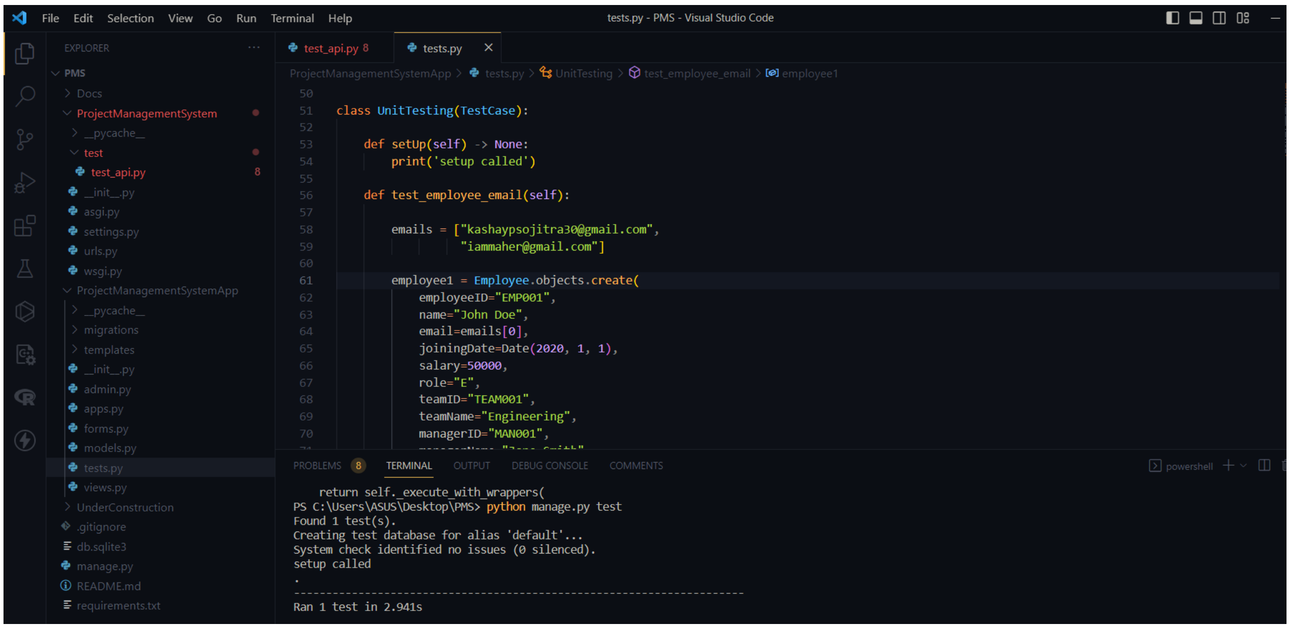
Unit Testing

Unit testing is a type of testing where the individual components of software are tested to validate their correctness in isolation. It complements the integration testing and system level testing. It is a type of white-box technique where the code is evaluated. Usually, it starts in the development phase so that it becomes
cost-effective.

Phase 1: Test Plan
The documentation of the test plan should cover the aspects like
objectives, schedule, deliverables, which features should be tested, pass/fail criteria and responsibilities.
Phase 2: Implementation
1. Design and create test cases for individual components.
2. Execution of test cases
3. Fix the errors in code

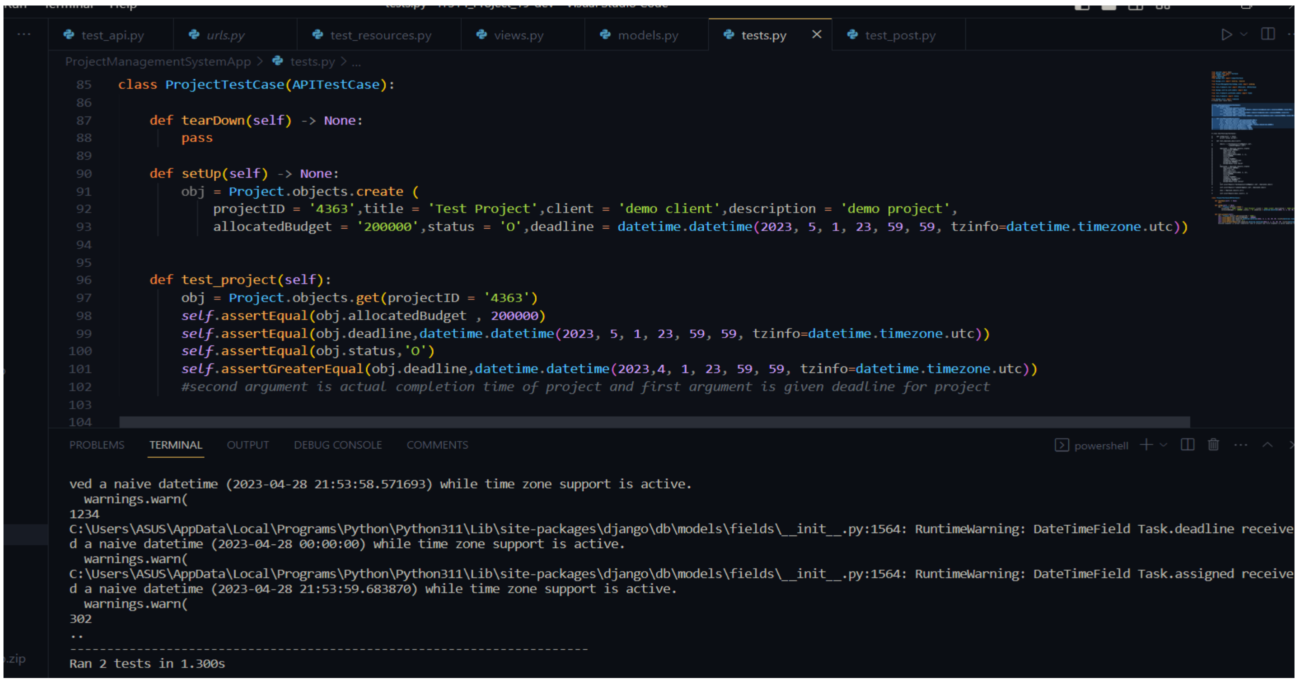
Employee model unit test



```python
class UnitTesting(TestCase):

    def setUp(self) -> None:
        print('setup called')

    def test_employee_email(self):

        emails = ["kashaypsojitra30@gmail.com",
                  "iammaher@gmail.com"]

        employee1 = Employee.objects.create(
            employeeID="EMP001",
            name="John Doe",
            email=emails[0],
            joiningDate=Date(2020, 1, 1),
            salary=50000,
            role="E",
            teamID="TEAM001",
            teamName="Engineering",
            managerID="MAN001",
```

```
    return self._execute_with_wrappers(
PS C:\Users\ASUS\Desktop\PMS> python manage.py test
Found 1 test(s).
Creating test database for alias 'default'...
System check identified no issues (0 silenced).
setup called
.
----------------------------------------------------------------------
Ran 1 test in 2.941s
```

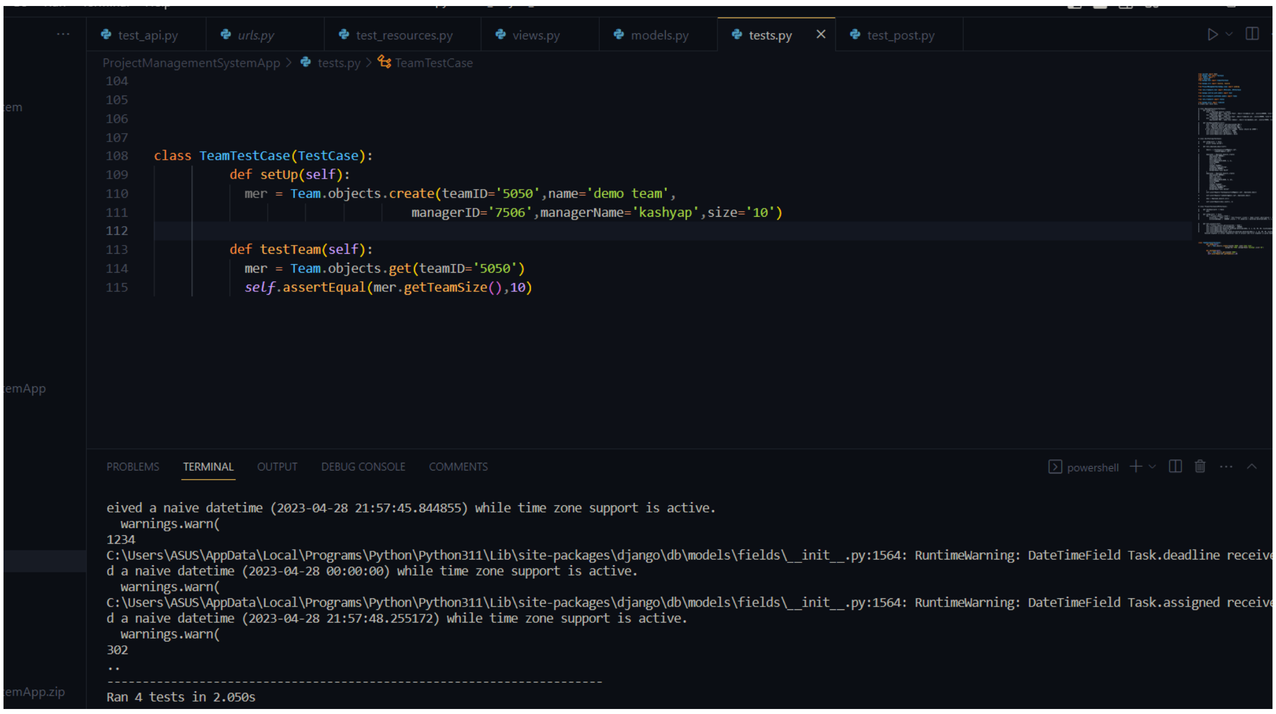
Project Model Unit Test



```
class ProjectTestCase(APITestCase):

    def tearDown(self) -> None:
        pass

    def setUp(self) -> None:
        obj = Project.objects.create (
            projectID = '4363',title = 'Test Project',client = 'demo client',description = 'demo project',
            allocatedBudget = '200000',status = 'O',deadline = datetime.datetime(2023, 5, 1, 23, 59, 59, tzinfo=datetime.timezone.utc))


    def test_project(self):
        obj = Project.objects.get(projectID = '4363')
        self.assertEqual(obj.allocatedBudget , 200000)
        self.assertEqual(obj.deadline,datetime.datetime(2023, 5, 1, 23, 59, 59, tzinfo=datetime.timezone.utc))
        self.assertEqual(obj.status,'O')
        self.assertGreaterEqual(obj.deadline,datetime.datetime(2023,4, 1, 23, 59, 59, tzinfo=datetime.timezone.utc))
        #second argument is actual completion time of project and first argument is given deadline for project
```

```
ved a naive datetime (2023-04-28 21:53:58.571693) while time zone support is active.
  warnings.warn(
1234
C:\Users\ASUS\AppData\Local\Programs\Python\Python311\Lib\site-packages\django\db\models\fields\__init__.py:1564: RuntimeWarning: DateTimeField Task.deadline receive
d a naive datetime (2023-04-28 00:00:00) while time zone support is active.
  warnings.warn(
C:\Users\ASUS\AppData\Local\Programs\Python\Python311\Lib\site-packages\django\db\models\fields\__init__.py:1564: RuntimeWarning: DateTimeField Task.assigned receive
d a naive datetime (2023-04-28 21:53:59.683870) while time zone support is active.
  warnings.warn(
302
..
----------------------------------------------------------------------
Ran 2 tests in 1.300s
```

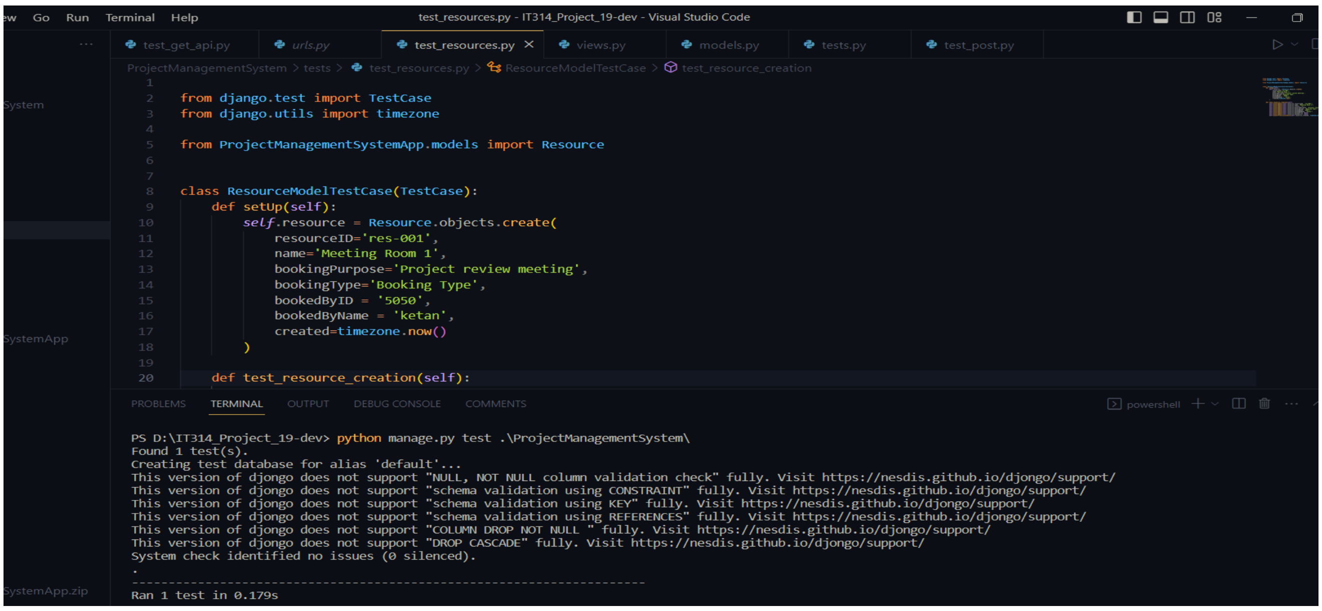
Team Model Unit Test



```
class TeamTestCase(TestCase):
        def setUp(self):
          mer = Team.objects.create(teamID='5050',name='demo team',
                                  managerID='7506',managerName='kashyap',size='10')

        def testTeam(self):
          mer = Team.objects.get(teamID='5050')
          self.assertEqual(mer.getTeamSize(),10)
```

```
eived a naive datetime (2023-04-28 21:57:45.844855) while time zone support is active.
  warnings.warn(
1234
C:\Users\ASUS\AppData\Local\Programs\Python\Python311\Lib\site-packages\django\db\models\fields\__init__.py:1564: RuntimeWarning: DateTimeField Task.deadline receive
d a naive datetime (2023-04-28 00:00:00) while time zone support is active.
  warnings.warn(
C:\Users\ASUS\AppData\Local\Programs\Python\Python311\Lib\site-packages\django\db\models\fields\__init__.py:1564: RuntimeWarning: DateTimeField Task.assigned receive
d a naive datetime (2023-04-28 21:57:48.255172) while time zone support is active.
  warnings.warn(
302
..
----------------------------------------------------------------------
Ran 4 tests in 2.050s
```

Resource Model Unit Test


ew Go Run Terminal Help
test_resources.py - IT314_Project_19-dev - Visual Studio Code
test_get_api.py
urls.py
test_resources.py
views.py
models.py
tests.py
test_post.py
ProjectManagementSystem > tests > test_resources.py > ResourceModelTestCase > test_resource_creation
PROBLEMS
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powershell

```python

from django.test import TestCase
from django.utils import timezone

from ProjectManagementSystemApp.models import Resource


class ResourceModelTestCase(TestCase):
    def setUp(self):
        self.resource = Resource.objects.create(
            resourceID='res-001',
            name='Meeting Room 1',
            bookingPurpose='Project review meeting',
            bookingType='Booking Type',
            bookedByID = '5050',
            bookedByName = 'ketan',
            created=timezone.now()
        )

    def test_resource_creation(self):
```

```
PS D:\IT314_Project_19-dev> python manage.py test .\ProjectManagementSystem\
Found 1 test(s).
Creating test database for alias 'default'...
This version of djongo does not support "NULL, NOT NULL column validation check" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "schema validation using CONSTRAINT" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "schema validation using KEY" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "schema validation using REFERENCES" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "COLUMN DROP NOT NULL " fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "DROP CASCADE" fully. Visit https://nesdis.github.io/djongo/support/
System check identified no issues (0 silenced).
.
----------------------------------------------------------------------
Ran 1 test in 0.179s
```

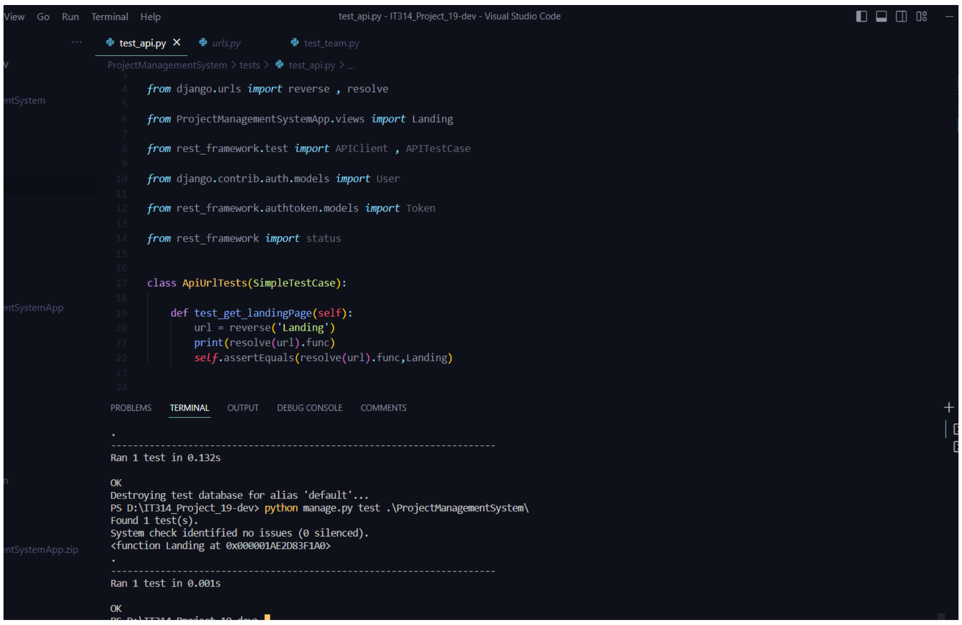
API Testing

API testing is a type of software testing that analyses an application program interface (API) to verify that it fulfils its expected functionality, security, performance and reliability. The tests are performed either directly on the API or as part of integration testing.

An API is code that enables the communication exchange of data between two software programs. An application typically consists of multiple layers, including an API layer. API layers focus on the business logic in applications, defining requests such as how to make them and the data formats used.

As opposed to user interface (UI) testing, which focuses on validating the application's look and feel, API testing focuses on analysing the application's business logic as well as security and data responses. An API test is generally performed by making requests to one or more API endpoints and comparing the responses with expected results.

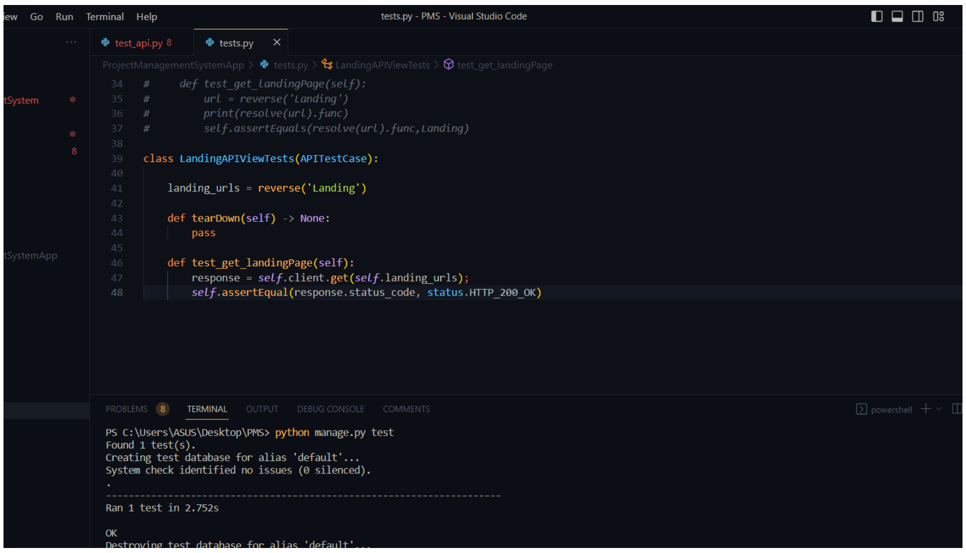
API function name resolver


View Go Run Terminal Help
test_api.py - IT314_Project_19-dev - Visual Studio Code
test_api.py
urls.py
test_team.py
ProjectManagementSystem > tests > test_api.py > ...
PROBLEMS TERMINAL OUTPUT DEBUG CONSOLE COMMENTS

```python
from django.urls import reverse , resolve

from ProjectManagementSystemApp.views import Landing

from rest_framework.test import APIClient , APITestCase

from django.contrib.auth.models import User

from rest_framework.authtoken.models import Token

from rest_framework import status


class ApiUrlTests(SimpleTestCase):

    def test_get_landingPage(self):
        url = reverse('Landing')
        print(resolve(url).func)
        self.assertEquals(resolve(url).func,Landing)
```

```
.
----------------------------------------------------------------------
Ran 1 test in 0.132s

OK
Destroying test database for alias 'default'...
PS D:\IT314_Project_19-dev> python manage.py test .\ProjectManagementSystem\
Found 1 test(s).
System check identified no issues (0 silenced).
<function Landing at 0x000001AE2D83F1A0>
.
----------------------------------------------------------------------
Ran 1 test in 0.001s

OK
```

Landing Page get request test


iew Go Run Terminal Help
tests.py - PMS - Visual Studio Code
test_api.py 8
tests.py
ProjectManagementSystemApp > tests.py > LandingAPIViewTests > test_get_landingPage
tSystem
tSystemApp
PROBLEMS 8
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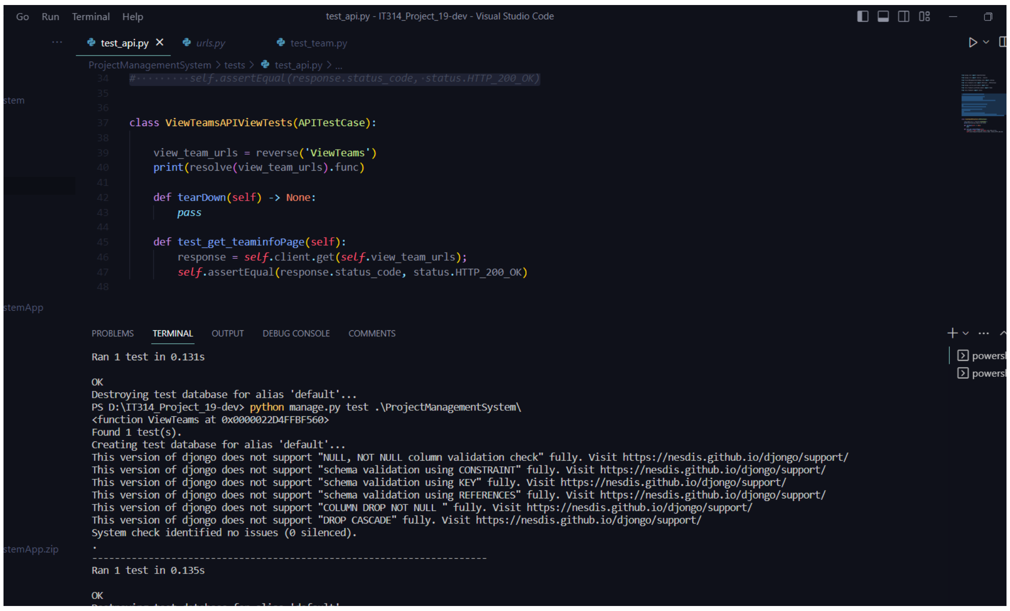
DEBUG CONSOLE
COMMENTS
powershell

```python
#     def test_get_landingPage(self):
#         url = reverse('Landing')
#         print(resolve(url).func)
#         self.assertEquals(resolve(url).func,Landing)

class LandingAPIViewTests(APITestCase):

    landing_urls = reverse('Landing')

    def tearDown(self) -> None:
        pass

    def test_get_landingPage(self):
        response = self.client.get(self.landing_urls);
        self.assertEqual(response.status_code, status.HTTP_200_OK)
```

```
PS C:\Users\ASUS\Desktop\PMS> python manage.py test
Found 1 test(s).
Creating test database for alias 'default'...
System check identified no issues (0 silenced).
.
----------------------------------------------------------------------
Ran 1 test in 2.752s

OK
Destroying test database for alias 'default'...
```

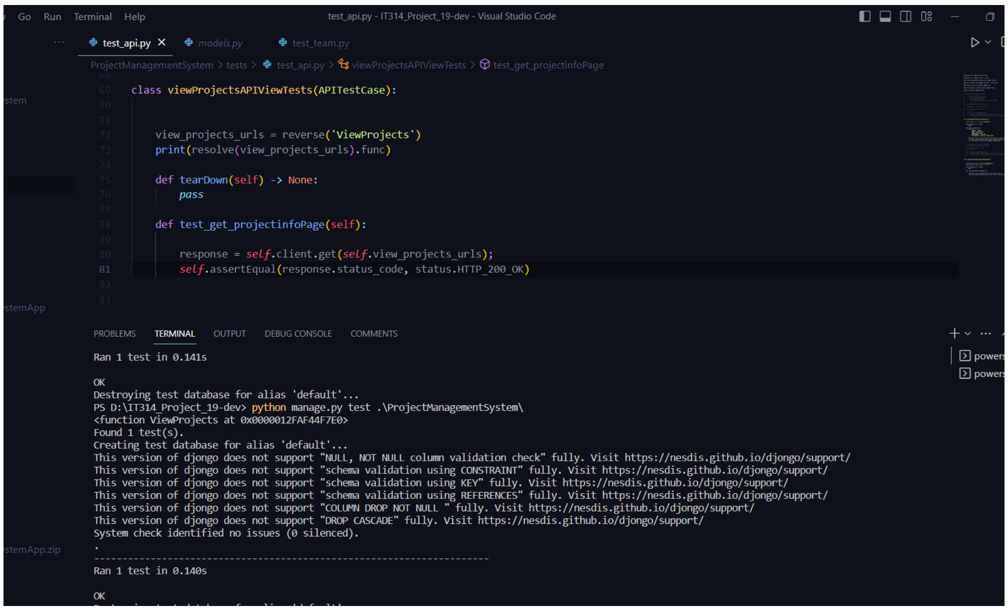
View Teams page Get Request test



```python
#        self.assertEqual(response.status_code, status.HTTP_200_OK)


class ViewTeamsAPIViewTests(APITestCase):

    view_team_urls = reverse('ViewTeams')
    print(resolve(view_team_urls).func)

    def tearDown(self) -> None:
        pass

    def test_get_teaminfoPage(self):
        response = self.client.get(self.view_team_urls);
        self.assertEqual(response.status_code, status.HTTP_200_OK)
```

```
Ran 1 test in 0.131s

OK
Destroying test database for alias 'default'...
PS D:\IT314_Project_19-dev> python manage.py test .\ProjectManagementSystem\
<function ViewTeams at 0x0000022D4FFBF560>
Found 1 test(s).
Creating test database for alias 'default'...
This version of djongo does not support "NULL, NOT NULL column validation check" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "schema validation using CONSTRAINT" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "schema validation using KEY" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "schema validation using REFERENCES" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "COLUMN DROP NOT NULL " fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "DROP CASCADE" fully. Visit https://nesdis.github.io/djongo/support/
System check identified no issues (0 silenced).
.
----------------------------------------------------------------------
Ran 1 test in 0.135s

OK
```

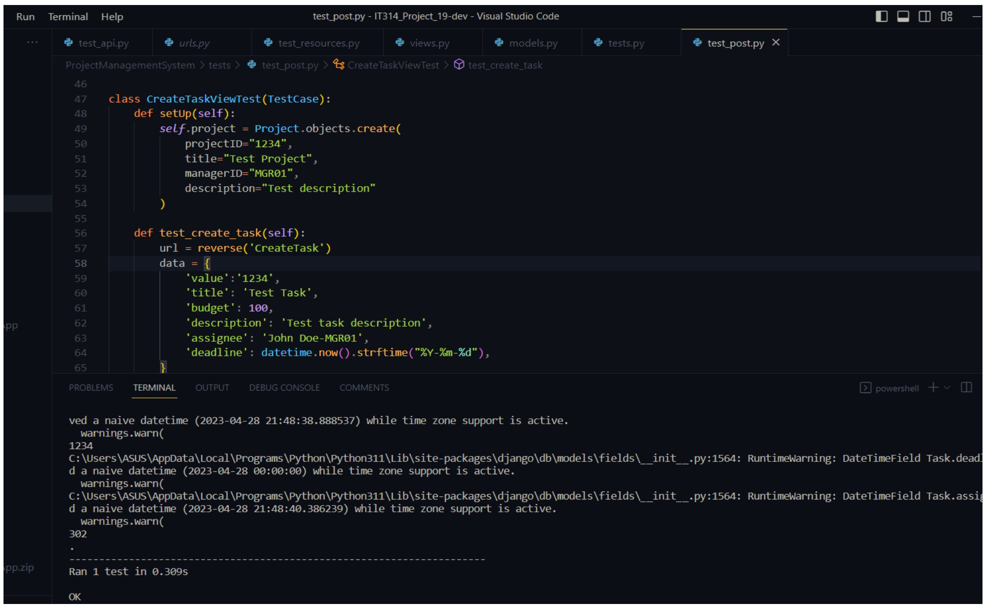
View projects get request api test


Go Run Terminal Help
test_api.py - IT314_Project_19-dev - Visual Studio Code
test_api.py
models.py
test_team.py
ProjectManagementSystem > tests > test_api.py > viewProjectsAPIViewTests > test_get_projectinfoPage
PROBLEMS TERMINAL OUTPUT DEBUG CONSOLE COMMENTS

```python
class viewProjectsAPIViewTests(APITestCase):


    view_projects_urls = reverse('ViewProjects')
    print(resolve(view_projects_urls).func)

    def tearDown(self) -> None:
        pass

    def test_get_projectinfoPage(self):

        response = self.client.get(self.view_projects_urls);
        self.assertEqual(response.status_code, status.HTTP_200_OK)
```

```
Ran 1 test in 0.141s

OK
Destroying test database for alias 'default'...
PS D:\IT314_Project_19-dev> python manage.py test .\ProjectManagementSystem\
<function ViewProjects at 0x0000012FAF44F7E0>
Found 1 test(s).
Creating test database for alias 'default'...
This version of djongo does not support "NULL, NOT NULL column validation check" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "schema validation using CONSTRAINT" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "schema validation using KEY" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "schema validation using REFERENCES" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "COLUMN DROP NOT NULL " fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "DROP CASCADE" fully. Visit https://nesdis.github.io/djongo/support/
System check identified no issues (0 silenced).
.
----------------------------------------------------------------------
Ran 1 test in 0.140s

OK
```

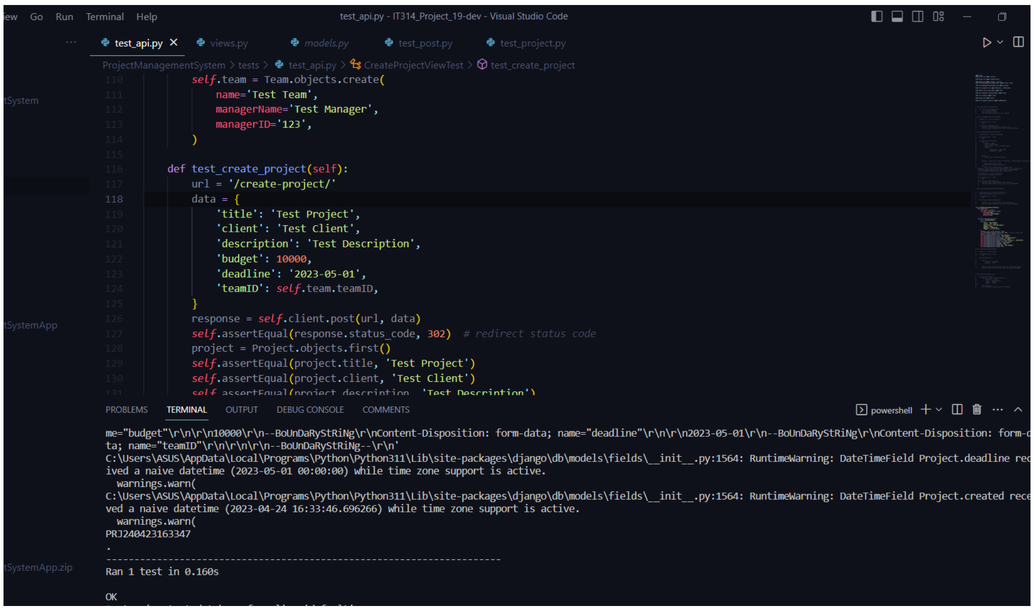
Create Task Post Request test


Run Terminal Help
test_post.py - IT314_Project_19-dev - Visual Studio Code
test_api.py
urls.py
test_resources.py
views.py
models.py
tests.py
test_post.py
ProjectManagementSystem > tests > test_post.py > CreateTaskViewTest > test_create_task
PROBLEMS TERMINAL OUTPUT DEBUG CONSOLE COMMENTS
powershell

```python

class CreateTaskViewTest(TestCase):
    def setUp(self):
        self.project = Project.objects.create(
            projectID="1234",
            title="Test Project",
            managerID="MGR01",
            description="Test description"
        )

    def test_create_task(self):
        url = reverse('CreateTask')
        data = {
            'value':'1234',
            'title': 'Test Task',
            'budget': 100,
            'description': 'Test task description',
            'assignee': 'John Doe-MGR01',
            'deadline': datetime.now().strftime("%Y-%m-%d"),
        }
```

```
ved a naive datetime (2023-04-28 21:48:38.888537) while time zone support is active.
  warnings.warn(
1234
C:\Users\ASUS\AppData\Local\Programs\Python\Python311\Lib\site-packages\django\db\models\fields\__init__.py:1564: RuntimeWarning: DateTimeField Task.dead
d a naive datetime (2023-04-28 00:00:00) while time zone support is active.
  warnings.warn(
C:\Users\ASUS\AppData\Local\Programs\Python\Python311\Lib\site-packages\django\db\models\fields\__init__.py:1564: RuntimeWarning: DateTimeField Task.assi
d a naive datetime (2023-04-28 21:48:40.386239) while time zone support is active.
  warnings.warn(
302
.
----------------------------------------------------------------------
Ran 1 test in 0.309s

OK
```

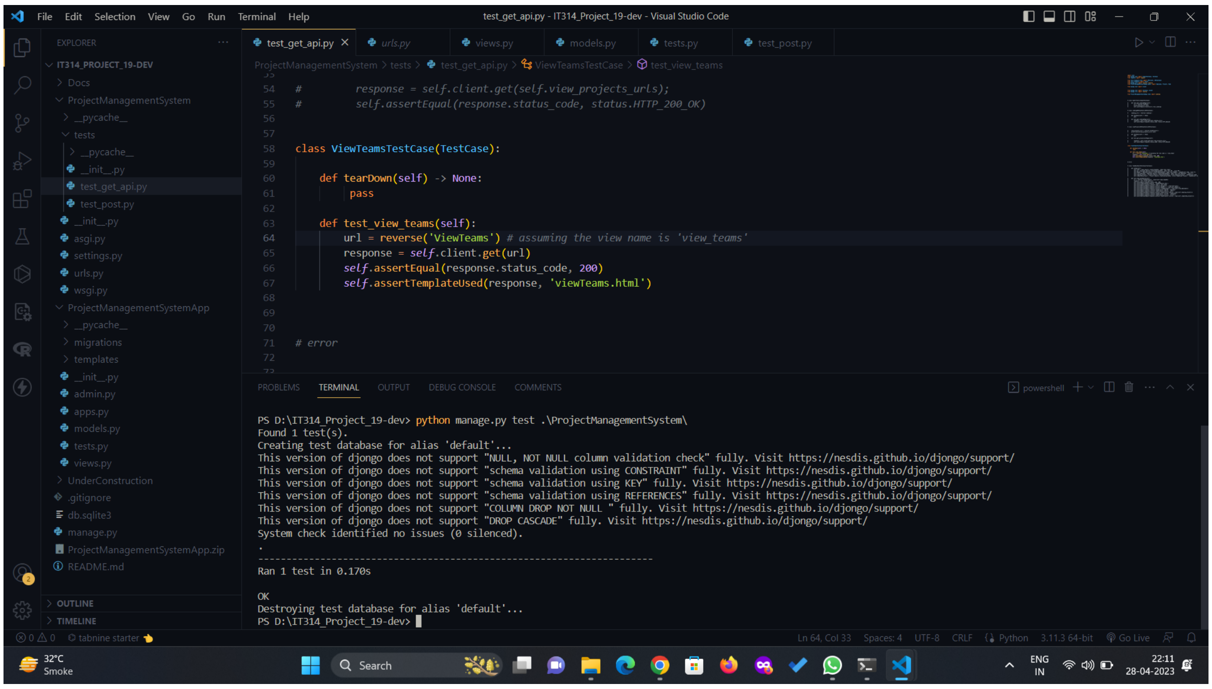
Create Project post request api test



```python
        self.team = Team.objects.create(
            name='Test Team',
            managerName='Test Manager',
            managerID='123',
        )

    def test_create_project(self):
        url = '/create-project/'
        data = {
            'title': 'Test Project',
            'client': 'Test Client',
            'description': 'Test Description',
            'budget': 10000,
            'deadline': '2023-05-01',
            'teamID': self.team.teamID,
        }
        response = self.client.post(url, data)
        self.assertEqual(response.status_code, 302)  # redirect status code
        project = Project.objects.first()
        self.assertEqual(project.title, 'Test Project')
        self.assertEqual(project.client, 'Test Client')
```

```
me="budget"\r\n\r\n10000\r\n--BoUnDaRyStRiNg\r\nContent-Disposition: form-data; name="deadline"\r\n\r\n2023-05-01\r\n--BoUnDaRyStRiNg\r\nContent-Disposition: form-d
ta; name="teamID"\r\n\r\n\r\n--BoUnDaRyStRiNg--\r\n'
C:\Users\ASUS\AppData\Local\Programs\Python\Python311\Lib\site-packages\django\db\models\fields\__init__.py:1564: RuntimeWarning: DateTimeField Project.deadline rec
ived a naive datetime (2023-05-01 00:00:00) while time zone support is active.
  warnings.warn(
C:\Users\ASUS\AppData\Local\Programs\Python\Python311\Lib\site-packages\django\db\models\fields\__init__.py:1564: RuntimeWarning: DateTimeField Project.created rece
ved a naive datetime (2023-04-24 16:33:46.696266) while time zone support is active.
  warnings.warn(
PRJ240423163347
.
----------------------------------------------------------------------
Ran 1 test in 0.160s

OK
```

View Teams GET Request test

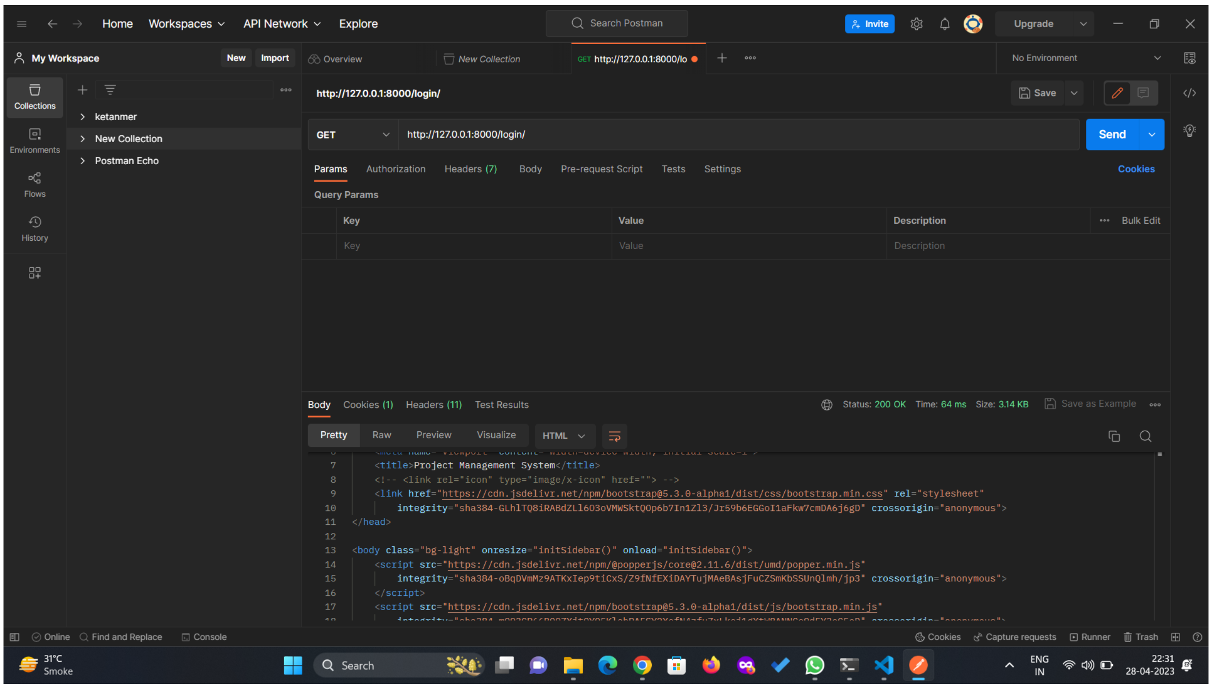


```python
#         response = self.client.get(self.view_projects_urls);
#         self.assertEqual(response.status_code, status.HTTP_200_OK)


class ViewTeamsTestCase(TestCase):

    def tearDown(self) -> None:
        pass

    def test_view_teams(self):
        url = reverse('ViewTeams') # assuming the view name is 'view_teams'
        response = self.client.get(url)
        self.assertEqual(response.status_code, 200)
        self.assertTemplateUsed(response, 'viewTeams.html')




# error

```

```
PS D:\IT314_Project_19-dev> python manage.py test .\ProjectManagementSystem\
Found 1 test(s).
Creating test database for alias 'default'...
This version of djongo does not support "NULL, NOT NULL column validation check" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "schema validation using CONSTRAINT" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "schema validation using KEY" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "schema validation using REFERENCES" fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "COLUMN DROP NOT NULL " fully. Visit https://nesdis.github.io/djongo/support/
This version of djongo does not support "DROP CASCADE" fully. Visit https://nesdis.github.io/djongo/support/
System check identified no issues (0 silenced).
.
----------------------------------------------------------------------
Ran 1 test in 0.170s

OK
Destroying test database for alias 'default'...
PS D:\IT314_Project_19-dev>
```

API testing using postman

1) Login page GET request

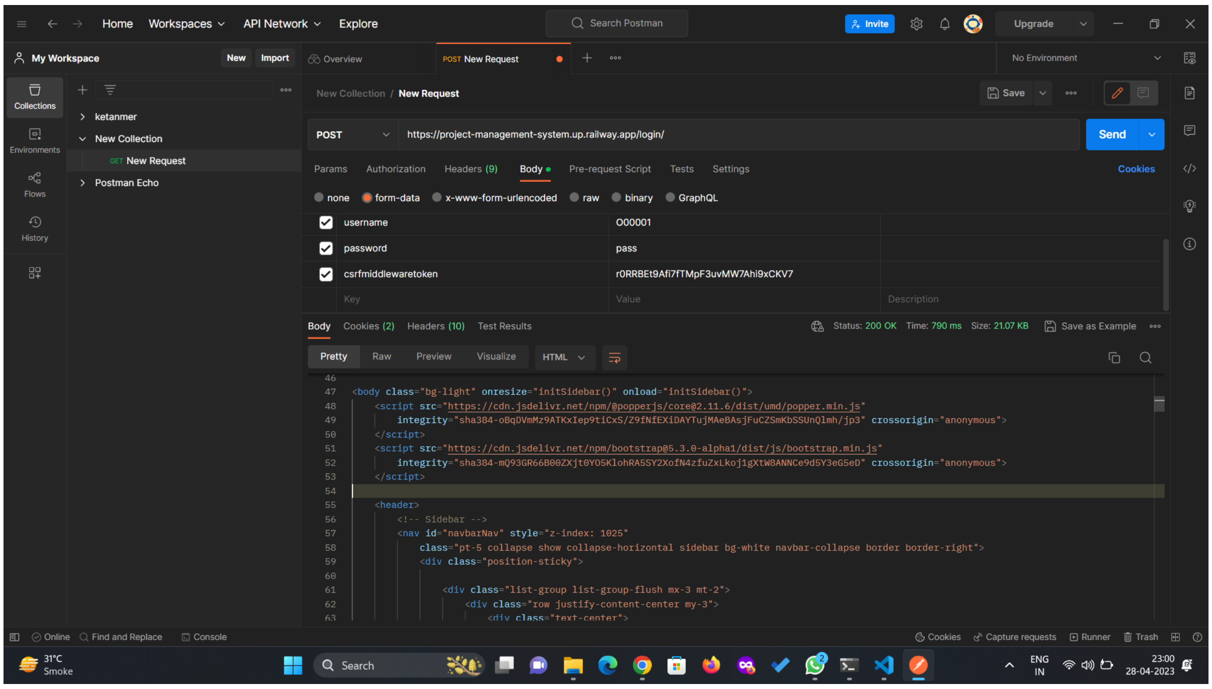


GET http://127.0.0.1:8000/login/

Status: 200 OK Time: 64 ms Size: 3.14 KB

```html
    <title>Project Management System</title>
    <!-- <link rel="icon" type="image/x-icon" href=""> -->
    <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0-alpha1/dist/css/bootstrap.min.css" rel="stylesheet"
        integrity="sha384-GLhlTQ8iRABdZLl6O3oVMWSktQOp6b7In1Zl3/Jr59b6EGGoI1aFkw7cmDA6j6gD" crossorigin="anonymous">
</head>

<body class="bg-light" onresize="initSidebar()" onload="initSidebar()">
    <script src="https://cdn.jsdelivr.net/npm/@popperjs/core@2.11.6/dist/umd/popper.min.js"
        integrity="sha384-oBqDVmMz9ATKxIep9tiCxS/Z9fNfEXiDAYTujMAeBAsjFuCZSmKbSSUnQlmh/jp3" crossorigin="anonymous">
    </script>
    <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0-alpha1/dist/js/bootstrap.min.js"
```

2) Login page POST request with credentials and cookies



POST https://project-management-system.up.railway.app/login/

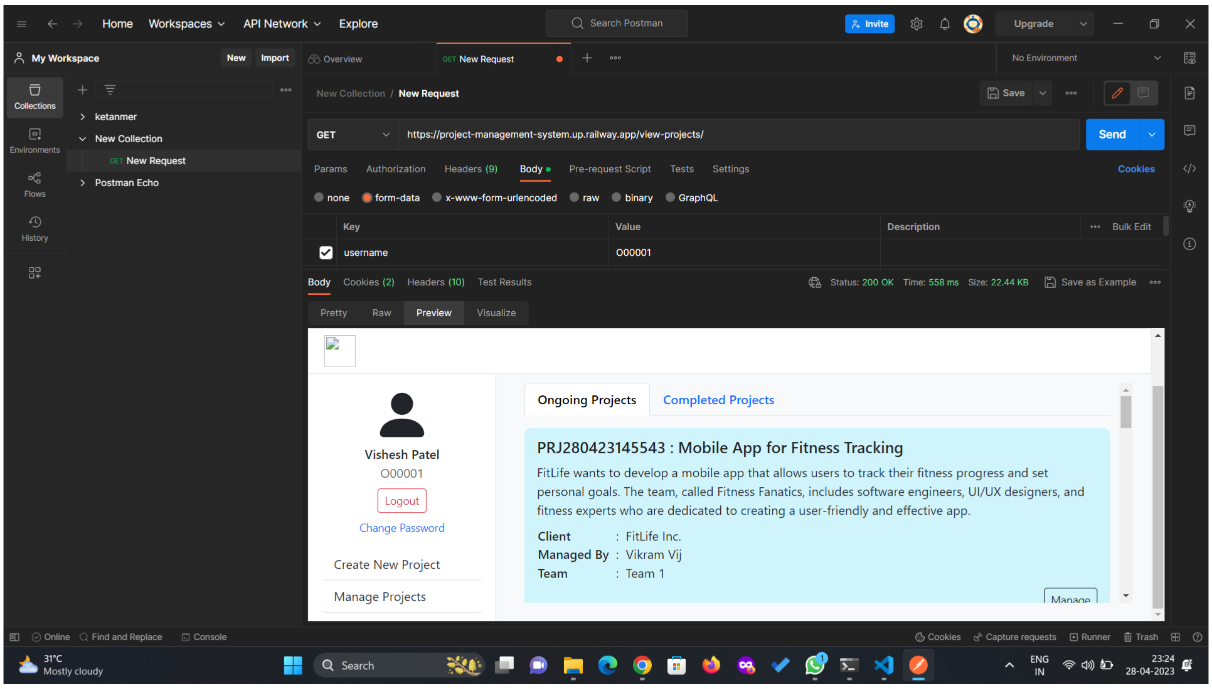
Body: form-data

Key	Value	Description
username	O00001	
password	pass	
csrfmiddlewaretoken	r0RRBEt9Afi7fTMpF3uvMW7Ahi9xCKV7	

Status: 200 OK Time: 790 ms Size: 21.07 KB

```html

<body class="bg-light" onresize="initSidebar()" onload="initSidebar()">
    <script src="https://cdn.jsdelivr.net/npm/@popperjs/core@2.11.6/dist/umd/popper.min.js"
        integrity="sha384-oBqDVmMz9ATKxIep9tiCxS/Z9fNfEXiDAYTujMAeBAsjFuCZSmKbSSUnQlmh/jp3" crossorigin="anonymous">
    </script>
    <script src="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0-alpha1/dist/js/bootstrap.min.js"
        integrity="sha384-mQ93GR66B00ZXjt0YO5KlohRA5SY2XofN4zfuZxLkoj1gXtW8ANNCe9d5Y3eG5eD" crossorigin="anonymous">
    </script>

    <header>
        <!-- Sidebar -->
        <nav id="navbarNav" style="z-index: 1025"
            class="pt-5 collapse show collapse-horizontal sidebar bg-white navbar-collapse border border-right">
            <div class="position-sticky">

                <div class="list-group list-group-flush mx-3 mt-2">
                    <div class="row justify-content-center my-3">
                        <div class="text-center">
```

3) GET request to view projects:



New Collection / New Request

GET https://project-management-system.up.railway.app/view-projects/

Body: none, [✓ form-data], x-www-form-urlencoded, raw, binary, GraphQL

Key	Value	Description
✓ username	O00001	

Body | Cookies (2) | Headers (10) | Test Results — Status: 200 OK Time: 558 ms Size: 22.44 KB

Vishesh Patel
O00001
Logout
Change Password
Create New Project
Manage Projects

Ongoing Projects | Completed Projects

PRJ280423145543 : Mobile App for Fitness Tracking

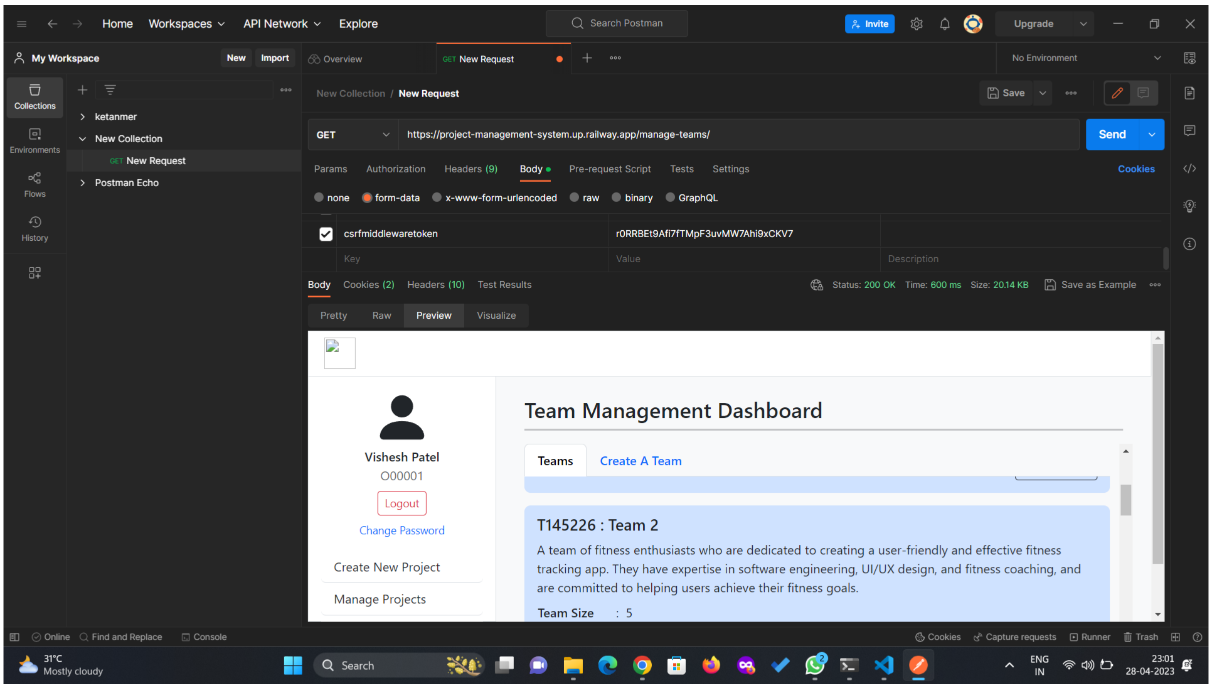
FitLife wants to develop a mobile app that allows users to track their fitness progress and set personal goals. The team, called Fitness Fanatics, includes software engineers, UI/UX designers, and fitness experts who are dedicated to creating a user-friendly and effective app.

Client	: FitLife Inc.
Managed By	: Vikram Vij
Team	: Team 1

Manage

31°C Mostly cloudy ENG IN 23:24 28-04-2023

4) GET request to view teams:



New Collection / New Request

GET https://project-management-system.up.railway.app/manage-teams/

Body: none, [✓ form-data], x-www-form-urlencoded, raw, binary, GraphQL

Key	Value	Description
✓ csrfmiddlewaretoken	rORRBEt9Afi7fTMpF3uvMW7Ahi9xCKV7	
Key	Value	Description

Body | Cookies (2) | Headers (10) | Test Results — Status: 200 OK Time: 600 ms Size: 20.14 KB

Vishesh Patel
O00001
Logout
Change Password
Create New Project
Manage Projects

Team Management Dashboard

Teams | Create A Team

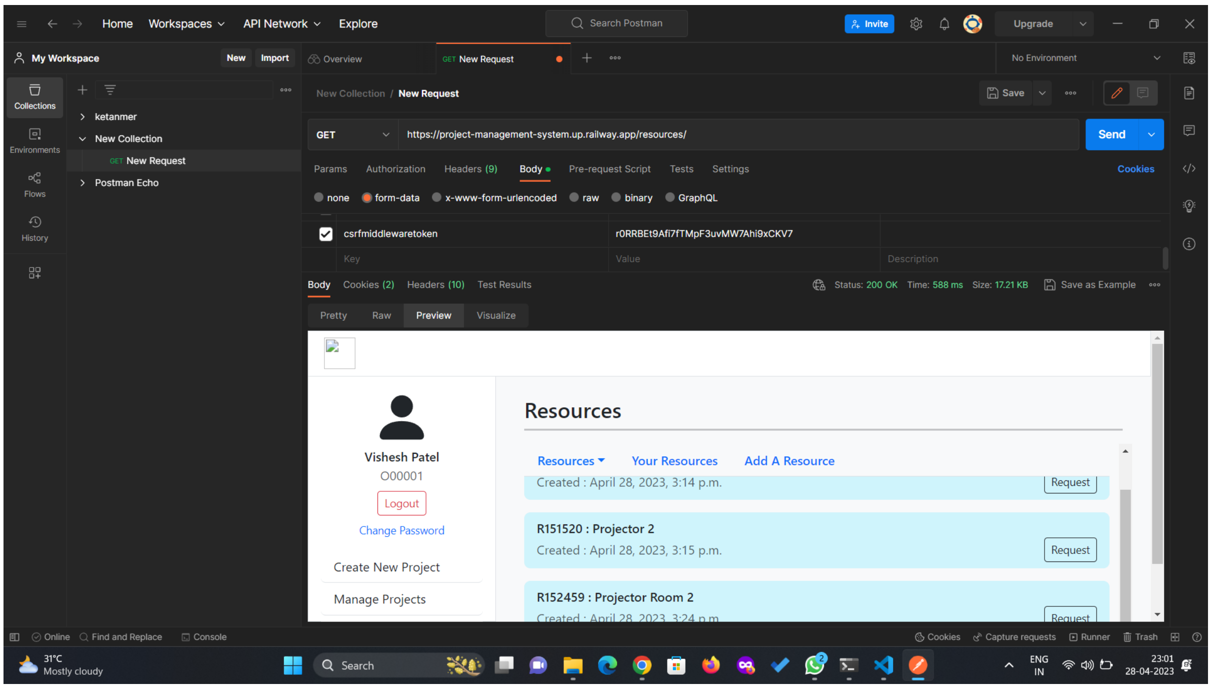
T145226 : Team 2

A team of fitness enthusiasts who are dedicated to creating a user-friendly and effective fitness tracking app. They have expertise in software engineering, UI/UX design, and fitness coaching, and are committed to helping users achieve their fitness goals.

Team Size : 5

31°C Mostly cloudy ENG IN 23:01 28-04-2023

5) GET request to view available resources :



New Collection / New Request

GET https://project-management-system.up.railway.app/resources/

Body: form-data

	Key	Value	Description
✓	csrfmiddlewaretoken	r0RRBEt9Afi7fTMpF3uvMW7Ahi9xCKV7	

Status: 200 OK Time: 588 ms Size: 17.21 KB

Resources

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O00001
Logout
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Create New Project
Manage Projects

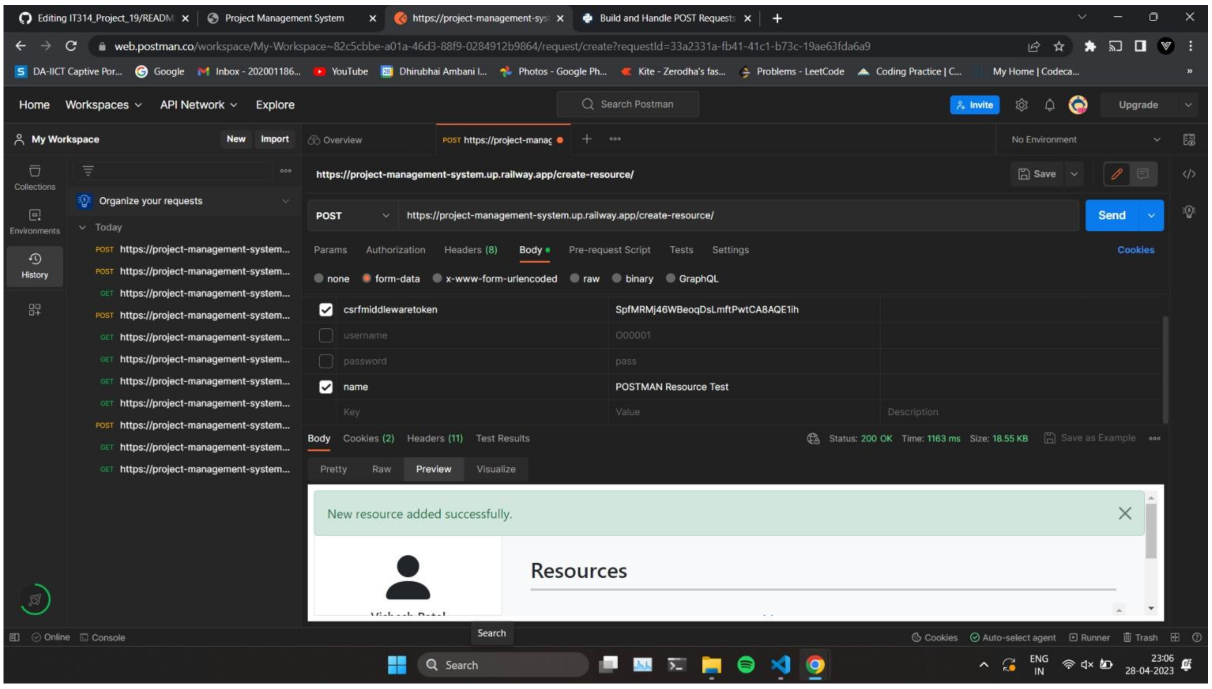
Resources ▾ Your Resources Add A Resource

Created : April 28, 2023, 3:14 p.m. Request

R151520 : Projector 2
Created : April 28, 2023, 3:15 p.m. Request

R152459 : Projector Room 2
Created : April 28, 2023, 3:24 p.m. Request

6) POST request to add new resource:



web.postman.co/workspace/My-Workspace~82c5cbbe-a01a-46d3-88f9-0284912b9864/request/create?requestId=33a2331a-fb41-41c1-b73c-19ae63fda6a9

POST https://project-management-system.up.railway.app/create-resource/

Body: form-data

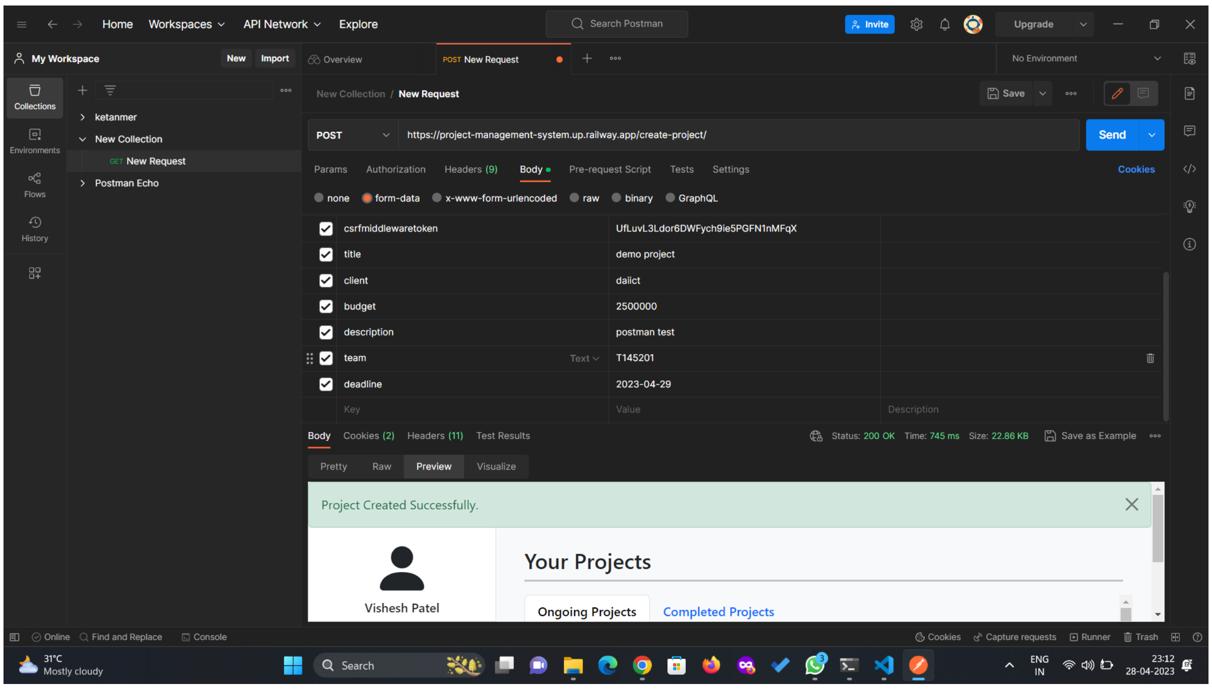
	Key	Value	Description
✓	csrfmiddlewaretoken	SpfMRMj46WBeoqDsLmftPwtCA8AQE1ih	
	username	O00001	
	password	pass	
✓	name	POSTMAN Resource Test	

Status: 200 OK Time: 1163 ms Size: 18.55 KB

New resource added successfully.

Resources

7) POST request to add new project:



New Collection / New Request

POST https://project-management-system.up.railway.app/create-project/

Body: form-data

Key	Value	Description
csrfmiddlewaretoken	UfLuvL3Ldor6DWFych9ie5PGFN1nMFqX	
title	demo project	
client	daiict	
budget	2500000	
description	postman test	
team	T145201	
deadline	2023-04-29	

Status: 200 OK Time: 745 ms Size: 22.86 KB

Project Created Successfully.

Your Projects

Vishesh Patel

Ongoing Projects Completed Projects