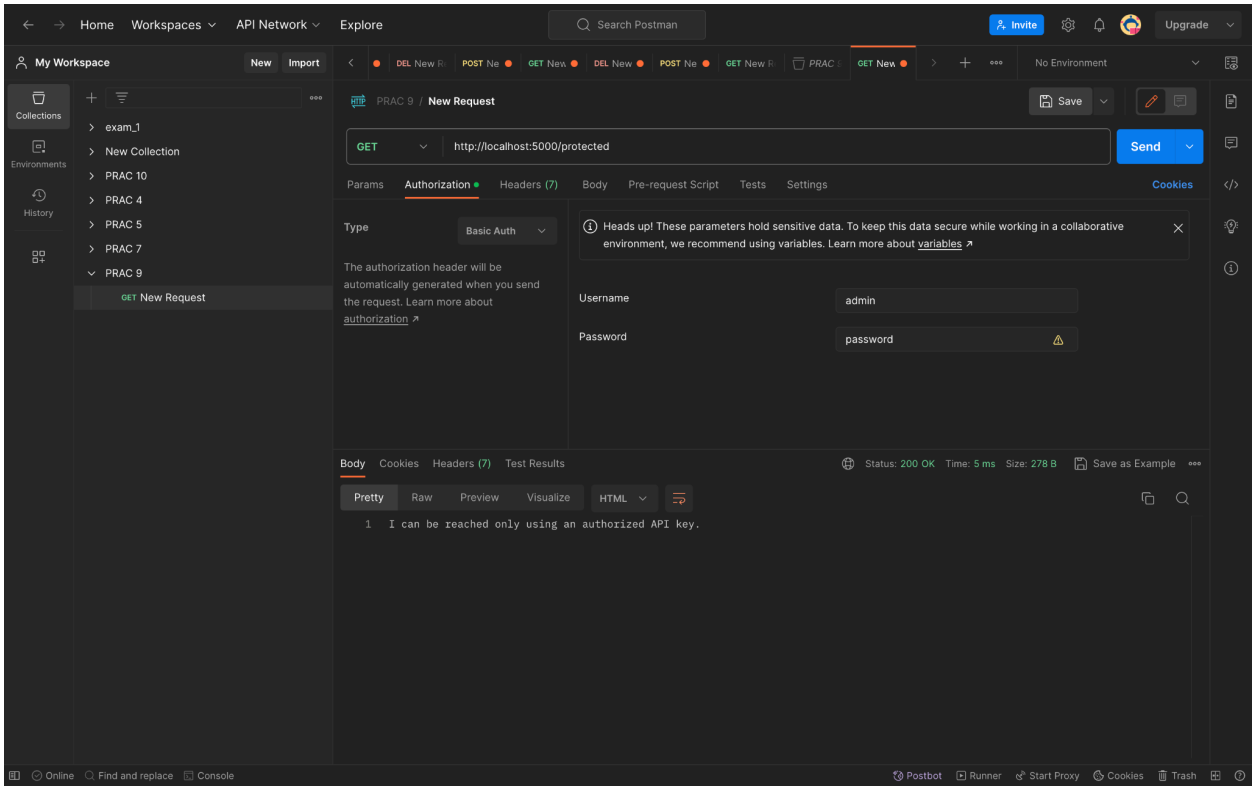




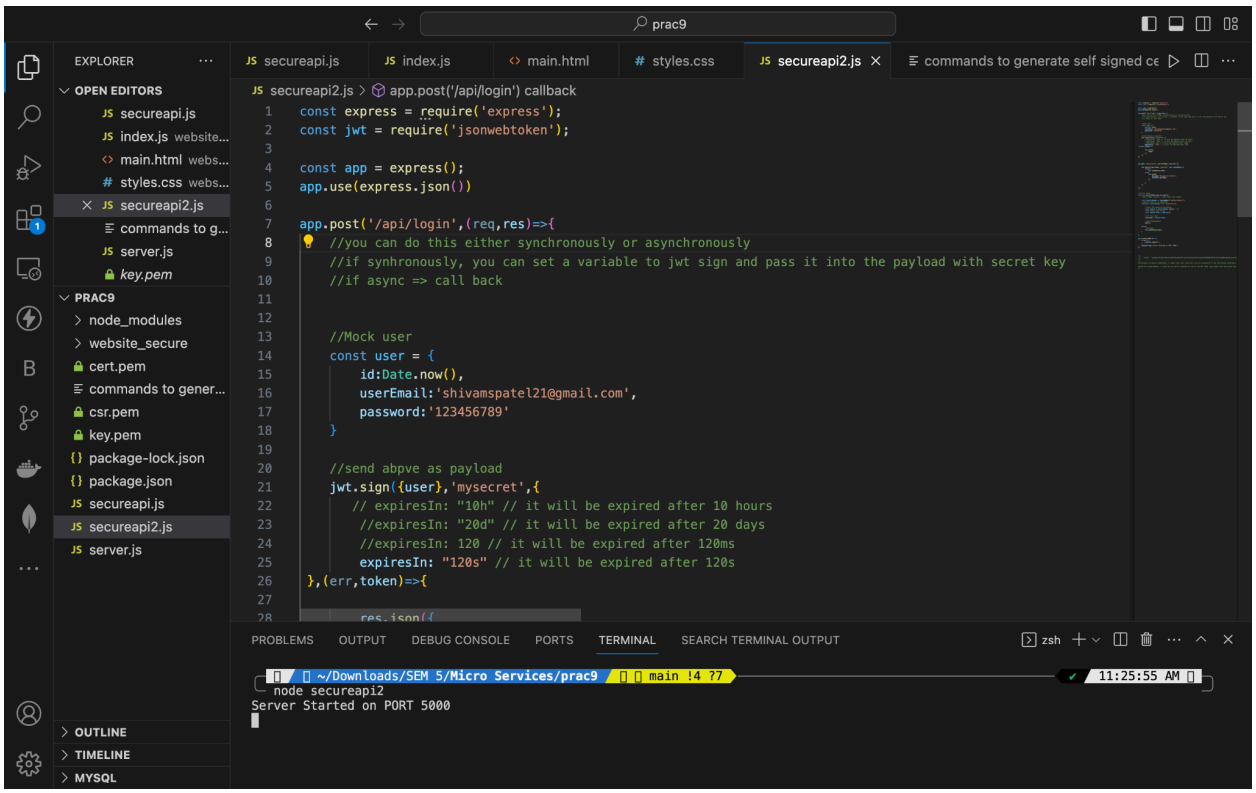


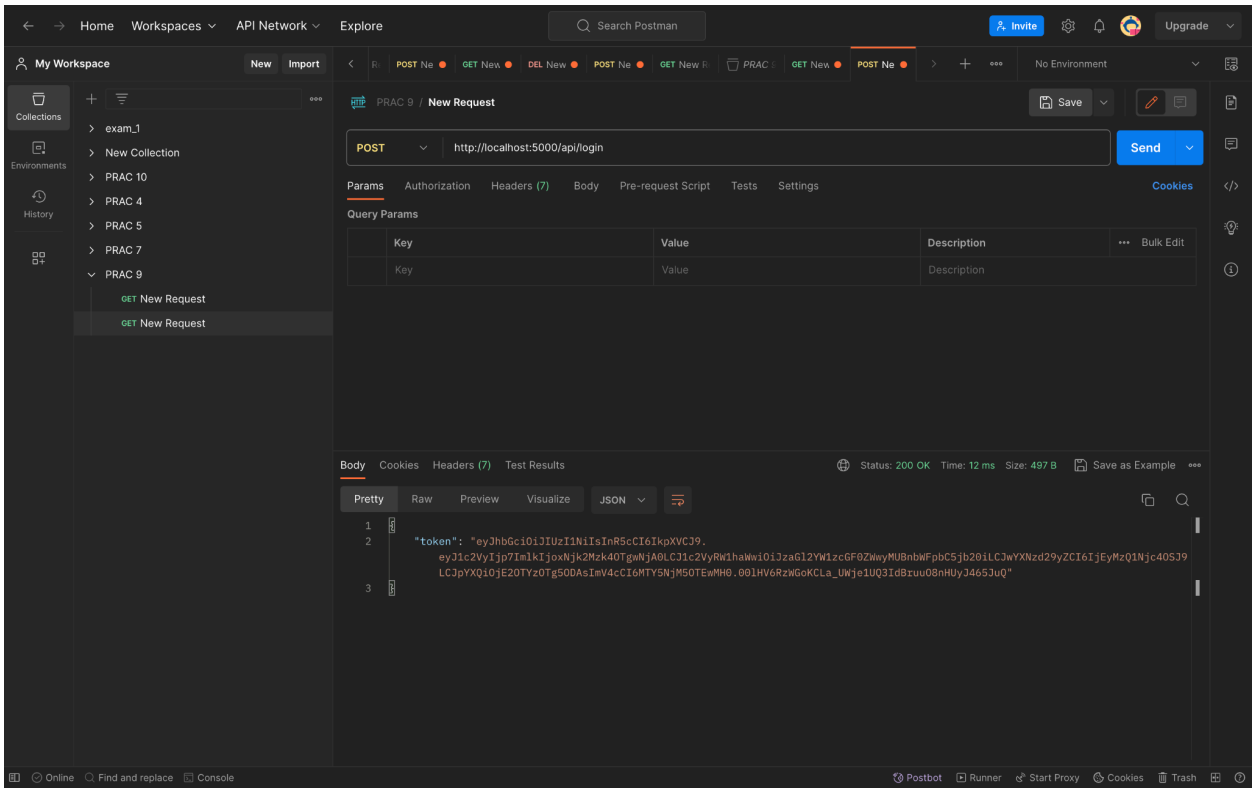
I can be reached only using an authorized API key.

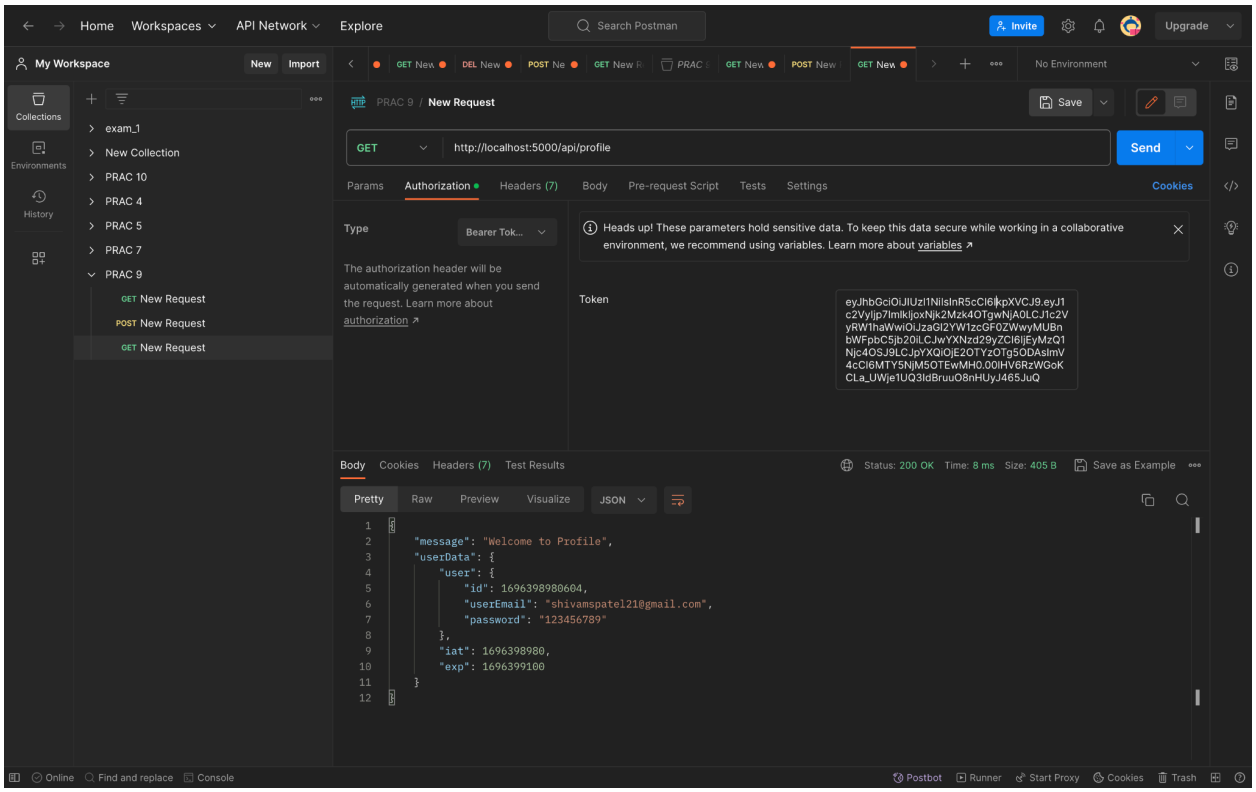




Practical 9.4: Secure your REST APIs using the Bearer token technique.




Home
Workspaces
API Network
Explore
Search Postman
Invite
Upgrade
My Workspace
New
Import
Collections
Environments
History
exam_1
New Collection
PRAC 10
PRAC 4
PRAC 5
PRAC 7
PRAC 9
GET New Request
GET New Request
No Environment
PRAC 9 / New Request
Save
POST
http://localhost:5000/api/login
Send
Params
Authorization
Headers (7)
Body
Pre-request Script
Tests
Settings
Cookies
Query Params
Key
Value
Description
Bulk Edit
Body
Cookies
Headers (7)
Test Results
Status: 200 OK
Time: 12 ms
Size: 497 B
Save as Example
Pretty
Raw
Preview
Visualize
JSON
{
"token": "eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.
eyJ1c2VyIjp7ImlkIjoxNjk2Mzk4OTgwNjA0LCJ1c2VyRW1haWwiOiJzaGl2YW1zcGF0ZWwyMUBnbWFpbC5jb20iLCJwYXNzd29yZCI6IjEyMzQ1Njc4OSJ9
LCJpYXQiOjE2OTYzOTg5ODAsImV4cCI6MTY5NjM5OTEwMH0.00lHV6RzWGoKCLa_UWje1UQ3IdBruuO8nHUyJ465JuQ"
}
Online
Find and replace
Console
Postbot
Runner
Start Proxy
Cookies
Trash


Home
Workspaces
API Network
Explore
Search Postman
Invite
Upgrade
My Workspace
New
Import
Collections
Environments
History
exam_1
New Collection
PRAC 10
PRAC 4
PRAC 5
PRAC 7
PRAC 9
GET New Request
POST New Request
GET New Request
No Environment
PRAC 9 / New Request
Save
GET
http://localhost:5000/api/profile
Send
Params
Authorization
Headers (7)
Body
Pre-request Script
Tests
Settings
Cookies
Type
Bearer Tok...
The authorization header will be automatically generated when you send the request. Learn more about authorization
Heads up! These parameters hold sensitive data. To keep this data secure while working in a collaborative environment, we recommend using variables. Learn more about variables
Token
eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJ1c2VyIjp7ImlkIjoxNjk2Mzk4OTgwNjA0LCJ1c2VyRW1haWwiOiJzaGl2YW1zcGF0ZWwyMUBnbWFpbC5jb20iLCJwYXNzd29yZCI6IjEyMzQ1Njc4OSJ9LCJpYXQiOjE2OTYzOTg5ODAsImV4cCI6MTY5NjM5OTEwMH0.00lHV6RzWGoKCLa_UWje1UQ3IdBruuO8nHUyJ465JuQ
Body
Cookies
Headers (7)
Test Results
Status: 200 OK
Time: 8 ms
Size: 405 B
Save as Example
Pretty
Raw
Preview
Visualize
JSON
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"userData": {
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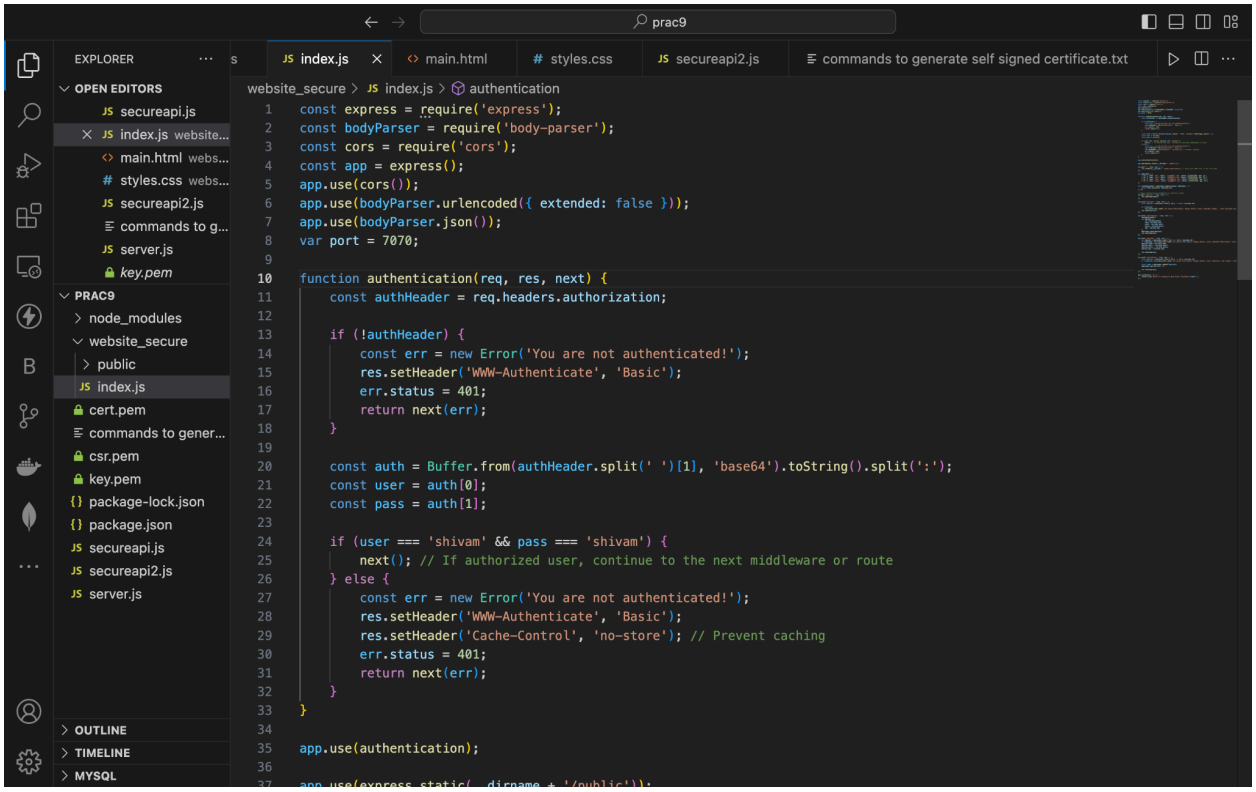
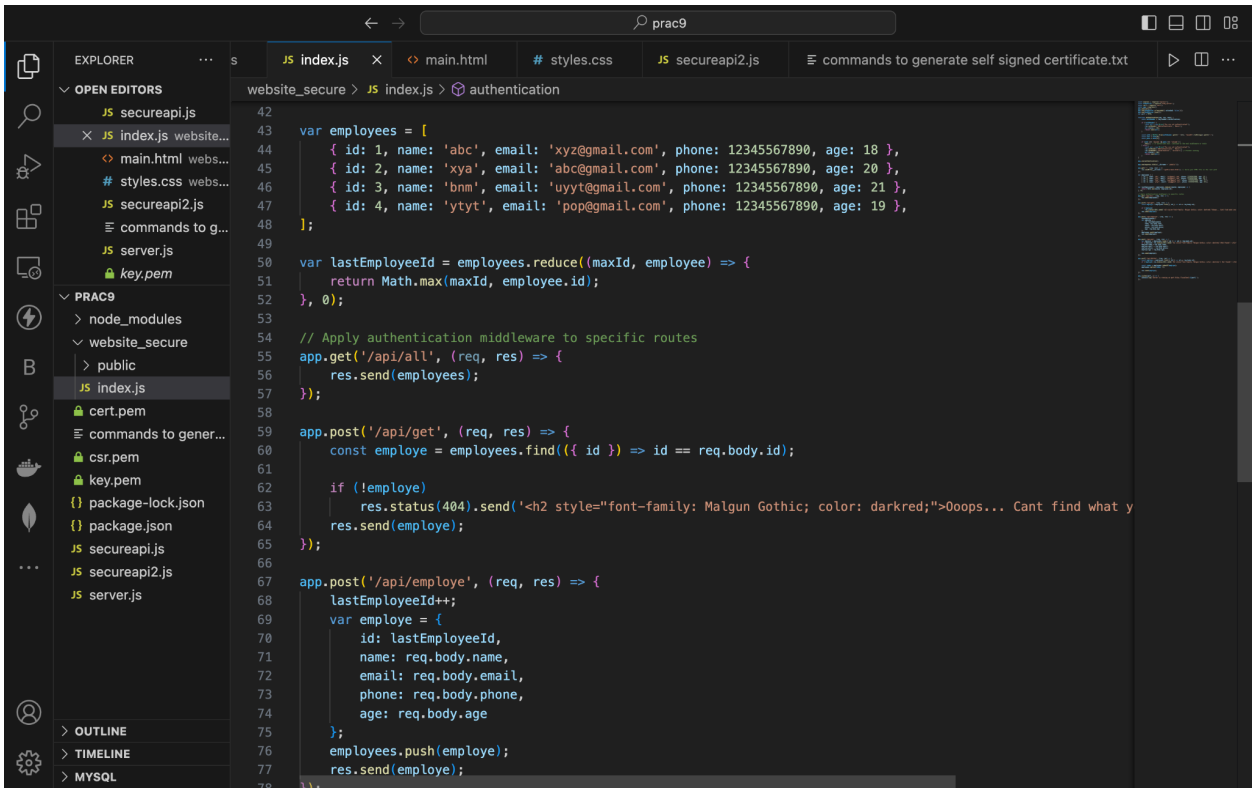
"userEmail": "shivamspatel21@gmail.com",
"password": "123456789"
},
"iat": 1696398980,
"exp": 1696399100
}
}
Online
Find and replace
Console
Postbot
Runner
Start Proxy
Cookies
Trash

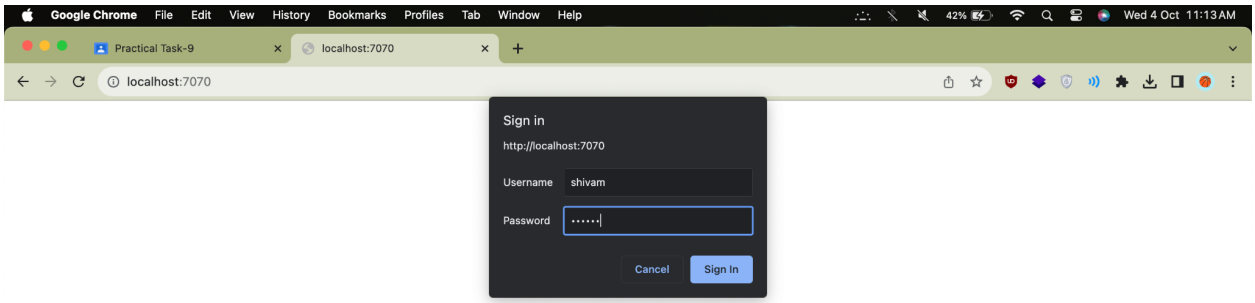
Practical 9.5: Secure your REST APIs created in previous practicals using username and password.

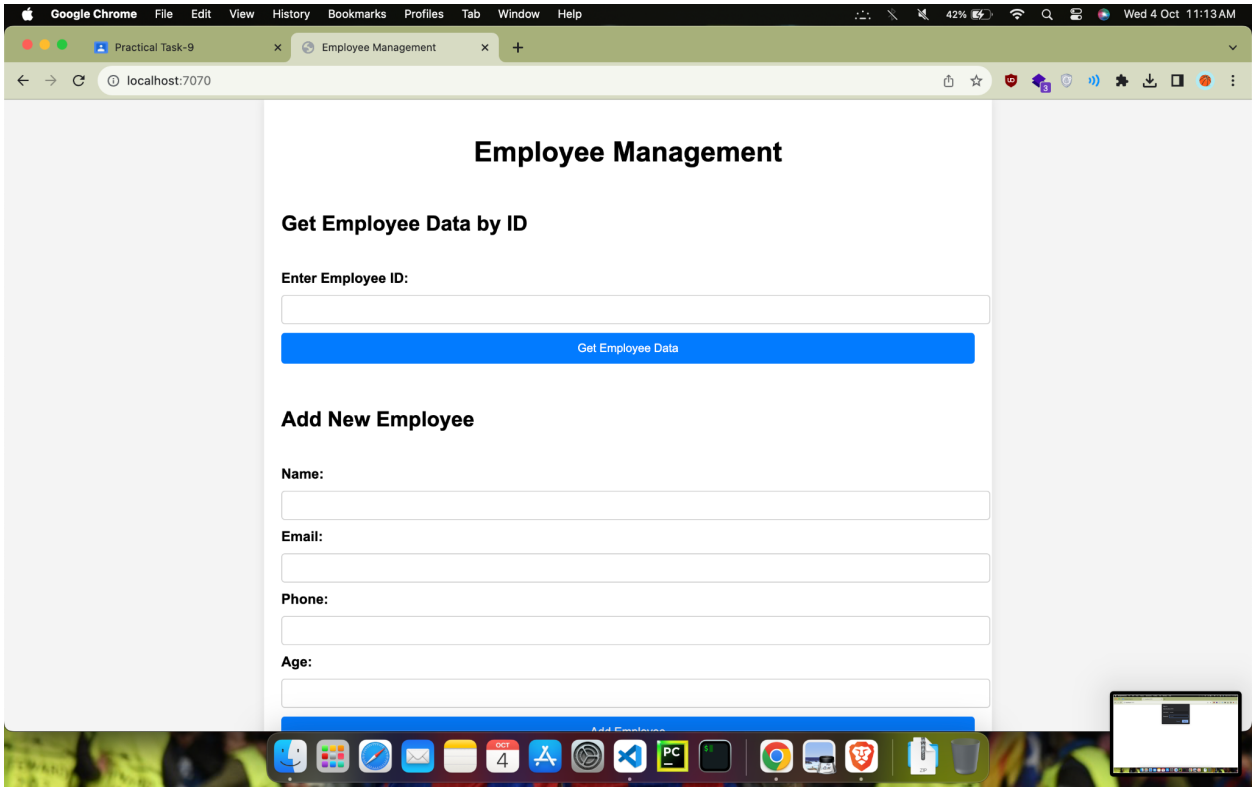


```
const express = require('express');
const bodyParser = require('body-parser');
const cors = require('cors');
const app = express();
app.use(cors());
app.use(bodyParser.urlencoded({ extended: false }));
app.use(bodyParser.json());
var port = 7070;

function authentication(req, res, next) {
    const authHeader = req.headers.authorization;

    if (!authHeader) {
        const err = new Error('You are not authenticated!');
        res.setHeader('WWW-Authenticate', 'Basic');
        err.status = 401;
        return next(err);
    }

    const auth = Buffer.from(authHeader.split(' ')[1], 'base64').toString().split(':');
    const user = auth[0];
    const pass = auth[1];

    if (user === 'shivam' && pass === 'shivam') {
        next(); // If authorized user, continue to the next middleware or route
    } else {
        const err = new Error('You are not authenticated!');
        res.setHeader('WWW-Authenticate', 'Basic');
        res.setHeader('Cache-Control', 'no-store'); // Prevent caching
        err.status = 401;
        return next(err);
    }
}

app.use(authentication);
```



```
var employees = [
    { id: 1, name: 'abc', email: 'xyz@gmail.com', phone: 12345567890, age: 18 },
    { id: 2, name: 'xya', email: 'abc@gmail.com', phone: 12345567890, age: 20 },
    { id: 3, name: 'bnm', email: 'uyyt@gmail.com', phone: 12345567890, age: 21 },
    { id: 4, name: 'ytyt', email: 'pop@gmail.com', phone: 12345567890, age: 19 },
];

var lastEmployeeId = employees.reduce((maxId, employee) => {
    return Math.max(maxId, employee.id);
}, 0);

// Apply authentication middleware to specific routes
app.get('/api/all', (req, res) => {
    res.send(employees);
});

app.post('/api/get', (req, res) => {
    const employe = employees.find(({ id }) => id == req.body.id);

    if (!employe)
        res.status(404).send('<h2 style="font-family: Malgun Gothic; color: darkred;">Ooops... Cant find what y
    res.send(employe);
});

app.post('/api/employe', (req, res) => {
    lastEmployeeId++;
    var employe = {
        id: lastEmployeeId,
        name: req.body.name,
        email: req.body.email,
        phone: req.body.phone,
        age: req.body.age
    };
    employees.push(employe);
    res.send(employe);
```


Google Chrome File Edit View History Bookmarks Profiles Tab Window Help
Wed 4 Oct 11:13 AM
Practical Task-9
localhost:7070
localhost:7070
Sign in
http://localhost:7070
Username
shivam
Password
Cancel
Sign In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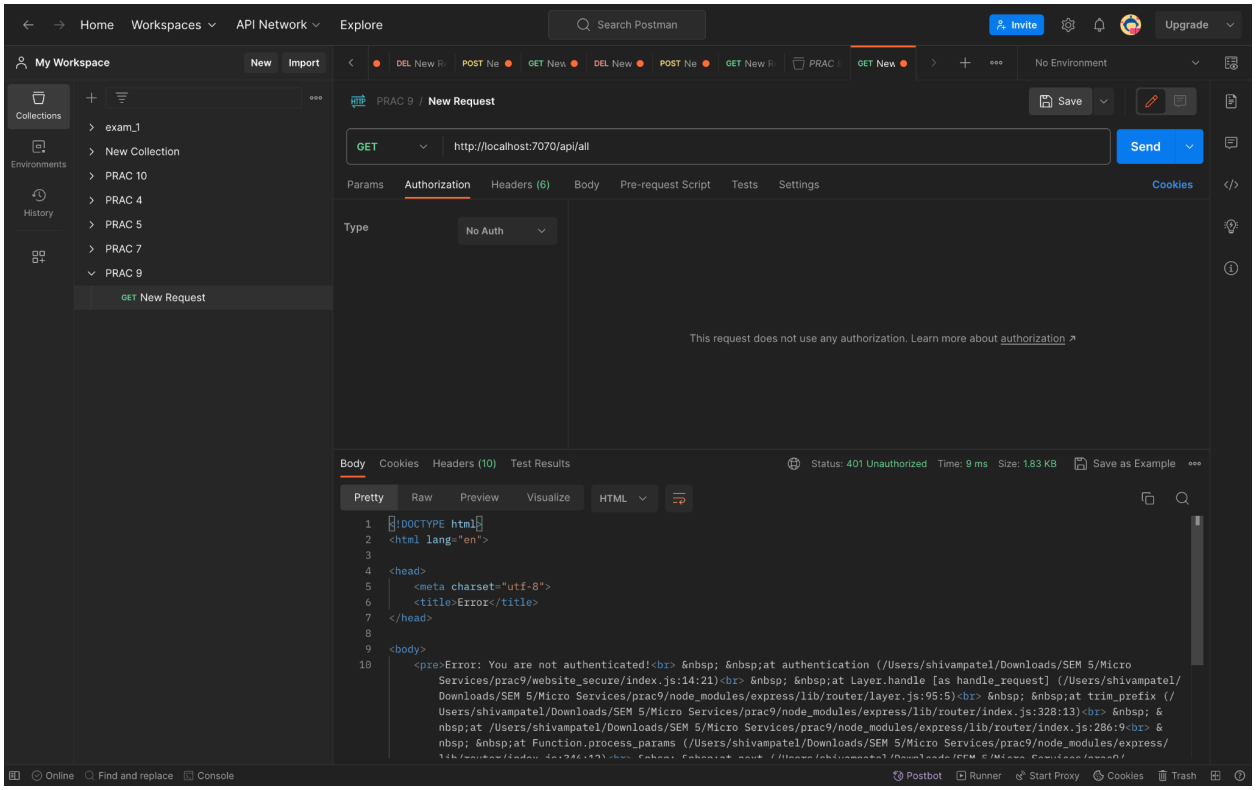
Wed 4 Oct 11:13 AM
Practical Task-9
Employee Management
localhost:7070
Employee Management
Get Employee Data by ID
Enter Employee ID:
Get Employee Data
Add New Employee
Name:
Email:
Phone:
Age:


Home
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Invite
Upgrade
My Workspace
New
Import
Collections
Environments
History
exam_1
New Collection
PRAC 10
PRAC 4
PRAC 5
PRAC 7
PRAC 9
GET New Request
No Environment
PRAC 9 / New Request
Save
GET
http://localhost:7070/api/all
Send
Params
Authorization
Headers (6)
Body
Pre-request Script
Tests
Settings
Cookies
Type
No Auth
This request does not use any authorization. Learn more about authorization
Body
Cookies
Headers (10)
Test Results
Status: 401 Unauthorized
Time: 9 ms
Size: 1.83 KB
Save as Example
Pretty
Raw
Preview
Visualize
HTML
<!DOCTYPE html>
<html lang="en">
<head>
<meta charset="utf-8">
<title>Error</title>
</head>
<body>
<pre>Error: You are not authenticated!
    at authentication (/Users/shivampatel/Downloads/SEM 5/Micro Services/prac9/website_secure/index.js:14:21)
    at Layer.handle [as handle_request] (/Users/shivampatel/Downloads/SEM 5/Micro Services/prac9/node_modules/express/lib/router/layer.js:95:5)
    at trim_prefix (/Users/shivampatel/Downloads/SEM 5/Micro Services/prac9/node_modules/express/lib/router/index.js:328:13)
    at /Users/shivampatel/Downloads/SEM 5/Micro Services/prac9/node_modules/express/lib/router/index.js:286:9
    at Function.process_params (/Users/shivampatel/Downloads/SEM 5/Micro Services/prac9/node_modules/express/
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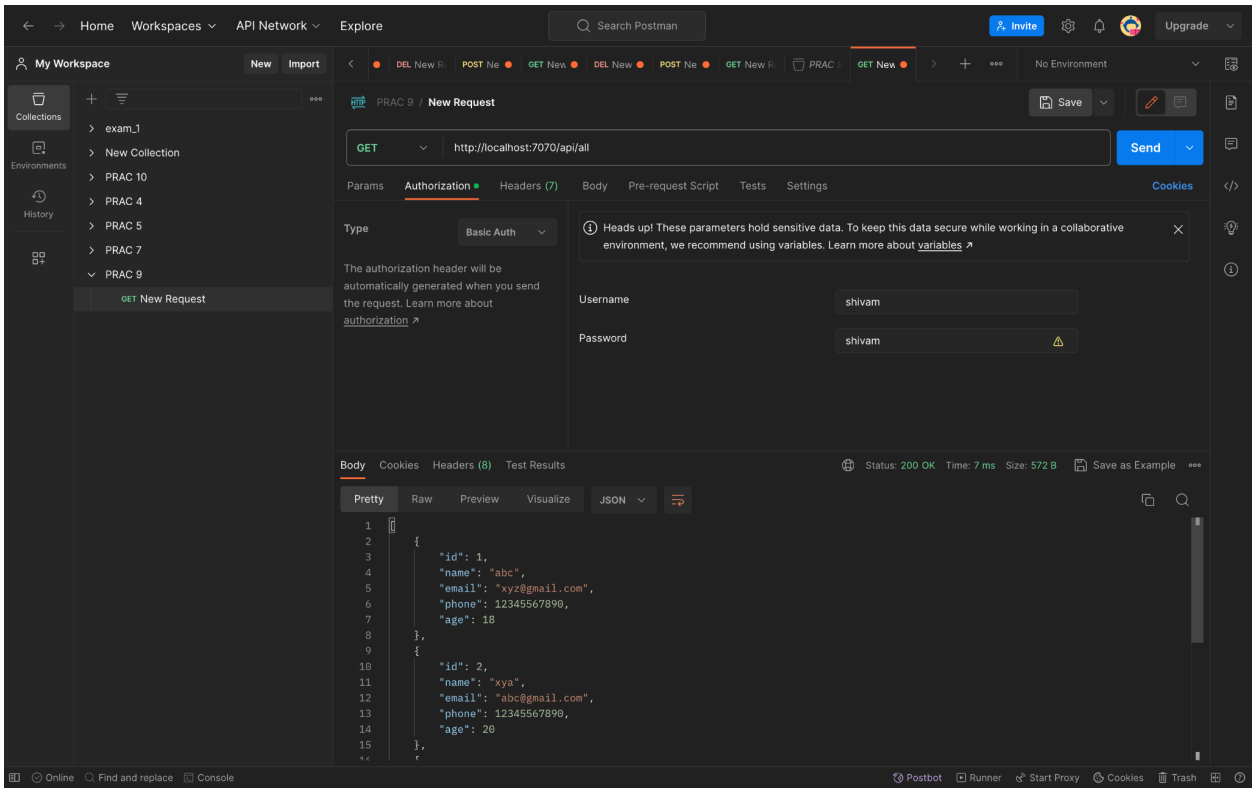
Find and replace
Console
Postbot
Runner
Start Proxy
Cookies
Trash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API Network
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Import
Collections
Environments
History
exam_1
New Collection
PRAC 10
PRAC 4
PRAC 5
PRAC 7
PRAC 9
GET New Request
No Environment
PRAC 9 / New Request
Save
GET
http://localhost:7070/api/all
Send
Params
Authorization
Headers (7)
Body
Pre-request Script
Tests
Settings
Cookies
Type
Basic Auth
The authorization header will be automatically generated when you send the request. Learn more about authorization
Heads up! These parameters hold sensitive data. To keep this data secure while working in a collaborative environment, we recommend using variables. Learn more about variables
Username
shivam
Password
shivam
Body
Cookies
Headers (8)
Test Results
Status: 200 OK
Time: 7 ms
Size: 572 B
Save as Example
Pretty
Raw
Preview
Visualize
JSON
[
{
"id": 1,
"name": "abc",
"email": "xyz@gmail.com",
"phone": 12345567890,
"age": 18
},
{
"id": 2,
"name": "xya",
"email": "abc@gmail.com",
"phone": 12345567890,
"age": 20
},
Online
Find and replace
Console
Postbot
Runner
Start Proxy
Cookies
Trash