API Testing

Get Request: Sending a request to get some data from the server is called get request.

Post Request: Sending a request to store some data into the database/server is called post request.

Put Request: Sending a request to update the existing data in the server.

Note: To create your own API these two software must be installed.

```
Creating our own API's
-----------------------
step1) NodeJS
    npm  - node package manager

node --version
npm --version


step2 ) json-server

runthe below command in the cmd/terminal
    npm install -g json-server
```

Install: 1. Nodejs software with npm

Check the software is available or not from the cmd : Nodejs: node –version and npm: npm –version

```
Command Prompt
Microsoft Windows [Version 10.0.19042.1348]
(c) Microsoft Corporation. All rights reserved.

C:\Users\HP>node --version
v22.12.0

C:\Users\HP>npm --version
10.9.0

C:\Users\HP>
```

Install : 2. Json-server.

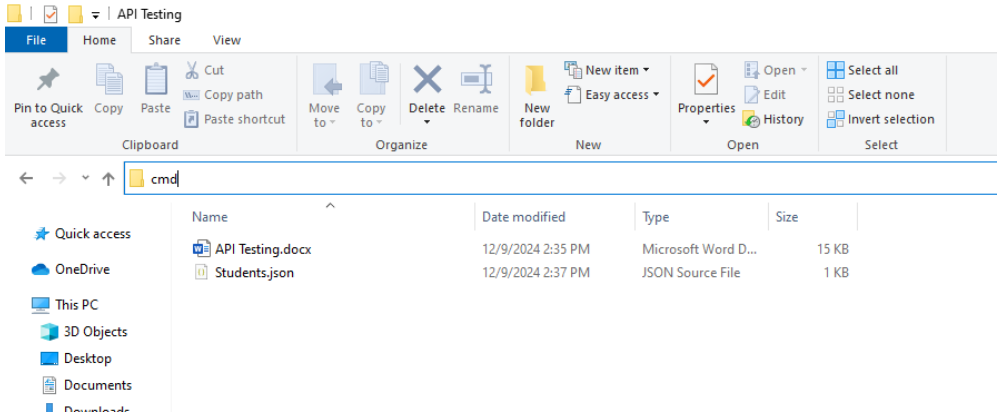
Create an Own/Dummy REST API " Students.Json " file with the following data :

```
{
 "students":[
 {
      "id": 1,
      "name": "John Doe",
      "age": 18,
      "grade": "12th",
      "subjects": [
         "Math",
         "Physics",
         "English"
      ]
   },
   {
      "id": 2,
      "name": "Jane Smith",
      "age": 17,
      "grade": "11th",
      "subjects": [
         "Biology",
         "Chemistry",
         "History"
      ]
   },
   {
      "id": 3,
      "name": "David Johnson",
      "age": 16,
      "grade": "10th",
      "subjects": [
         "Computer Science",
         "Spanish",
         "Art"
      ]
     }
   ]
}
```

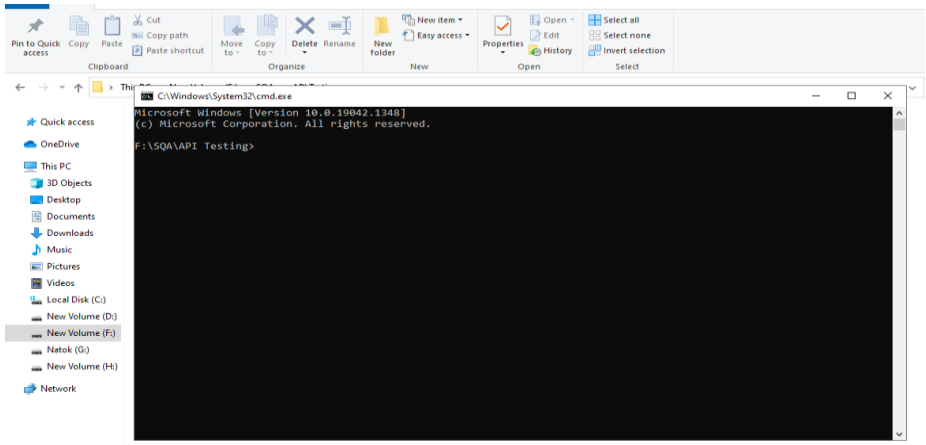
How to create own API ? **Task no-1**

Ans: Goto the location where the " Students.json " File is stored.

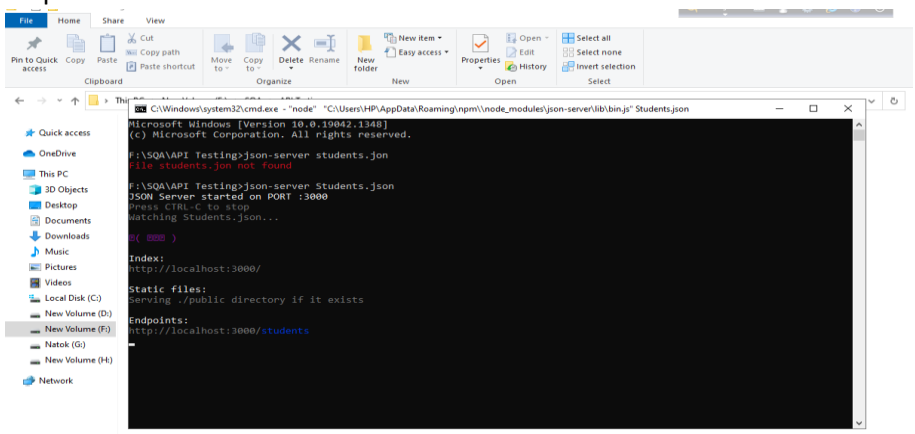
Step-1



Step-2

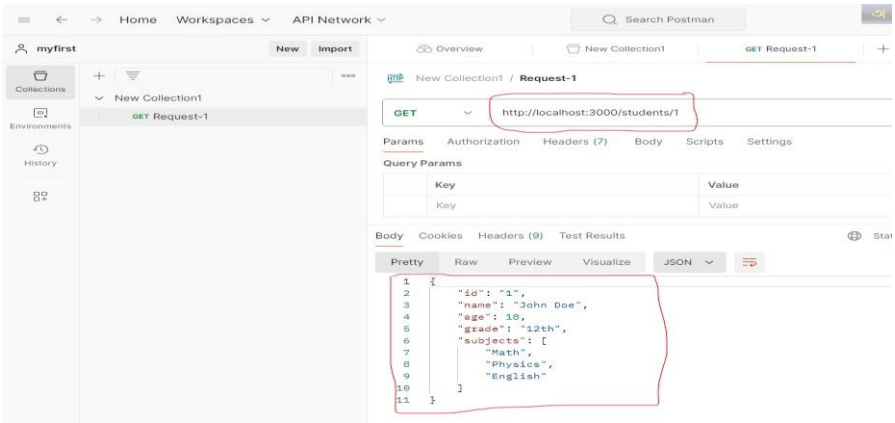


Step-3

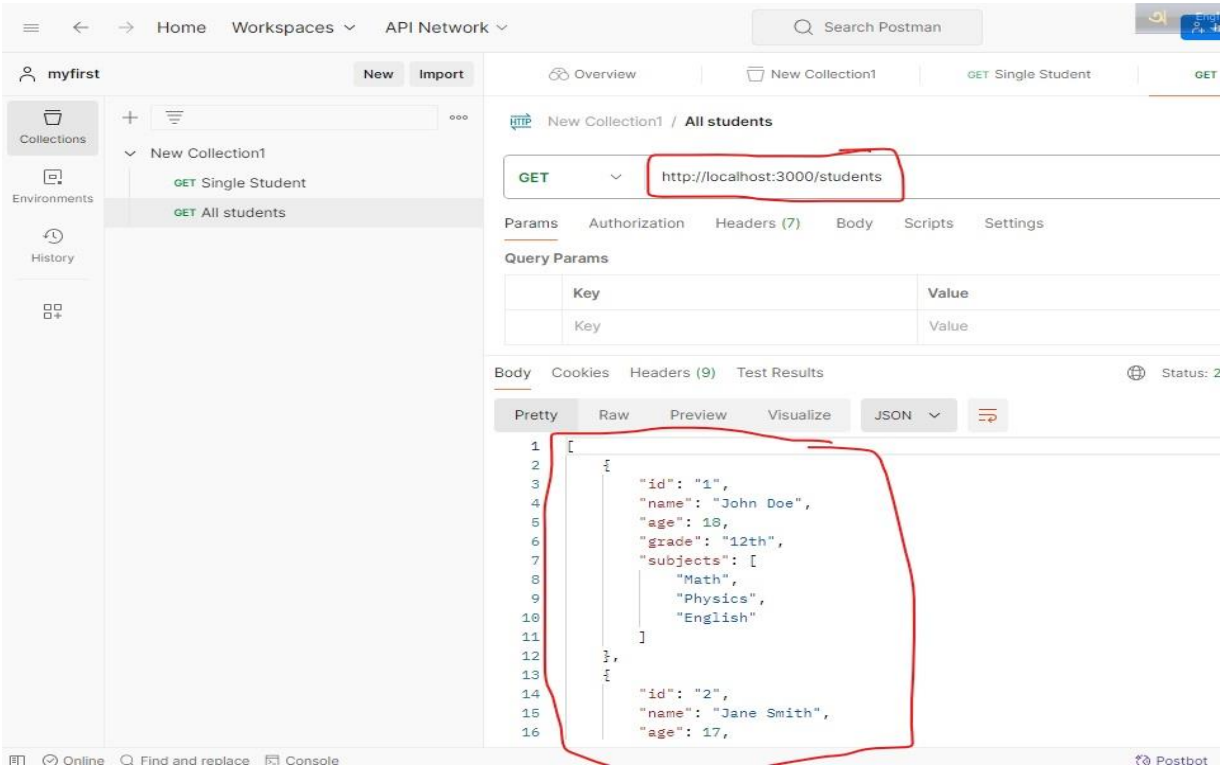


Link: http://localhost:3000/students

How to get single student data from the above URL? **Task No- 2**



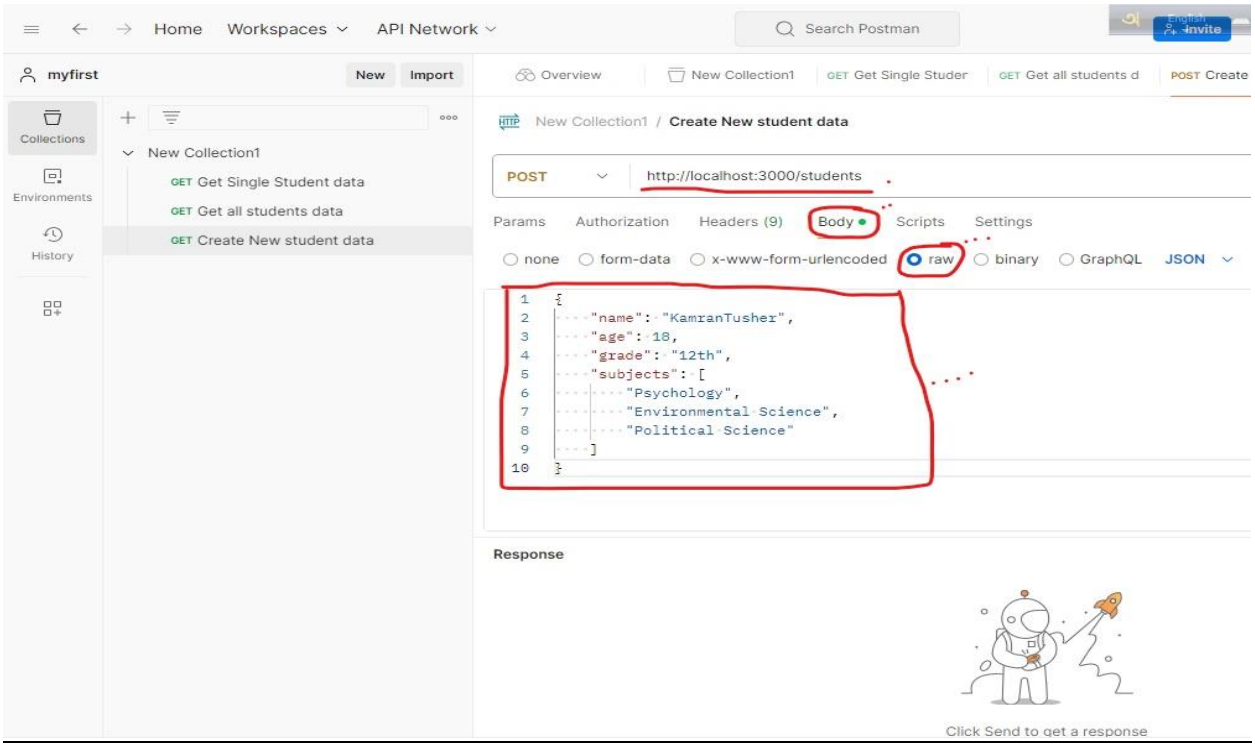
How to get all students data from the above URL? **Task No- 3**



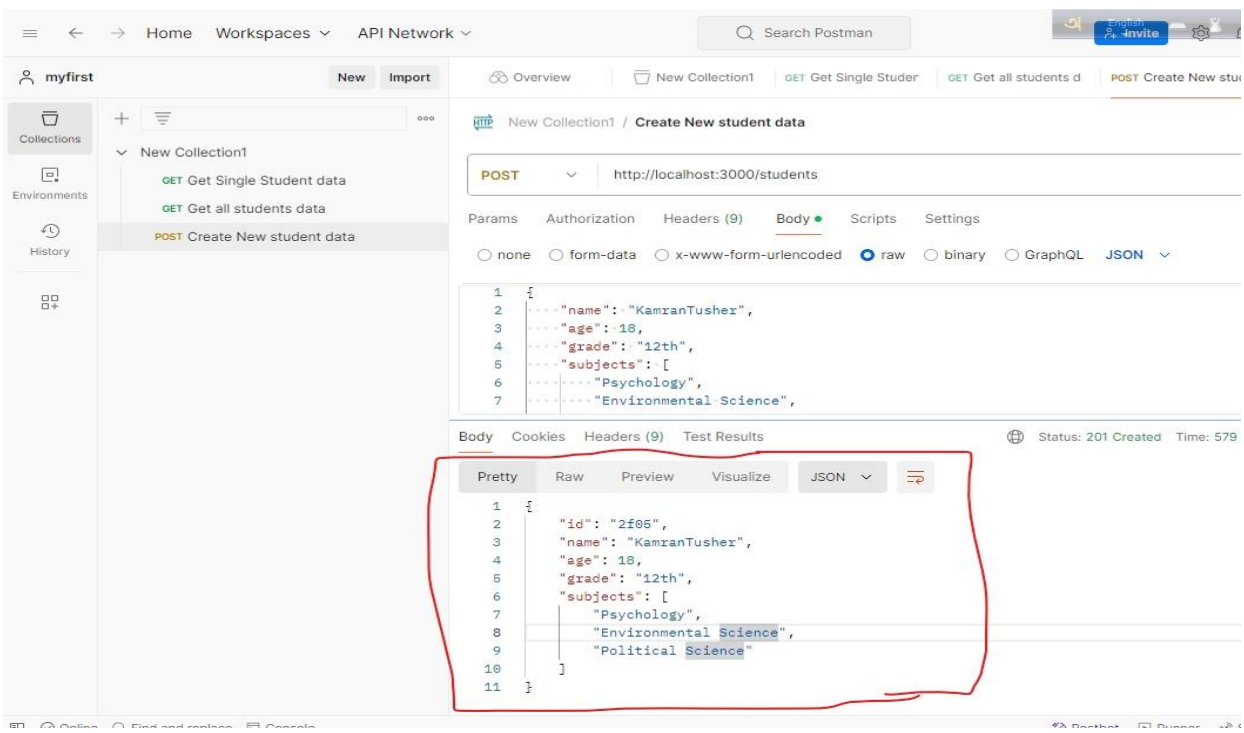
How to create new student data? Create = Post **Task No- 4**

<u>Ans:</u> Add a new collection " Post " then give the url. Then insert a new request in the "Request Payload "

<u>Step-1 </u>(Request Payload)

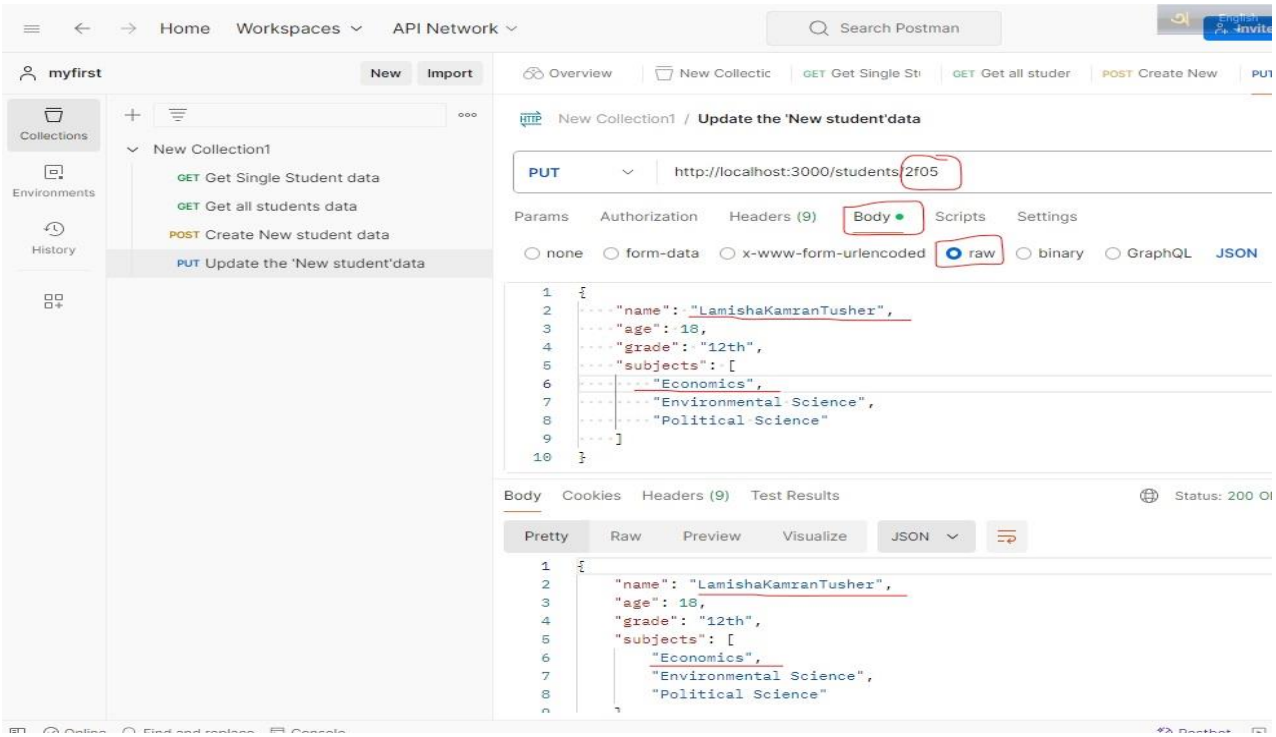


Step-2 (Response Payload)



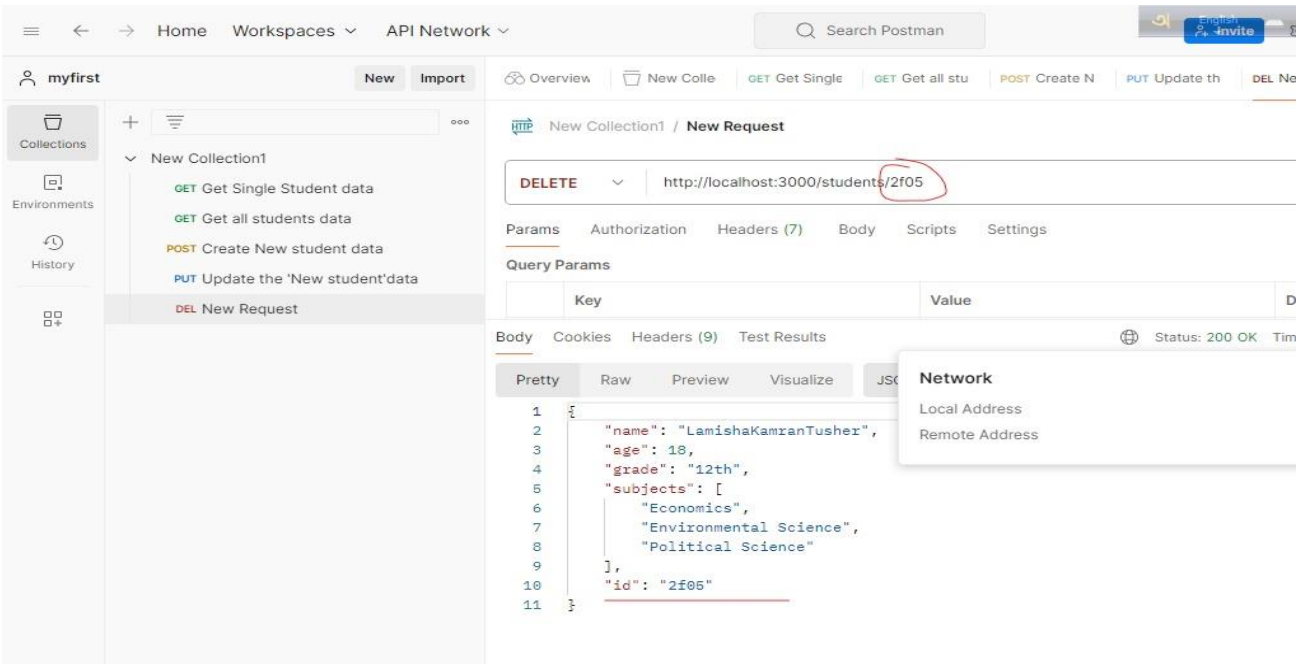
How to update the earlier "New student data" data? Update = Put **Task No- 5**

Ans : Make sure to set the "Id Number" beside the link_(http://localhost:3000/students/2f05)



How to delete any data from the request ? **Task No- 6**

Ans : I want to delete ID = " 2f05 "



Validation :

1. Response Body

2. Headers
3. Cookies
4. Status Code
5. Time

JSON ---Javascript object Notation

What is JSON?

- JSON – **Java Script Object Notation**
- JSON is a syntax for storing and exchanging data.
- Basically It was designed for human-readable data interchange.
- JSON is text, written with Java Script Object Notation.
- It has been extended from the JavaScript scripting language
- The filename extension is **.json**
- JSON internet Media type is **application/json**

JSON Data Types

- Number
- String
- Boolean
- Null
- Object
- Array

Note: In JSON format, we have to represent the data in the form of KEY: Value Pair

Data Types

- **String**
- Strings in JSON must be written in double quotes.
- Example:

```
{ "name":"John" }
```

- **Numbers**
- Numbers in JSON must be an integer or a floating point.
- Example:

```
{ "age":30 }
```

- **Object**
- Values in JSON can be objects.
- Example:

```
{
"employee":{ "name":"John", "age":30, "city":"New York" }
}
```

String

Example

{

"name": "John",

}

Note: KEY is always included in " " double quotation

"Key": Value { "name": " John " }

Here { "name" : " John " }------name is included in double quotation But John included in double quotation here because John is string.

When we input multiple inputs in one variable then we use [ ] this is called JSON Array.

Example:

{

"name": "John",

"age": 30,

"phone": [12345,6789]

}

Data Types

- **Array**
- Values in JSON can be arrays.
- Example:

```
{
"employees":[ "John", "Anna", "Peter" ]
}
```

- **Boolean**
- Values in JSON can be true/false.
- Example:

```
{ "sale":true }
```

- **Null**
- Values in JSON can be null.

```
{ "middlename":null }
```

Example :

```
{
"Firstname": "John",
"Lastname": Null,
"age": 30,
"phone": [12345,6789],
"Status": true
}
```

JSON - Syntax

- Data should be in name/value pairs
- Data should be separated by commas
- Curly braces should hold objects
- Square brackets hold arrays

```
{
  "student": [

    {
       "id":"01",
       "name": "Tom",
       "lastname": "Price"
    },

    {
       "id":"02",
       "name": "Nick",
       "lastname": "Thameson"
    }
  ]
}
```

JSON Object object—Which Contains Multiple KEY : Value Pairs
Student Data (Student Contains SID, SName, Grade) HERE 4 Student/Object.

```
{

"Student":[

        {
        "SID":101,
        "SName":"Kamran Tusher",
        "Grade":A
        },

         {
        "SID":102,
        "SName":"Lamisha Rahman",
        "Grade":A+
        },

        {
        "SID":103,
        "SName":"Zenith Chowdhury",
        "Grade":A
        },

        {
        "SID":104,
        "SName":"Liyana Lio",
        "Grade":A
        }
       ]
}
```


Explanation

```
{                                                        Object Starts
    "Title": "The Cuckoo's Calling"
    "Author": "Robert Galbraith",
    "Genre": "classic crime novel",
    "Detail": {                                          Object Starts
        "Publisher": "Little Brown"                      Value string
        "Publication_Year": 2013,                        Value number
        "ISBN-13": 9781408704004,
        "Language": "English",
        "Pages": 494
    }                                                    Object ends
    "Price": [                                           Array starts
        {                                                Object Starts
            "type": "Hardcover",
            "price": 16.65,
        }                                                Object ends
        {                                                Object Starts
            "type": "Kindle Edition",
            "price": 7.03,
        }                                                Object ends
    ]                                                    Array ends
}                                                        Object ends
```

JSON vs XML

JSON	XML
JSON is simple to read and write.	XML is less simple as compared to JSON.
It also supports **array**.	It doesn't support array.
JSON files are more **human-readable** than XML.	XML files are **less human readable**.
It supports only **text** and **number** data type	It supports many data types such as **text, number, images, charts, graphs**, etc.

Validate JSON Path : **Task No- 7**

```
{
"Student":[
        {
        "SID":101,
        "SName":"Kamran Tusher",
        "Grade":A
        },

        {
        "SID":102,
        "SName":"Lamisha Rahman",
        "Grade":A+
        },

        {
        "SID":103,
        "SName":"Zenith Chowdhury",
        "Grade":A
        },

        {
        "SID":104,
        "SName":"Liyana Lio",
        "Grade":A
        }
        ]
}
```

How to extract any data from the above JSON file by using JSON path ?

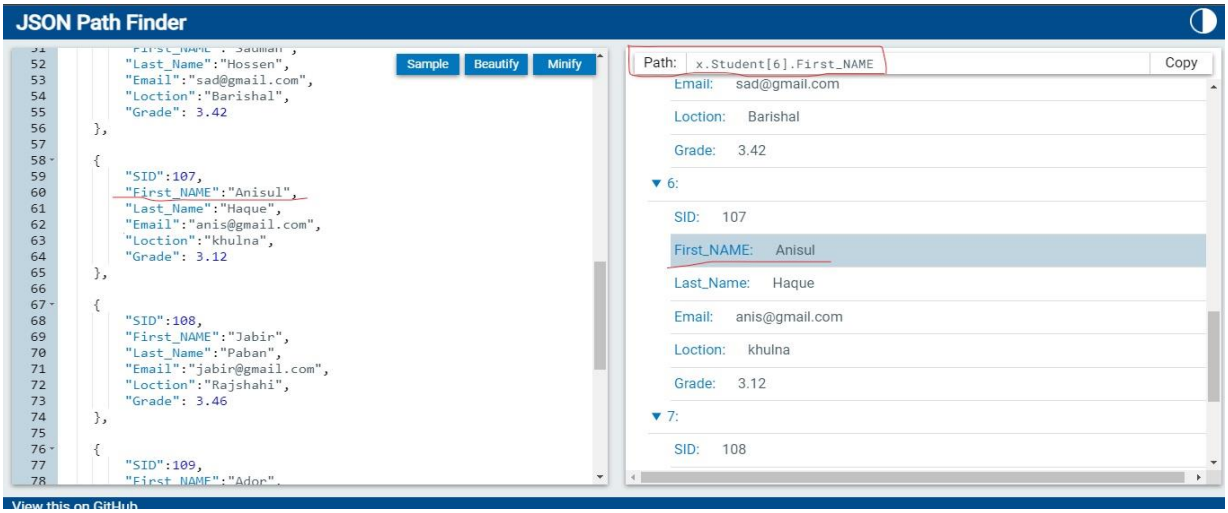
Ans: I want to extract the red-marked data from the file.

Extract Procedure— JSON Path : Student[1].SName-----Lamisha Rahman

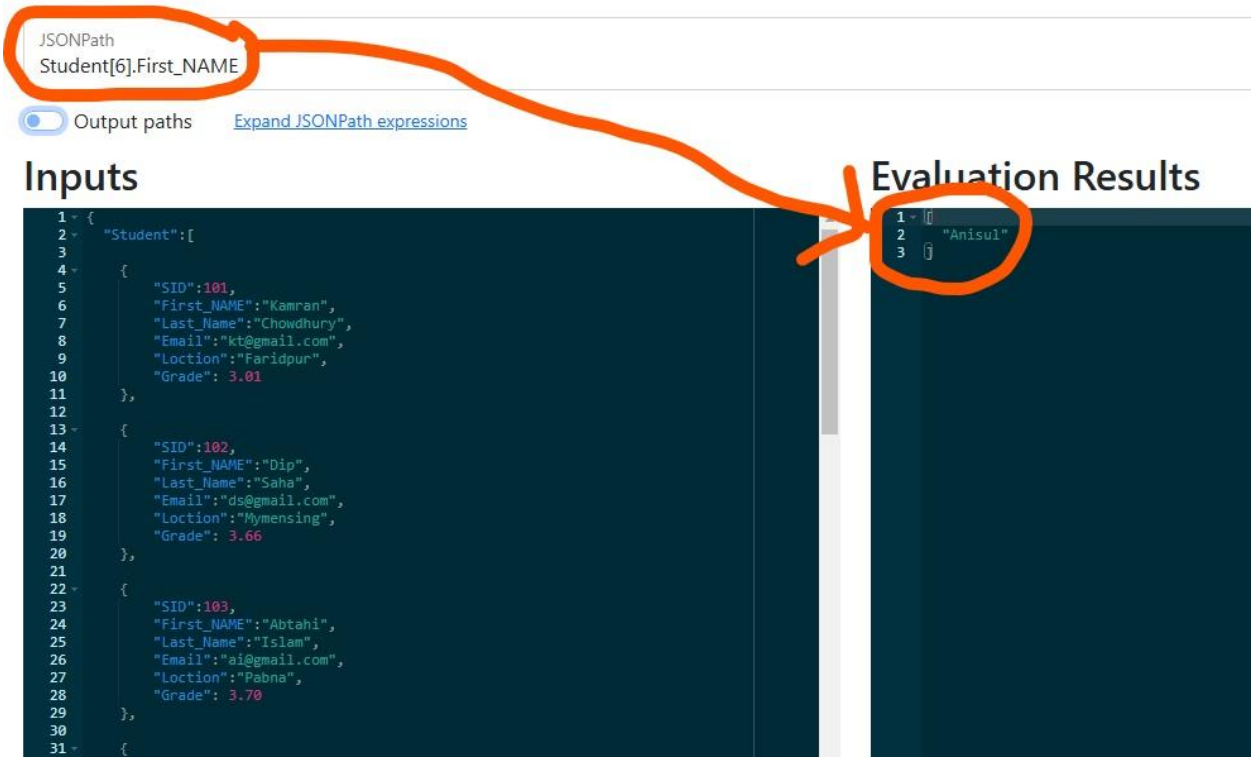
Note: For complex JSON file we need to use tools to extract the data

Tools: 1)JSON Pathfinder. 2) JSON .com

Example: I want get the 2nd object's first name data JSON path Site Link : Link



JSON path Validation (For path validation Site link: Link)

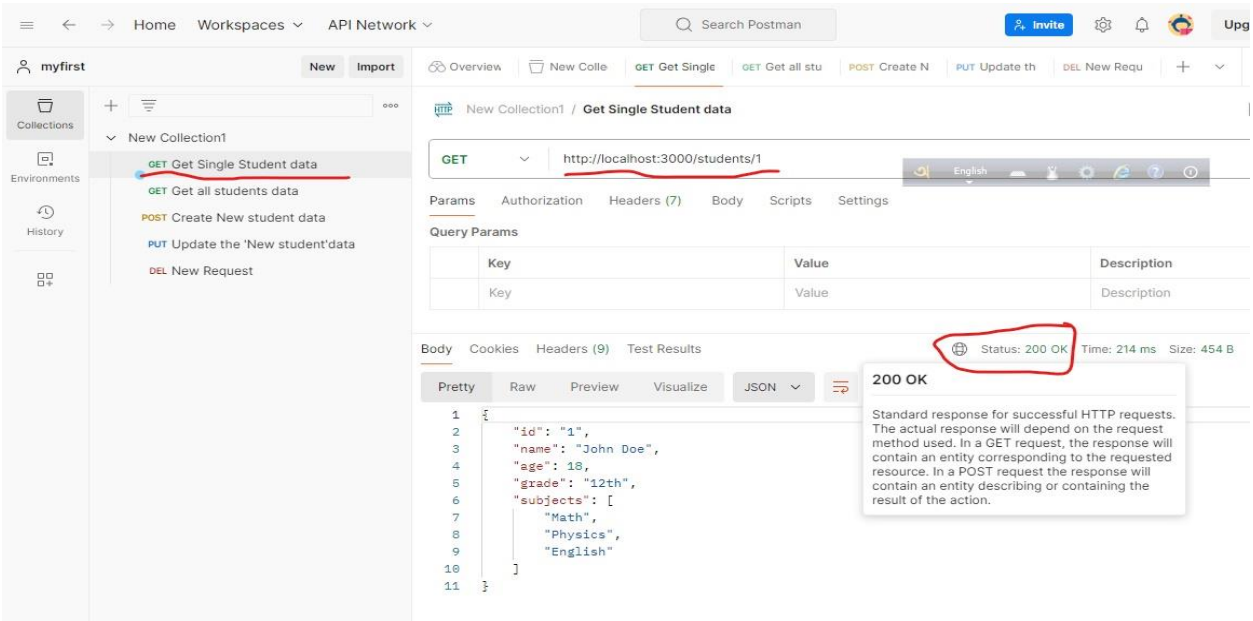


Response Validation

Task No--8

1. Status Code:

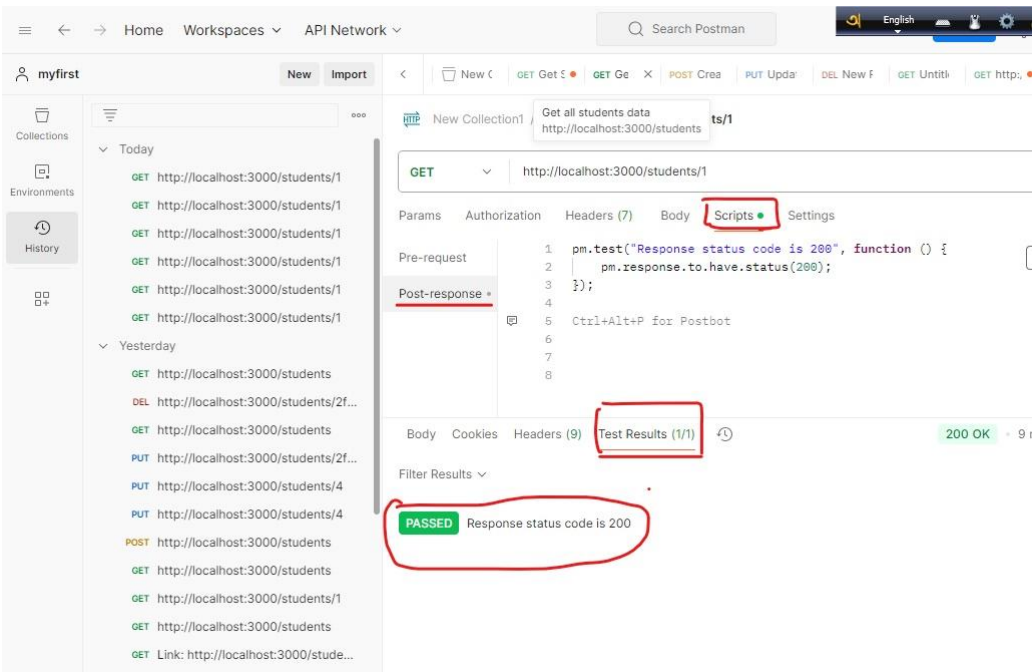
Step-1



Step-2

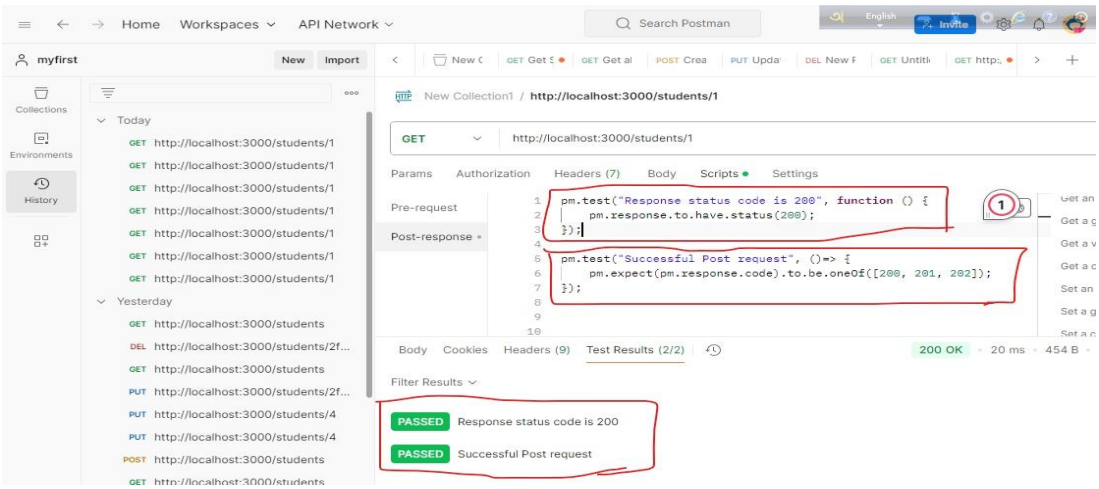
<u>For Single Status code</u>

```
pm.test("Response status code is 200", function () {
   pm.response.to.have.status(200);
});
```



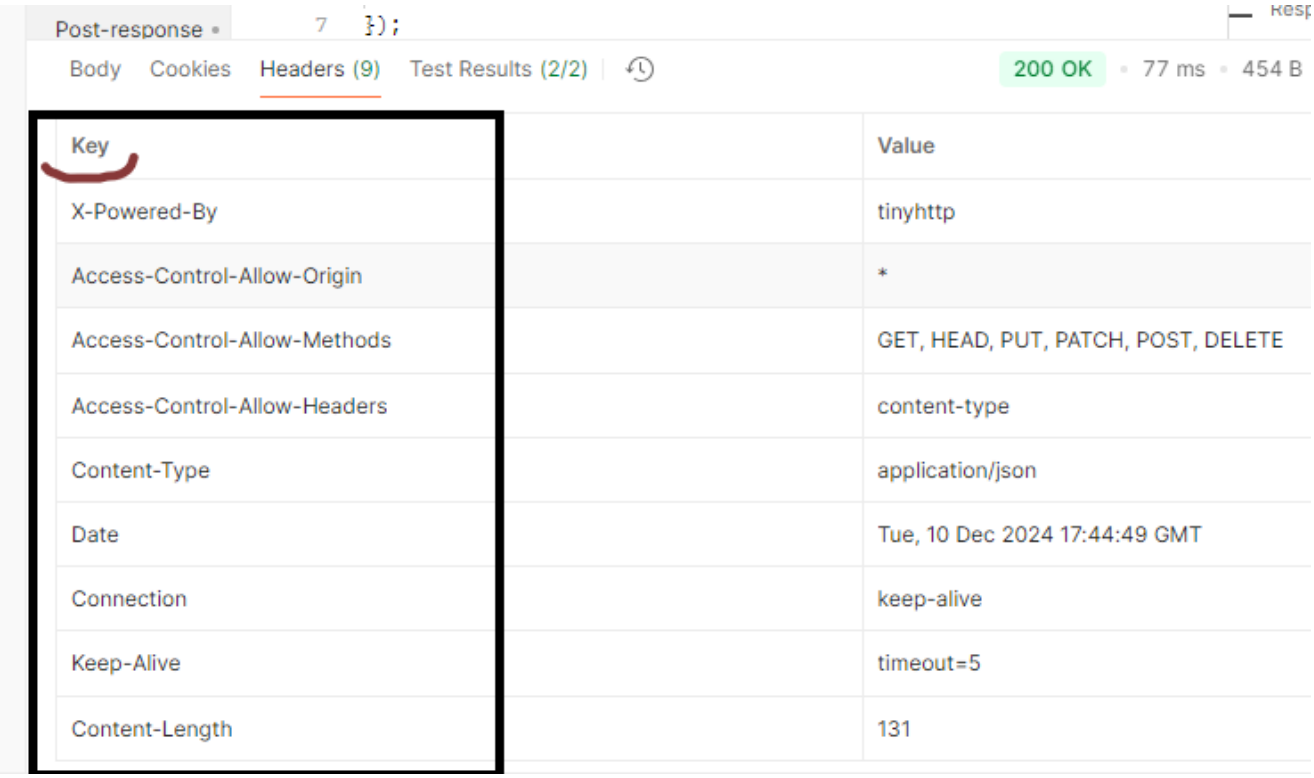
<u>For Multiple Status code</u>

```
pm.test("Successful Post request", ()=> {
   pm.expect(pm.response.code).to.be.oneOf([200, 201, 202]);
});
```



1. **Headers Validation** **Task No—9**

We will Validate “Key” of the header “ given below

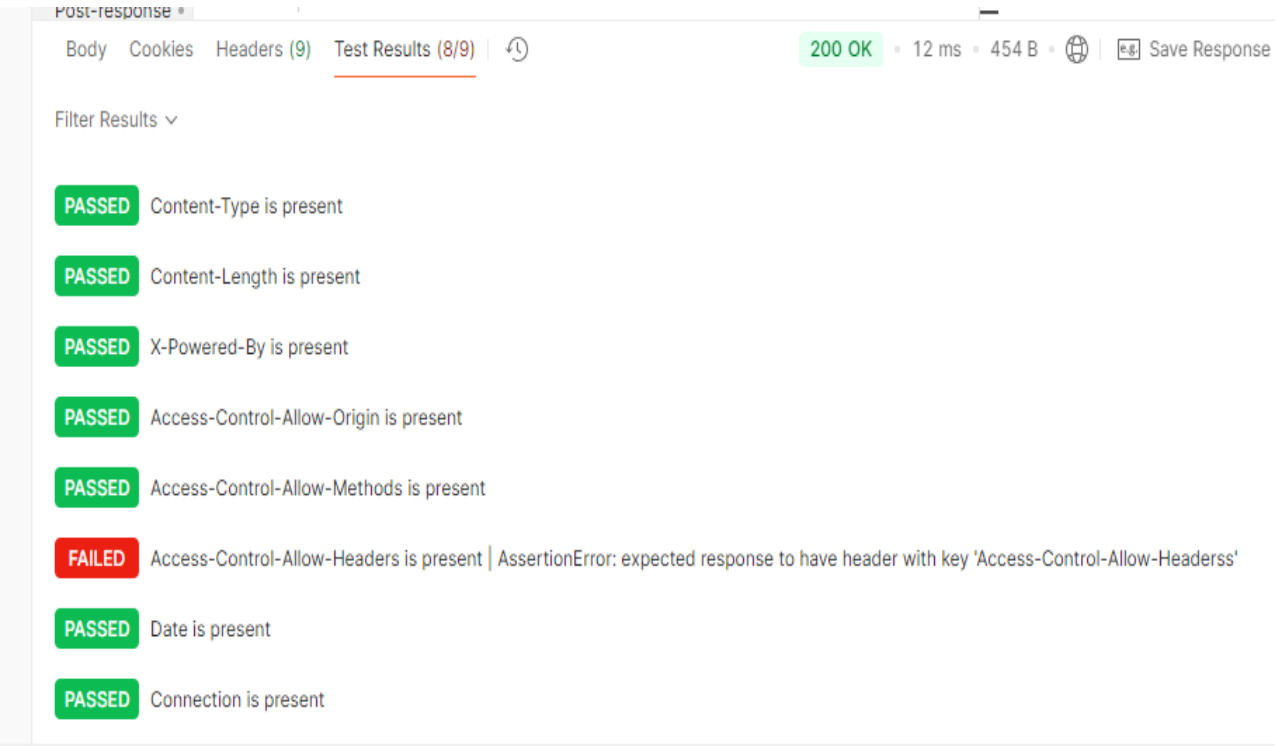


<u>How to validate All the “KEY” response header is present :</u>

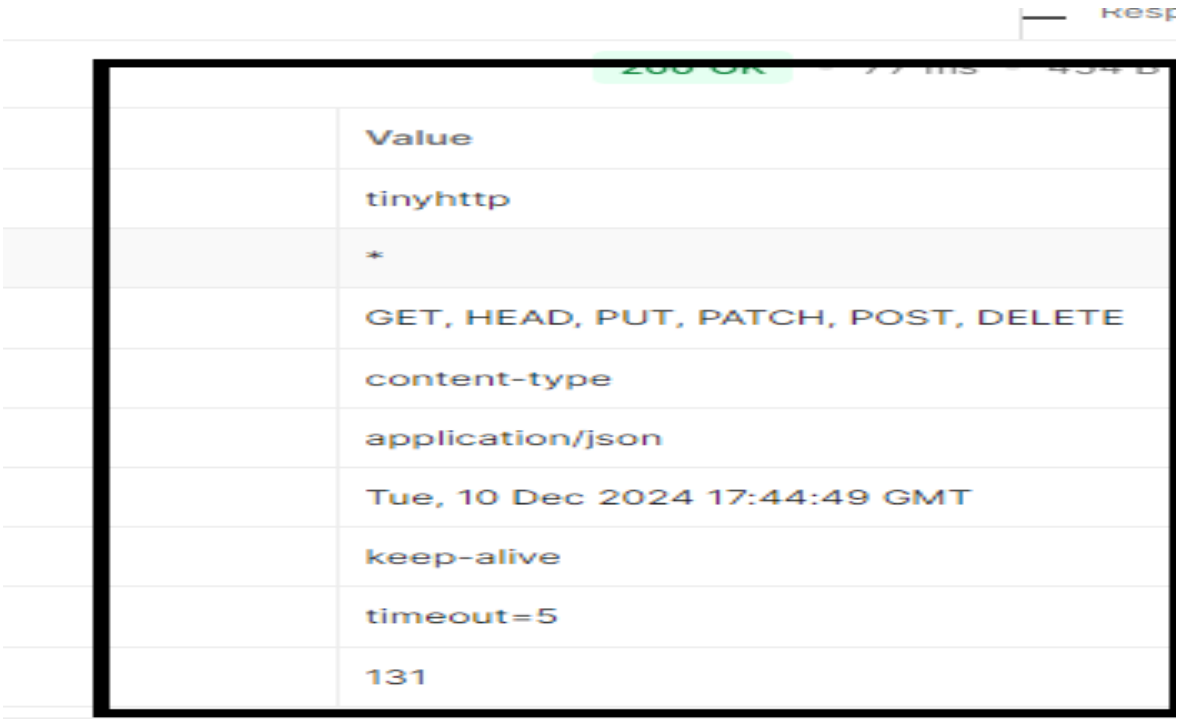
```
pm.test("Content-Type is present", function () {
    pm.response.to.have.header("Content-Type");
});
pm.test("Content-Length is present", function () {
    pm.response.to.have.header("Content-Length");
});
pm.test("X-Powered-By is present", function () {
    pm.response.to.have.header("X-Powered-By");
});
pm.test("Access-Control-Allow-Origin is present", function () {
    pm.response.to.have.header("Access-Control-Allow-Origin");
});
```

```
pm.test("Access-Control-Allow-Methods is present", function () {
   pm.response.to.have.header("Access-Control-Allow-Methods");
});
pm.test("Access-Control-Allow-Headers is present", function () {
   pm.response.to.have.header("Access-Control-Allow-Headerss");
});
pm.test("Date is present", function () {
   pm.response.to.have.header("Date");
});
pm.test("Connection is present", function () {
   pm.response.to.have.header("Connection");
});
pm.test("Keep-Alive is present", function () {
   pm.response.to.have.header("Keep-Alive");
});
```

Here Is the result Images:



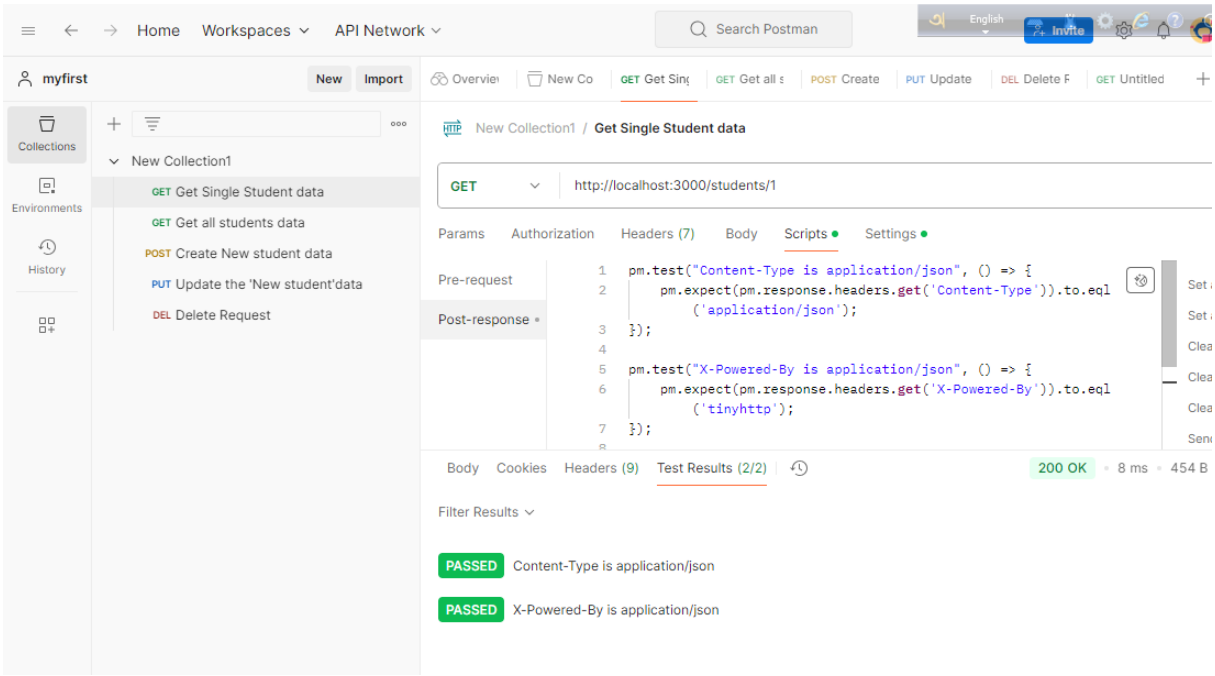
How to Validate the " value " of the header ? Task No-10



Value
tinyhttp
*
GET, HEAD, PUT, PATCH, POST, DELETE
content-type
application/json
Tue, 10 Dec 2024 17:44:49 GMT
keep-alive
timeout=5
131

Code is given below

```
pm.test("Content-Type is application/json", () => {
    pm.expect(pm.response.headers.get('Content-Type')).to.eql('application/json');
});
```



All the “ Value “ validated together using an Array

```
const headers = [
  { key: "X-Powered-By", value: "tinyhttp" },
  { key: "Access-Control-Allow-Origin", value: "*" },
  { key: "Access-Control-Allow-Methods", value: "GET, HEAD, PUT, PATCH, POST, DELETE" },
  { key: "Access-Control-Allow-Headers", value: "content-type" },
  { key: "Content-Type", value: "application/json" },
  //{ key: "Date", value: "Tue, 10 Dec 2024 20:04:59 GMT" },
  { key: "Connection", value: "keep-alive" },
  { key: "Keep-Alive", value: "timeout=5" },
  { key: "Content-Length", value: "131" }
];
// Loop through headers and validate each using a basic for loop
for (let i = 0; i < headers.length; i++) {
  const header = headers[i];
  pm.test(`${header.key} is ${header.value}`, () => {
    pm.expect(pm.response.headers.get(header.key)).to.eql(header.value);
  });
}
```

2. **Cookies Validation :**

We need to verify the cookie name and the value

How to check the cookies are present in the response?

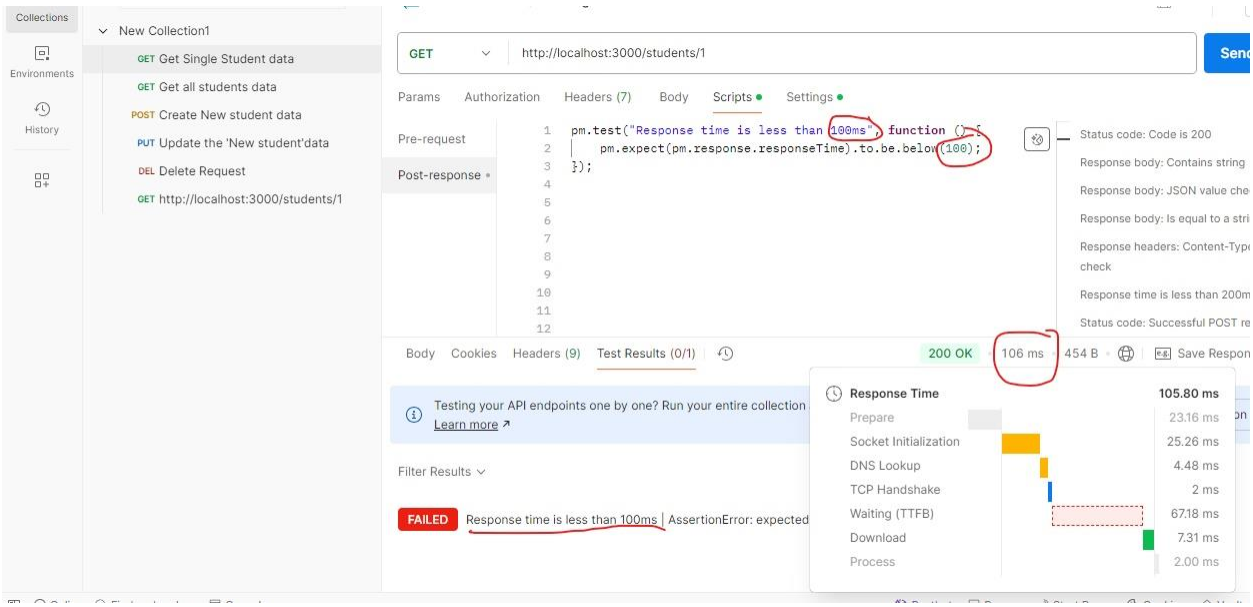
Ans:

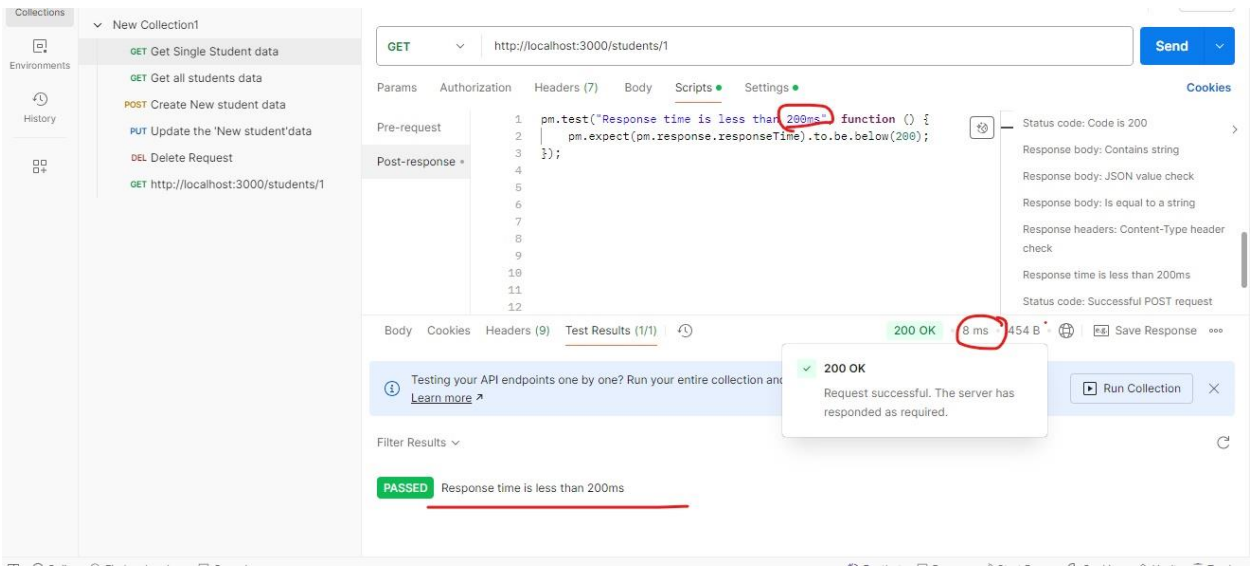
3. **Response Time validation :**

How to check the response time ?

Ans:
```
pm.test("Response time is less than 200ms", function () {
  pm.expect(pm.response.responseTime).to.be.below(200);
});
```

Actually, the response time keep changing during the execution.





Response Body: Task No-

Different types of validation are done in Response Body validation:

1. Validate the Data type of the Data in the fields
2. Validate the Array Properties/Array Content in the fields
3. Validate the Data of the fields are matched/Correct or Not
4. Validate the Json schema

1. **Validate the Data type of the Data in the fields :**

Validate the "Type" of the value: Validate all the "data type" of these data from every assertion in this Response body.

How to validate the 'Data type ' of the value from these assertions in the response body?

Here is the response body: (For single object in the response body)

```
{
   "id": "1",                    //verify the data type of id
   "name": "John Doe",   //verify the data type of name
   "age": 18,                //verify the data type of id
   "grade": "12th",       //verify the data type of id
   "subjects": [           //verify the data type of subject
      "Math",
      "Physics",
      "English"
   ]
}
```

CODE:

```
const jsonData = pm.response.json();
pm.test("Test the data type of the response",() =>{
pm.expect(jsonData).to.be.an("object");
pm.expect(jsonData.name).to.be.an("String");
pm.expect(jsonData.id).to.be.an("String");
pm.expect(jsonData.age).to.be.an("number");
pm.expect(jsonData.subjects).to.be.an("Array");

});
```

myfirst

New Import

Collections

Environments

History

New Collection1

- GET Get Single Student data
- GET Get all students data
- POST Create New student data
- PUT Update the 'New student'data
- DEL Delete Request
- GET http://localhost:3000/students/1

Overview | GET http://loca | GET Get Single | GET Get all stu | Postman \ | Runner | New

New Collection1 / **Get Single Student data**

GET http://localhost:3000/students/1

Params | Authorization | Headers (7) | Body | Scripts • | Settings •

Pre-request

Post-response •

```
const jsonData = pm.response.json();
pm.test("Test the data type of the response",() =>{
pm.expect(jsonData).to.be.an("object");
pm.expect(jsonData.name).to.be.an("String");
pm.expect(jsonData.id).to.be.an("String");
pm.expect(jsonData.age).to.be.an("number");
pm.expect(jsonData.subjects).to.be.an("Array");

});
```

Body | Cookies | Headers (9) | Test Results (1/1) | 200 OK

Pretty | Raw | Preview | Visualize | JSON

```
{
    "id": "1",
    "name": "John Doe",
    "age": 18,
    "grade": "12th",
    "subjects": [
        "Math",
        "Physics",
        "English"
    ]
}
```

Home | Workspaces | API Network | Search Postman | English | Invite

myfirst

New Import

Collections

Environments

History

New Collection1

- GET Get Single Student data
- GET Get all students data
- POST Create New student data
- PUT Update the 'New student'data
- DEL Delete Request
- GET http://localhost:3000/students/1

Overview | GET http://loca | GET Get Single | GET Get all stu | Postman \ | Runner

New Collection1 / **Get Single Student data**

GET http://localhost:3000/students/1

Params | Authorization | Headers (7) | Body | Scripts • | Settings •

Pre-request

Post-response •

```
const jsonData = pm.response.json();
pm.test("Test the data type of the response",() =>{
pm.expect(jsonData).to.be.an("object");
pm.expect(jsonData.name).to.be.an("String");
pm.expect(jsonData.id).to.be.an("String");
pm.expect(jsonData.age).to.be.an("number");
pm.expect(jsonData.subjects).to.be.an("Array");

});
```

Body | Cookies | Headers (9) | Test Results (1/1) | 200 OK

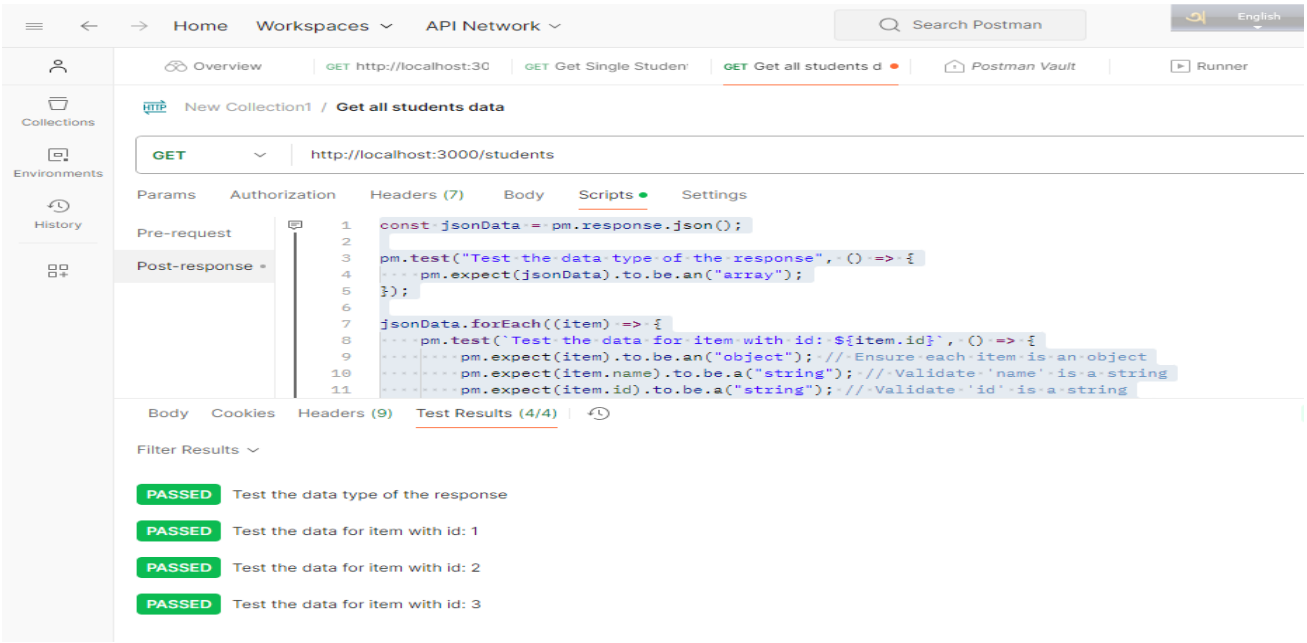
Filter Results

PASSED Test the data type of the response

(For multiple object in the response body):;

CODE:

```
const jsonData = pm.response.json();

pm.test("Test the data type of the response", () => {
   pm.expect(jsonData).to.be.an("array");
});

jsonData.forEach((item) => {
   pm.test(`Test the data for item with id: ${item.id}`, () => {
      pm.expect(item).to.be.an("object"); // Ensure each item is an object
      pm.expect(item.name).to.be.a("string"); // Validate 'name' is a string
      pm.expect(item.id).to.be.a("string"); // Validate 'id' is a string
      pm.expect(item.age).to.be.a("number"); // Validate 'age' is a number
      pm.expect(item.subjects).to.be.an("array"); // Validate 'subjects' is an array
   });
});
```



2. Validate the Array Properties/Array Content in the fields:

Array properties in the response body :

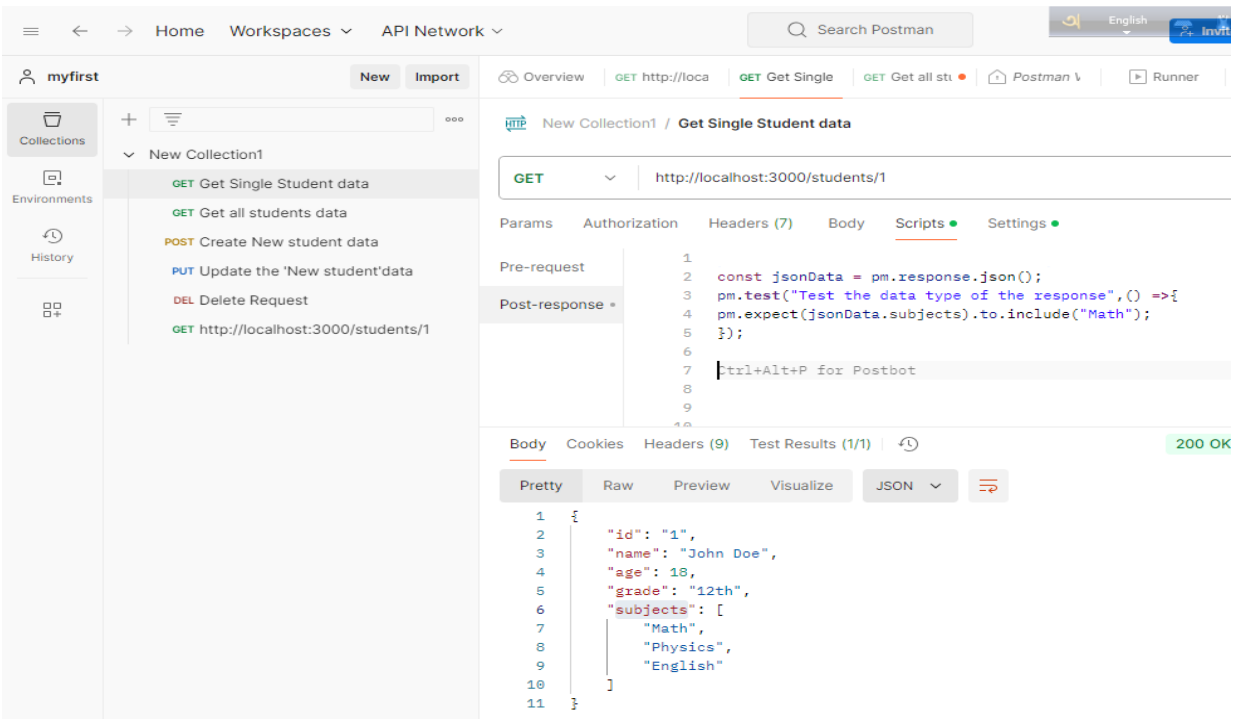
How to validate the Array properties in the response body ?

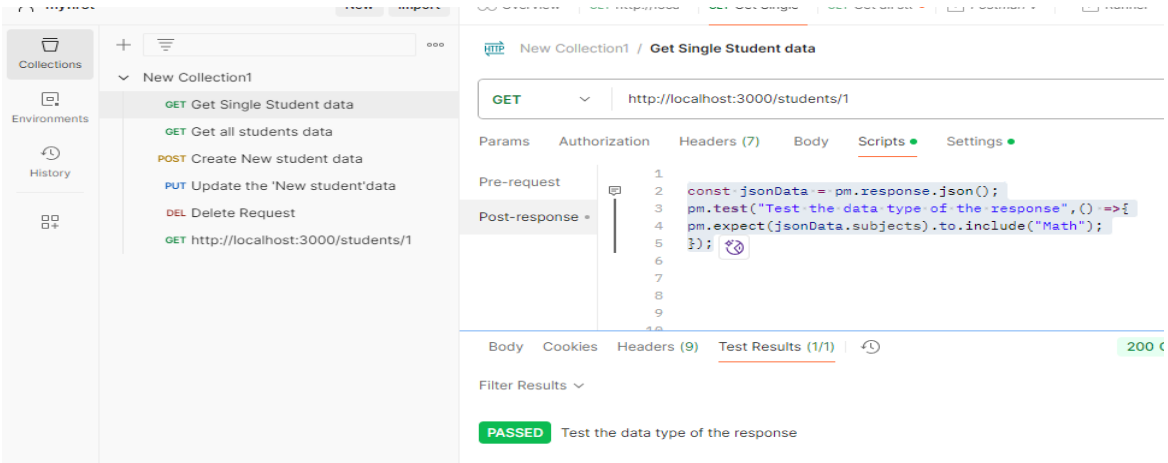
-(Validate a single property in the Array from the response body)

CODE:

```
const jsonData = pm.response.json();

pm.test("Test the data type of the response",() =>{

pm.expect(jsonData.subjects).to.include("Math");

});
```

Input:



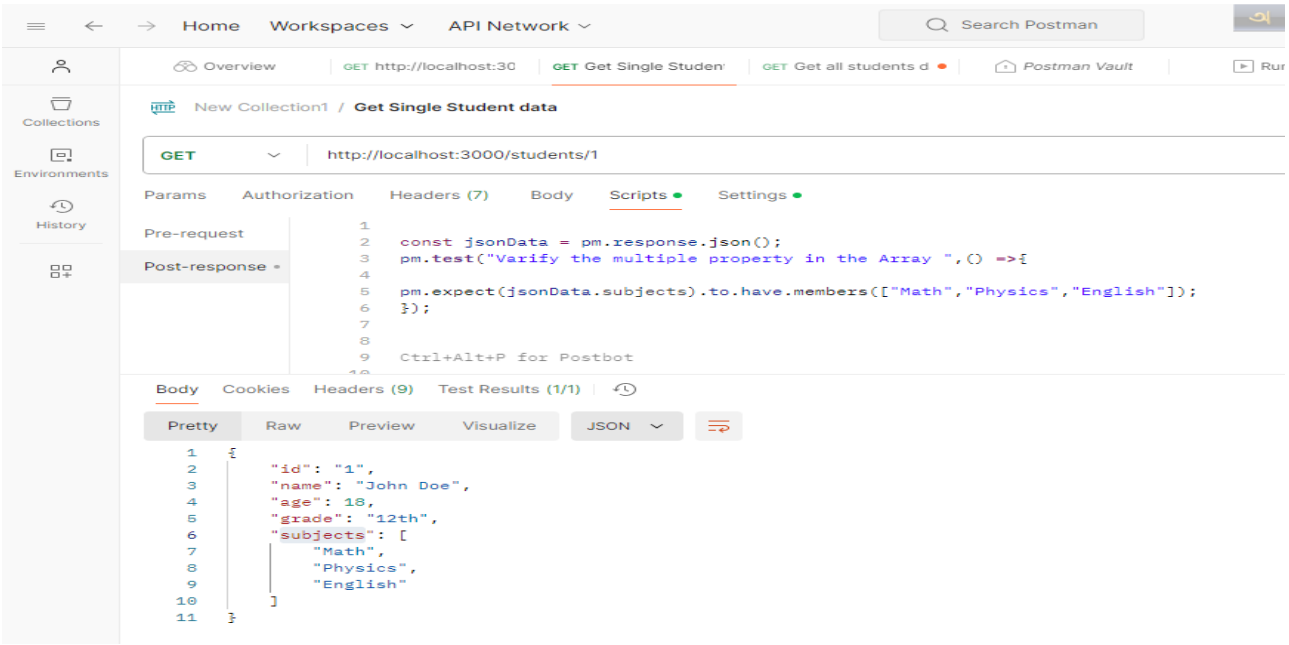


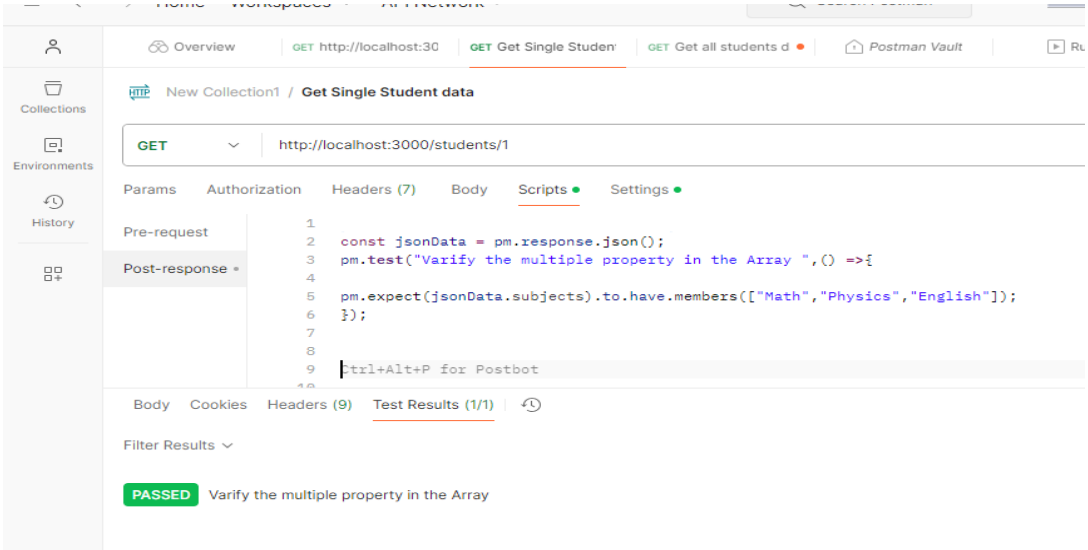
-(Validate a Multiple property in the Array from the response body)

<u>CODE</u>:

```
const jsonData = pm.response.json();

pm.test("Varify the multiple property in the Array ",() =>{

pm.expect(jsonData.subjects).to.have.members(["Math","Physics","English"]);

});
```

<u>Input:</u>





3. Validate the Data of the fields are matched/Correct or Not :

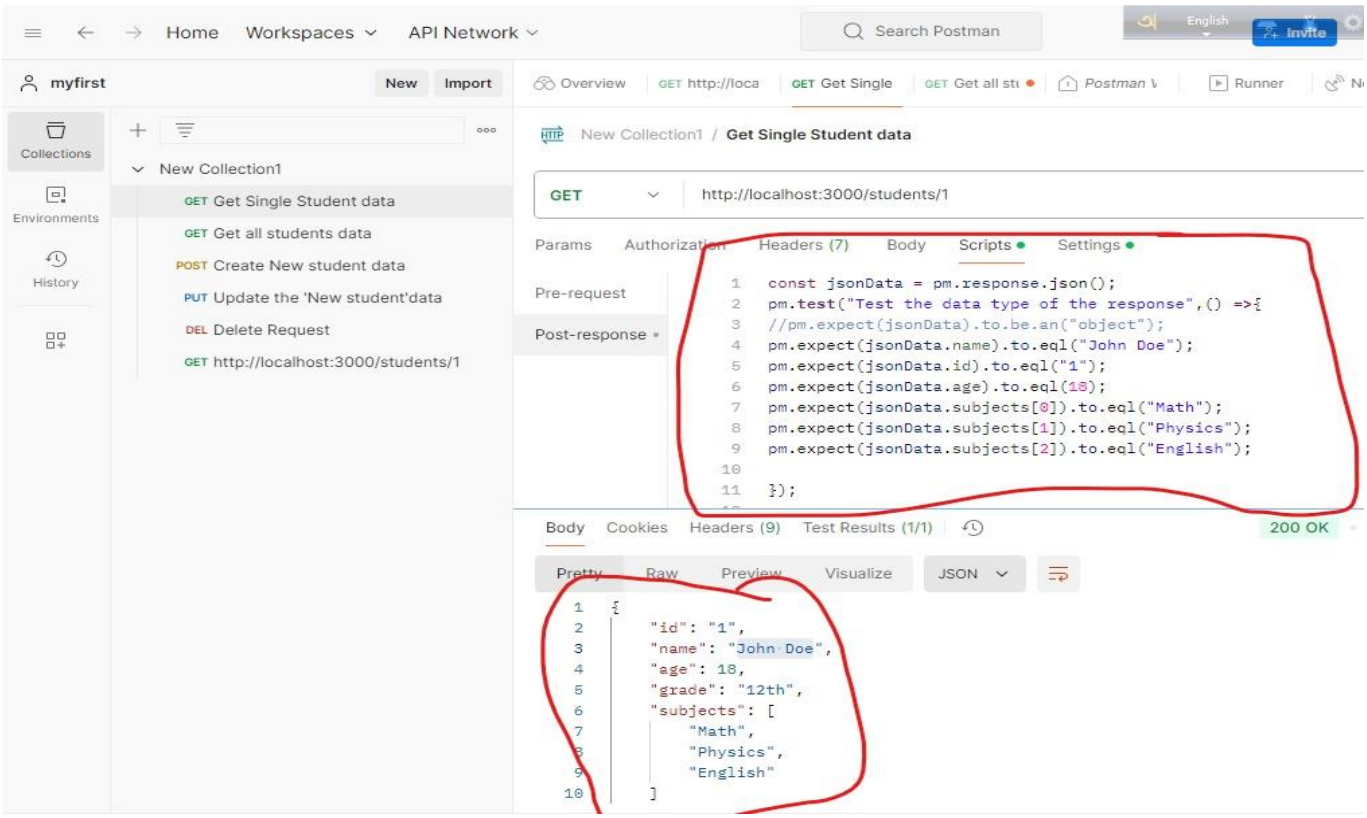
Validate the “value “ Of the response body

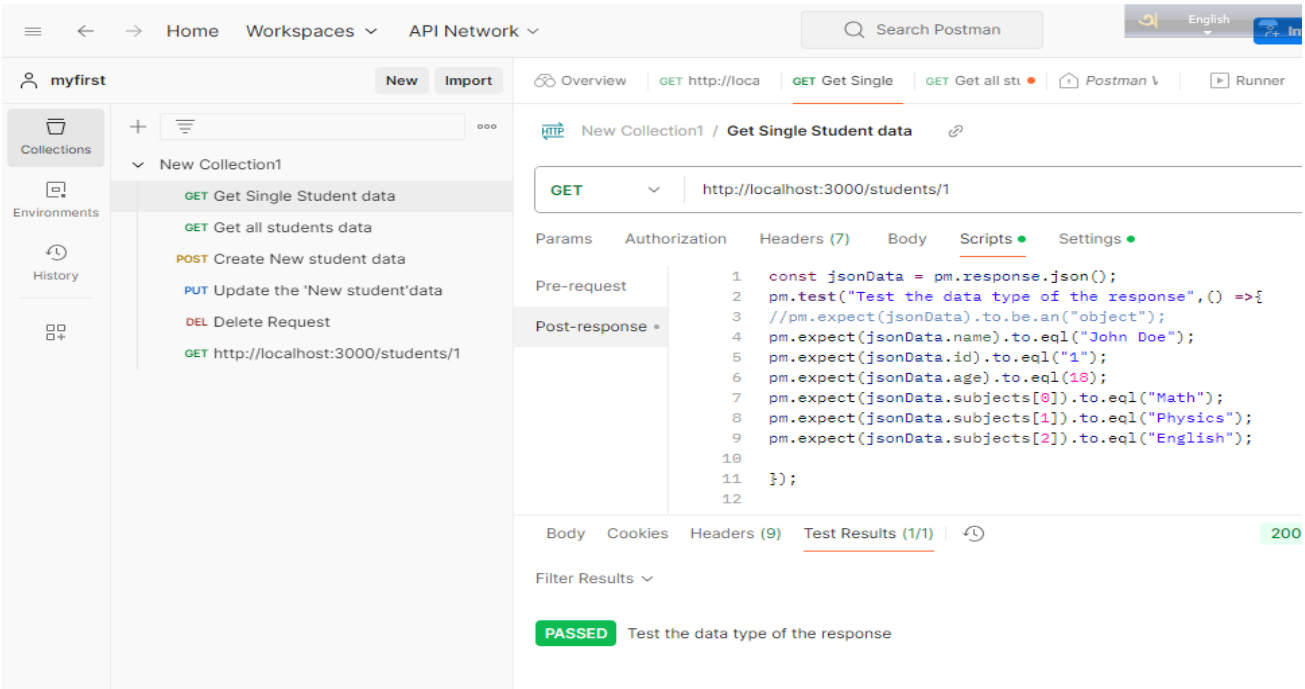
How to validate the value of of every field/assertion is match or not from the response body?

Ans:

CODE:

```
const jsonData = pm.response.json();

pm.test("Test the data type of the response",() =>{

//pm.expect(jsonData).to.be.an("object");

pm.expect(jsonData.name).to.eql("John Doe");

pm.expect(jsonData.id).to.eql("1");

pm.expect(jsonData.age).to.eql(18);

pm.expect(jsonData.subjects[0]).to.eql("Math");

pm.expect(jsonData.subjects[1]).to.eql("Physics");

pm.expect(jsonData.subjects[2]).to.eql("English");

});
```





4. Validate the Json schema :

Validate the Json Schema :

Convert Json to JSON schema link : Link

Sample JSON Document

```
1  {
2      "id": "1",
3      "name": "John Doe",
4      "age": 18,
5      "grade": "12th",
6      "subjects": [
7          "Math",
8          "Physics",
9          "English"
10     ]
11 }
```

```
{
  "$schema": "http://json-schema.org/draft-04/schema#",
  "type": "object",
  "properties": {
    "id": {
      "type": "string"
    },
    "name": {
      "type": "string"
    },
    "age": {
      "type": "integer"
    },
    "grade": {
      "type": "string"
    },
    "subjects": {
      "type": "array",
      "items": [
        {
          "type": "string"
        },
        {
          "type": "string"
        },
        {
          "type": "string"
        }
      ]
    }
  },
  "required": [
    "id",
    "name",
    "age",
    "grade",
    "subjects"
  ]
}
```

Schema validation code: `//Validate Json Schema of the response body.`

```
pm.test("Status code is 200", function () {
    pm.expect(tv4.validate(jsonData,schema)).to.be.true;
});
```

PostMan variables

What is a variable?

Ans: Variable is something which contains some data.

Why is variable need in postman?

Ans: Variable Is used to avoid the duplicate value

Where is use variable in Postman?

Ans : Variable is used in multiple level like Collection, and Environment. Request level.

Scope?

Ans : where we can create the variables

Scope to set up the variables:

1. Global variable ---Set the variable in global level
2. Collection variable---- Set the variable in collection level
3. Request variable---- Set the variable in request level
4. Environment variable---- Set the variable in environment level
5. Data variable---------- Set the variable in data level.

1. Global variable:

How do we create a global variable?

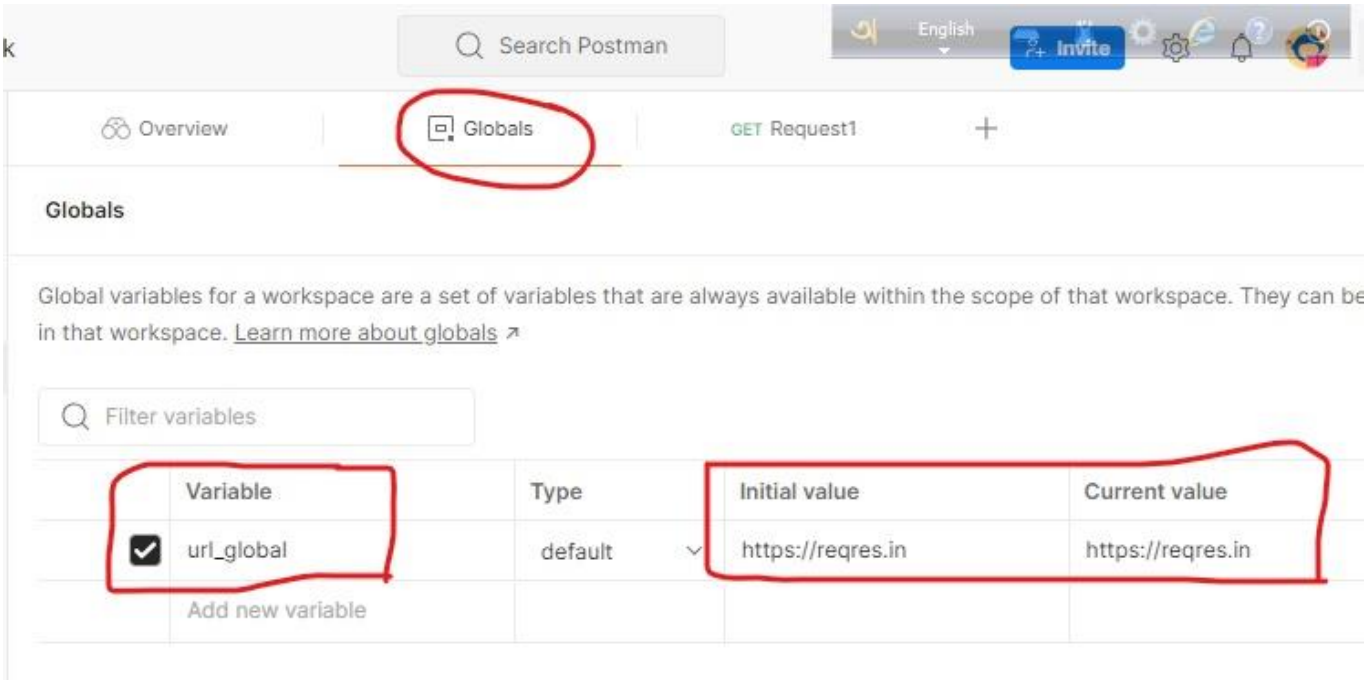
Ans: workspace--→Collection---→Request/Folder.

A global variable is accessible throughout the every workspace.

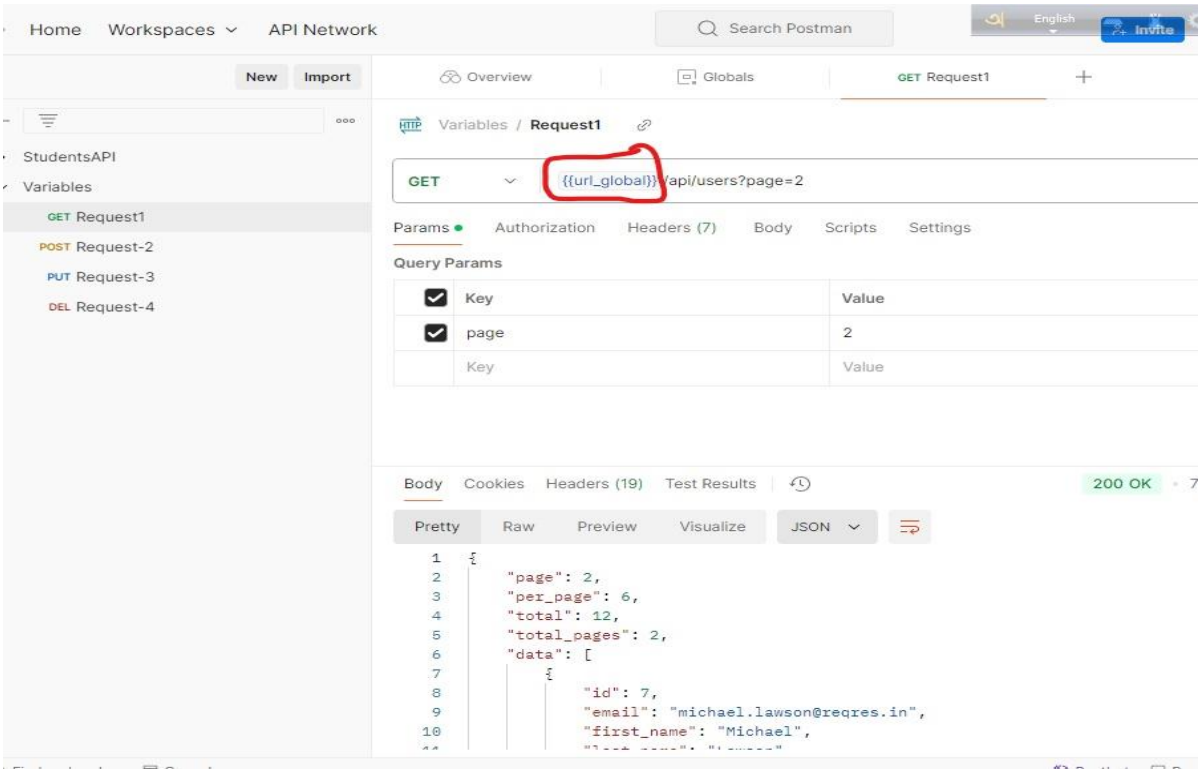
Step-1

Create a Global variable on the collection and save.

Step-2

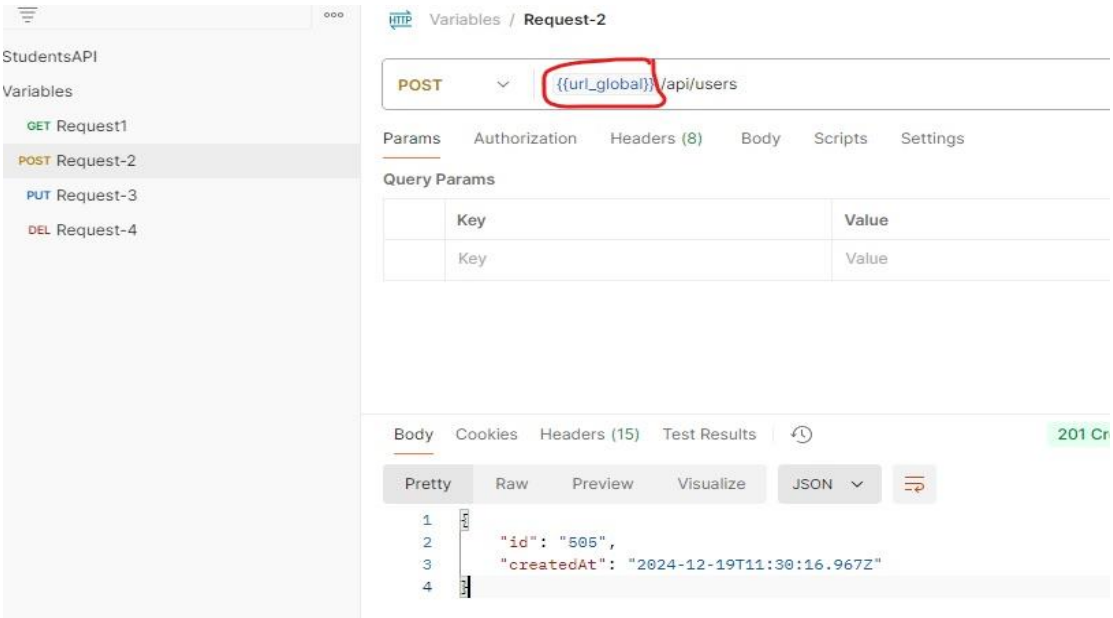


Step-3 ----(Get Request)

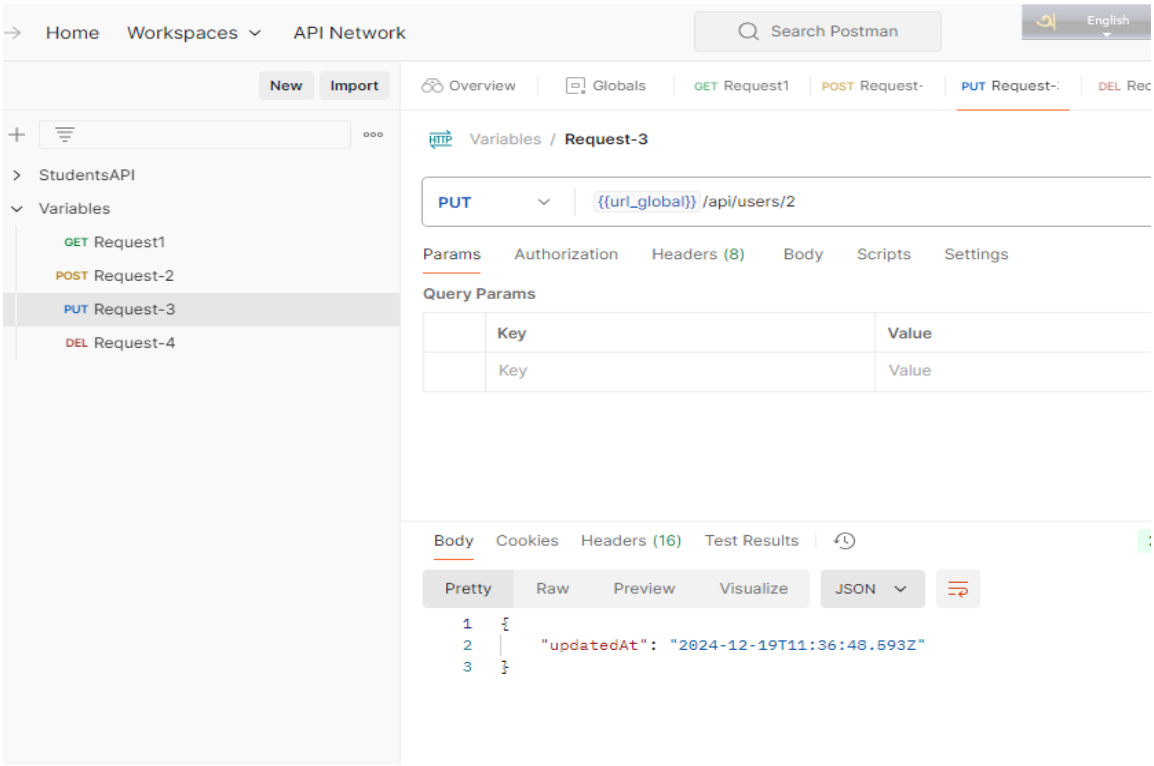


Step-5 ----(Post Request)

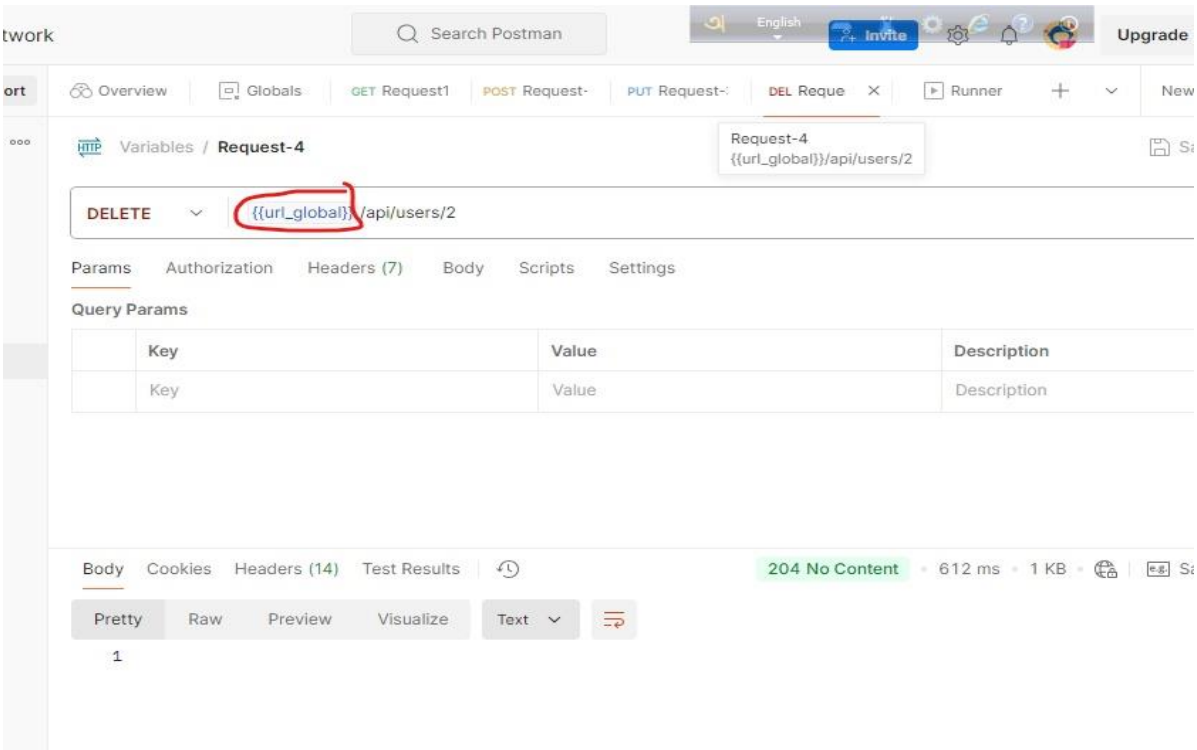
Put this " {{url_global}} " variable in every collection accordingly to change the value



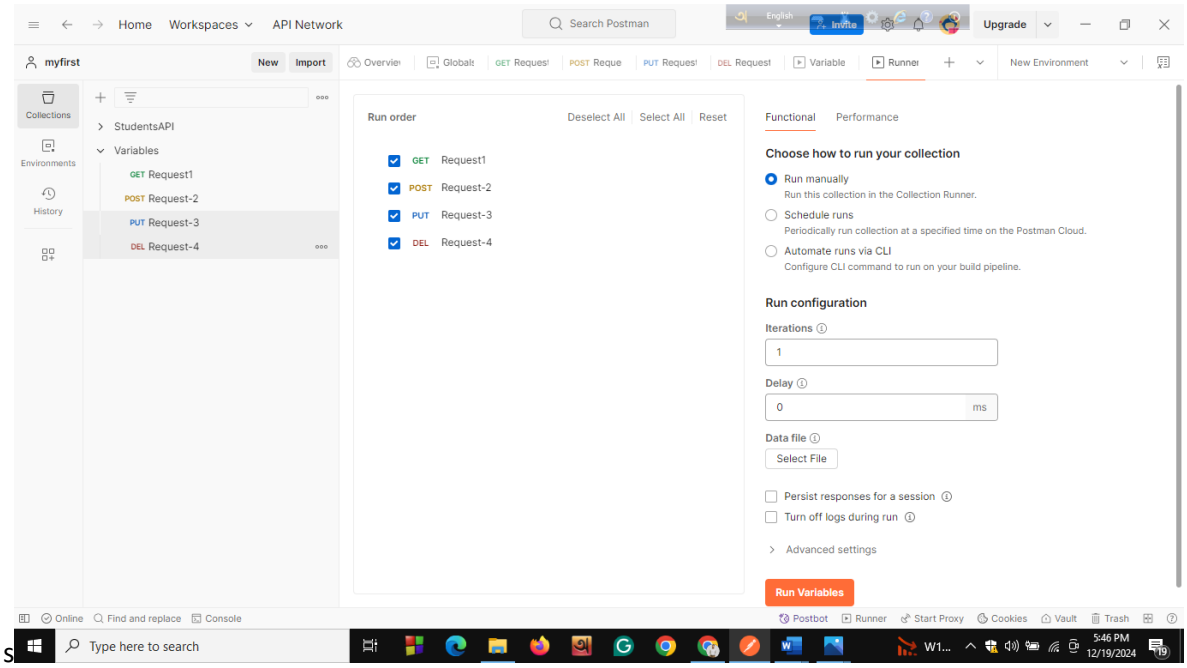
Step-6 (Put Request)



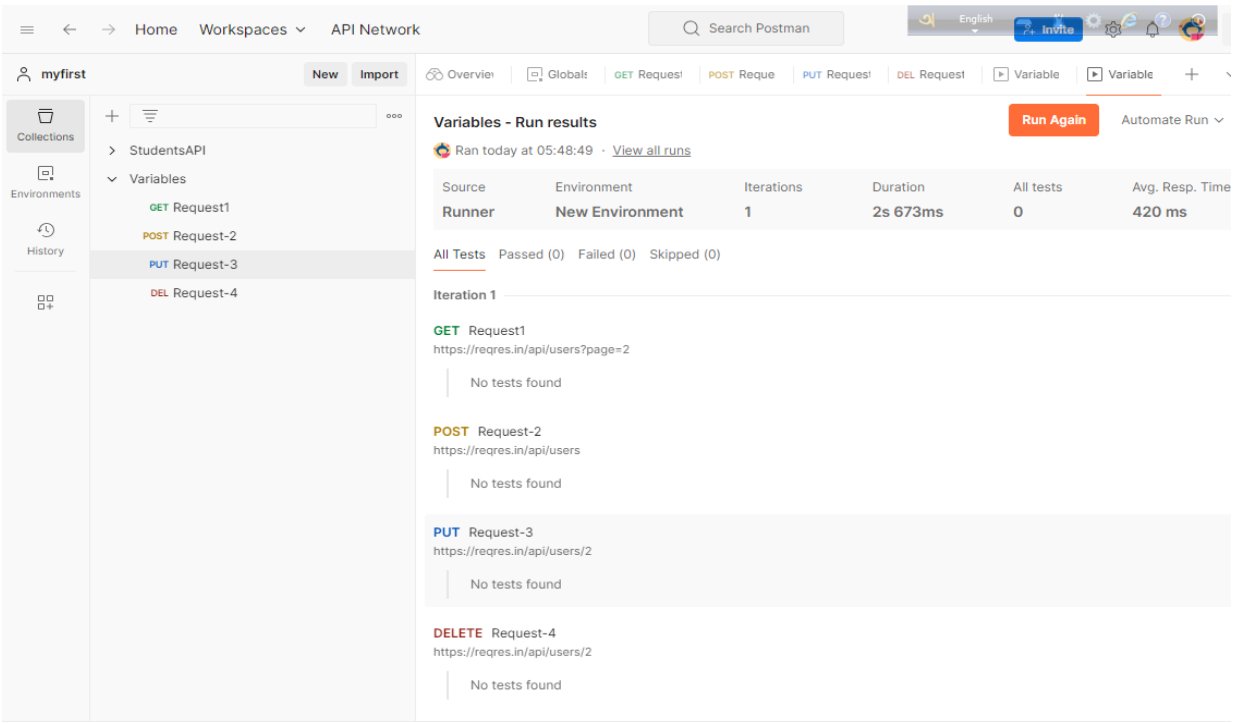
Step-7 ----(Delete Request)



Step-8

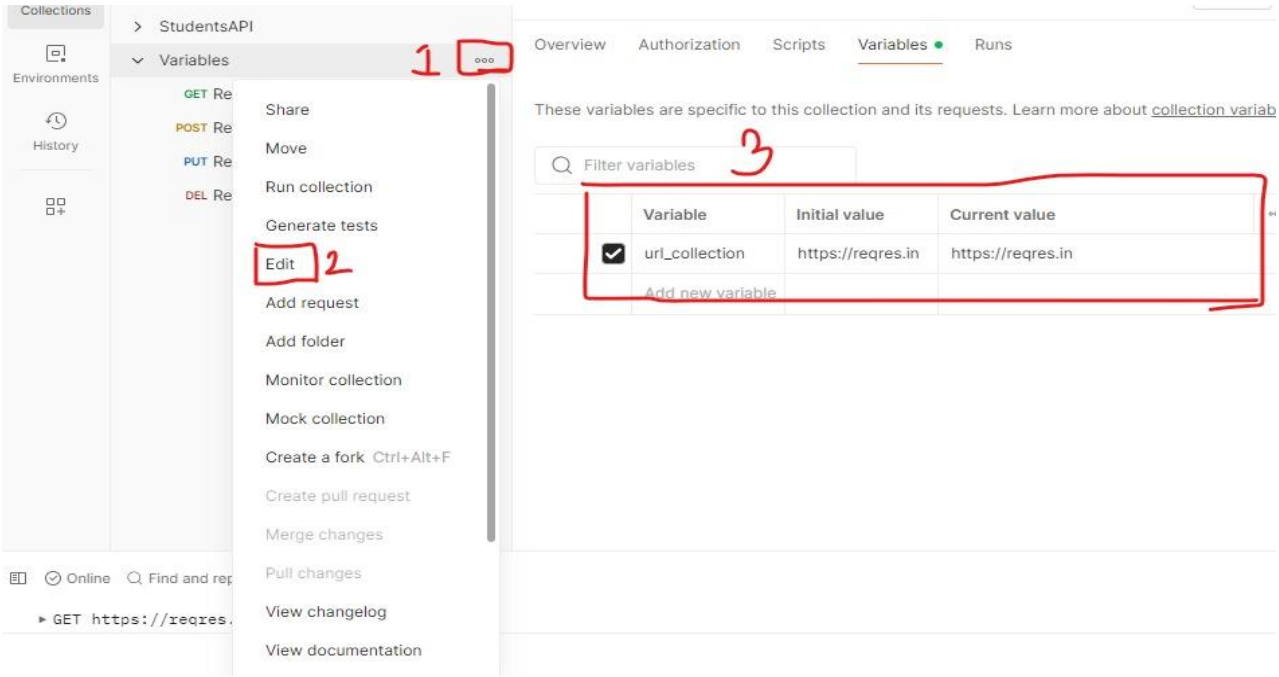

Home
Workspaces
API Network
Search Postman
Upgrade
myfirst
New
Import
Collections
Environments
History
StudentsAPI
Variables
GET Request1
POST Request-2
PUT Request-3
DEL Request-4
Run order
Deselect All
Select All
Reset
Functional
Performance
Choose how to run your collection
Run manually
Run this collection in the Collection Runner.
Schedule runs
Periodically run collection at a specified time on the Postman Cloud.
Automate runs via CLI
Configure CLI command to run on your build pipeline.
Run configuration
Iterations
1
Delay
0
ms
Data file
Select File
Persist responses for a session
Turn off logs during run
Advanced settings
Run Variables
Type here to search

Step-9

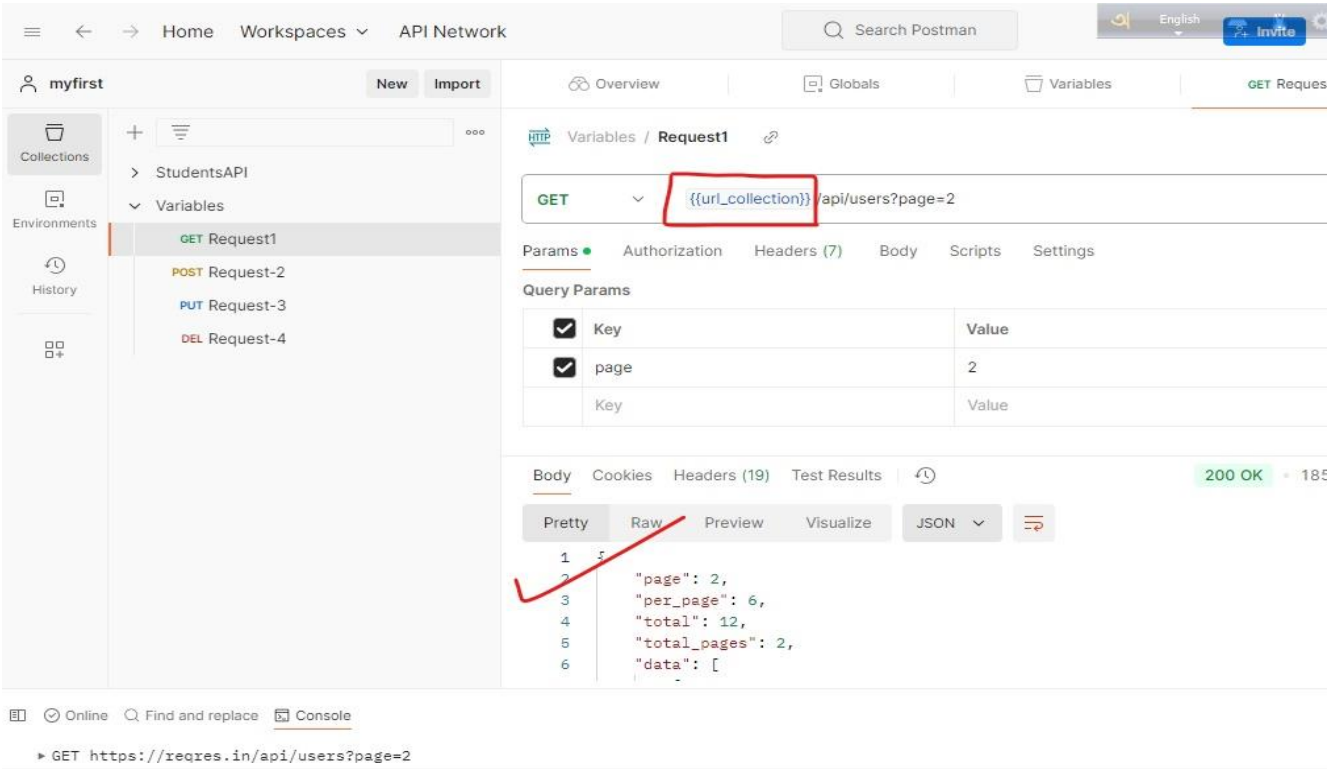

Home
Workspaces
API Network
Search Postman
myfirst
New
Import
Collections
Environments
History
StudentsAPI
Variables
GET Request1
POST Request-2
PUT Request-3
DEL Request-4
Variables - Run results
Run Again
Automate Run
Ran today at 05:48:49 · View all runs
Source
Runner
Environment
New Environment
Iterations
1
Duration
2s 673ms
All tests
0
Avg. Resp. Time
420 ms
All Tests
Passed (0)
Failed (0)
Skipped (0)
Iteration 1
GET Request1
https://reqres.in/api/users?page=2
No tests found
POST Request-2
https://reqres.in/api/users
No tests found
PUT Request-3
https://reqres.in/api/users/2
No tests found
DELETE Request-4
https://reqres.in/api/users/2
No tests found

Collection variable : Collection variable is accessible within the Collection among multiple requests.

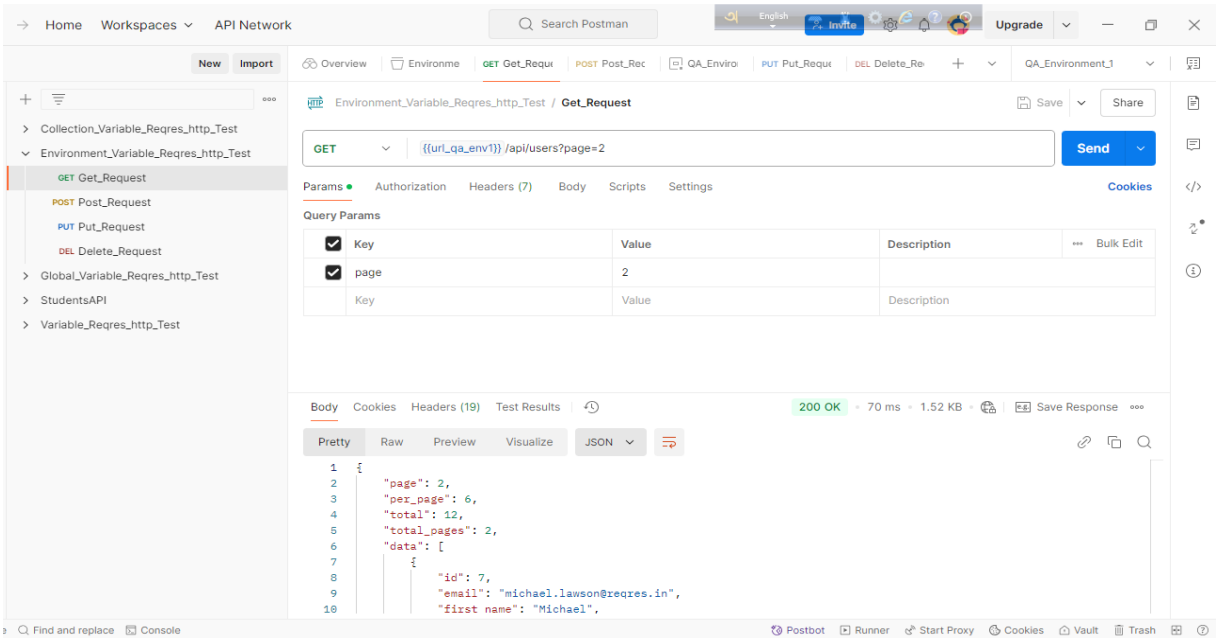
Step-1



Step-2

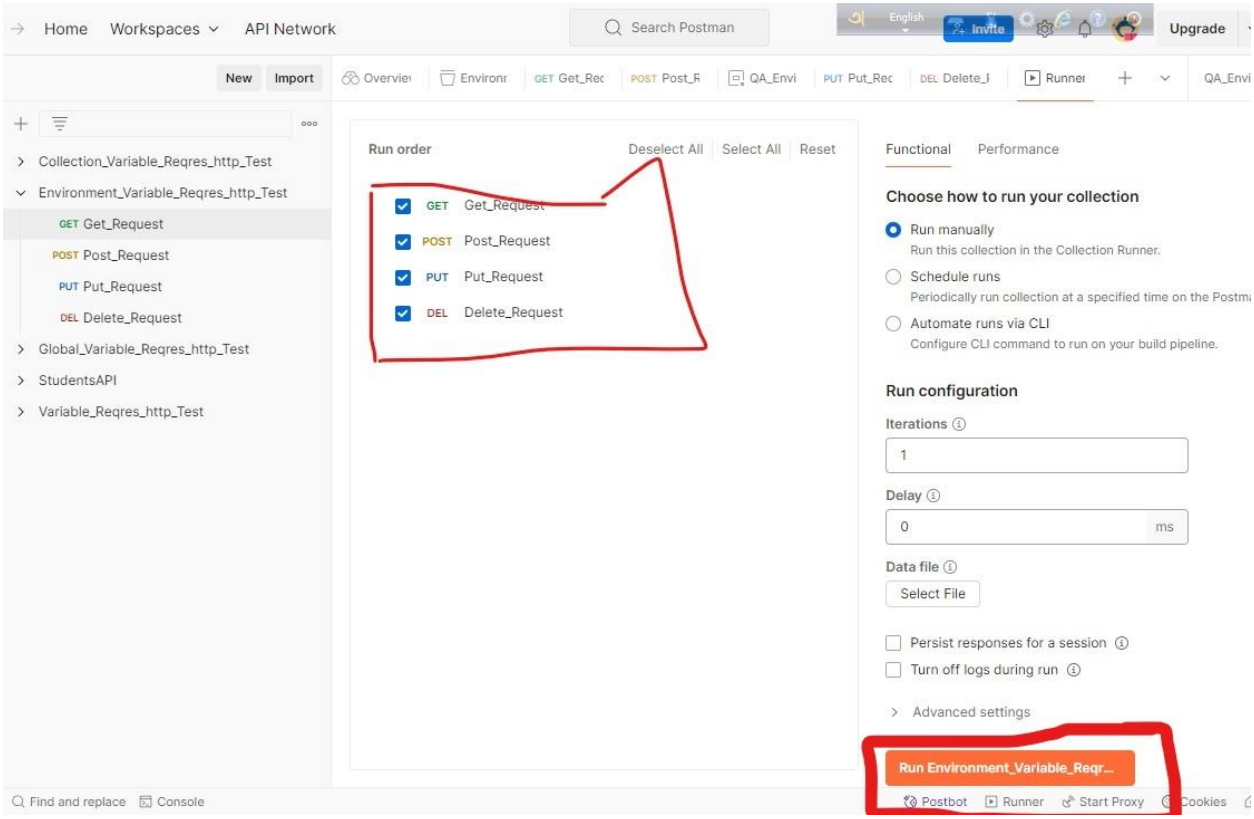


Environment Variable: Accessible in all collections but we use it for a specific environment

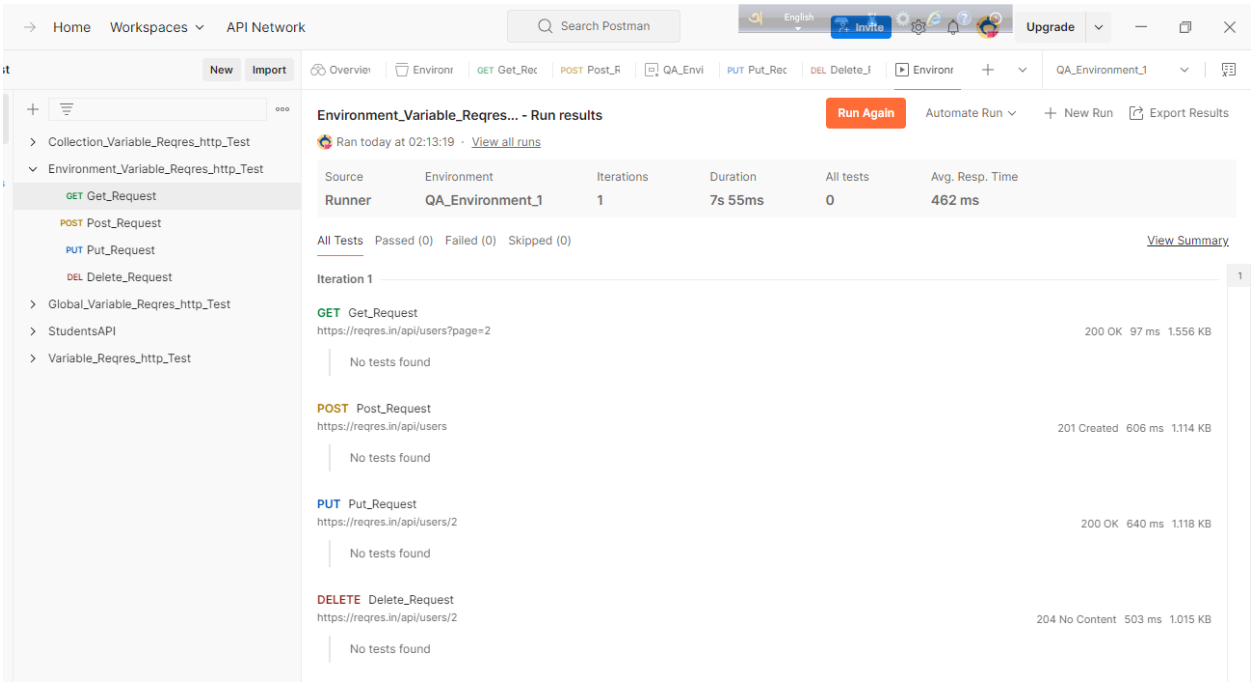


Run the whole collection of Environment Variable:

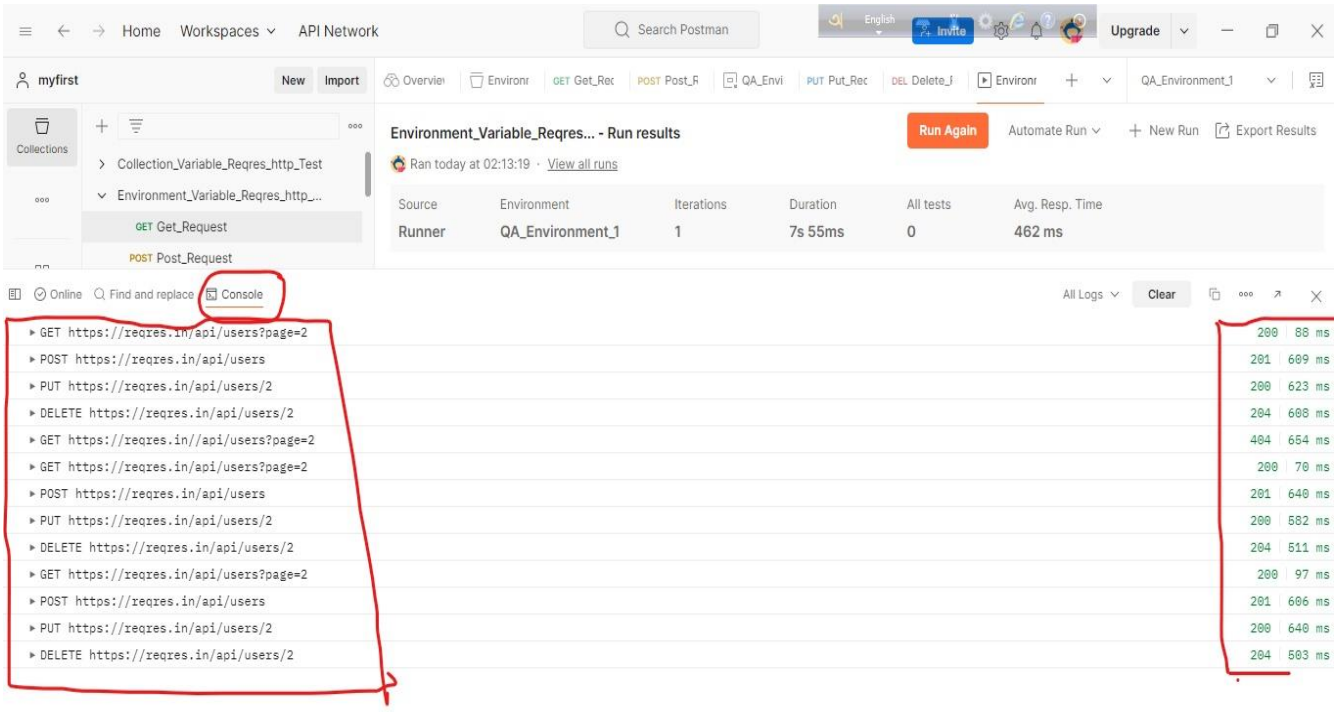
Step-1



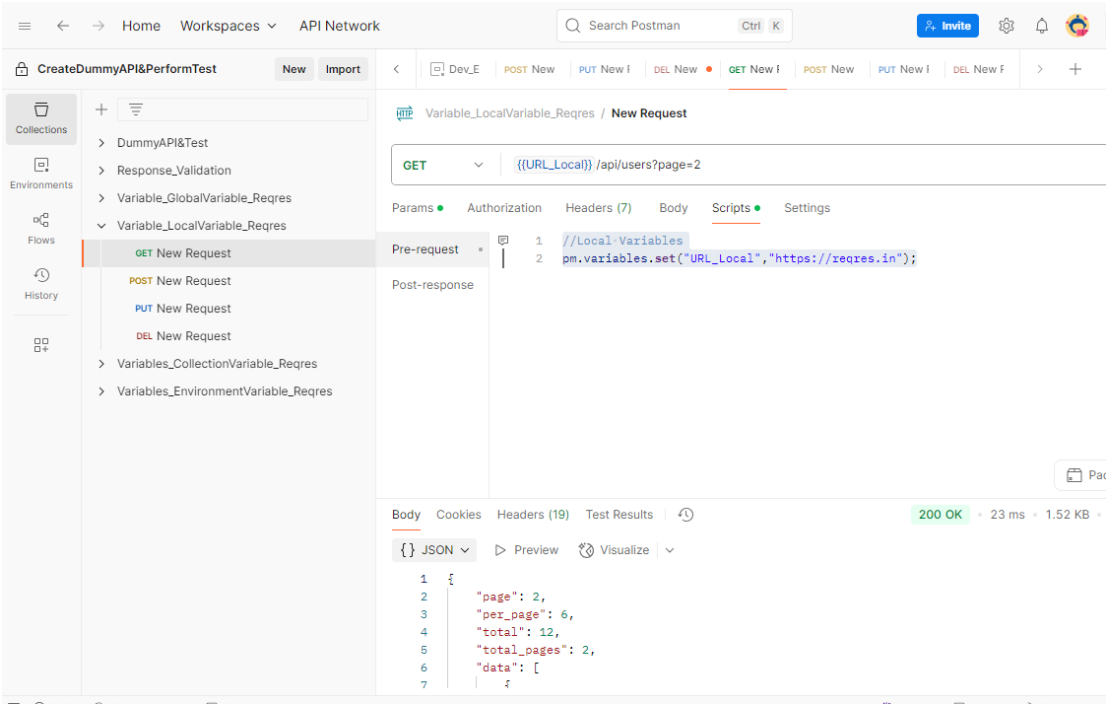
Step-2



Console result



Local Variables: Accessible only within the request.

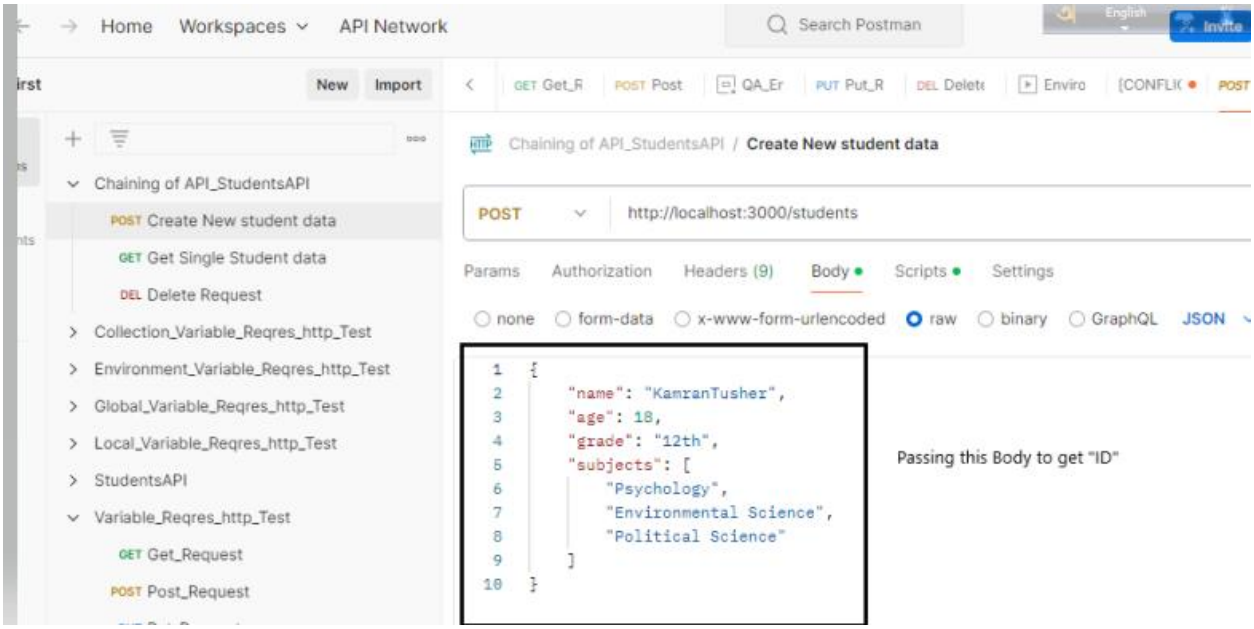


Chaining of API : The response of one API becomes the request of another API is called Chaing of API.

Task:

When I pass a body it will create an 'ID' in response to request from the body..Then this ' ID ' will stored in a variable.

Step-1) Pass this body



Step-2

Write a test script in the " post-response " body.

Script

var JsonData= JSON.**parse**(ResponseBody);

pm.environment("id"."JsonData.id");

Here this particular script will set an environment and give a id for the particular body which is given on the top.

Another Sample API from internet:

Step -1 : Take an API from the website : (https://gorest.co.in/#google_vignette).Here we will find some sample API .

Step-2 : To access this API We need to generate a token and pass it as part of the Authorization.

Note: Most of the time , whatever API is accessing through internet, those API would have some authorization

How to get Access token?

Sign up for Github/Google and click on anyone then get the access.

Sample API:

URL: https://gorest.co.in/

End Point

POST	/public/v2/users	Create a new user
GET	/public/v2/users/7386739	Get user details
PUT|PATCH	/public/v2/users/7386739	Update user details
DELETE	/public/v2/users/7386739	Delete user

Created Token: cf842adb5472f7db0196c587b55a74dfccd50e82e0f361ab59326843207adddf

Response Body

{

"name":"Chowdhury Kamran Hossain",

"gender":"male",

"email":"ckh123@gmail.com",

"status":"active"

}

Note: This Response Body is required for Post and Put requests only.

Note : Then Use the token in the Authorization section in the Collection level to cover all the request

GorestApi_Chaining example :

Process:

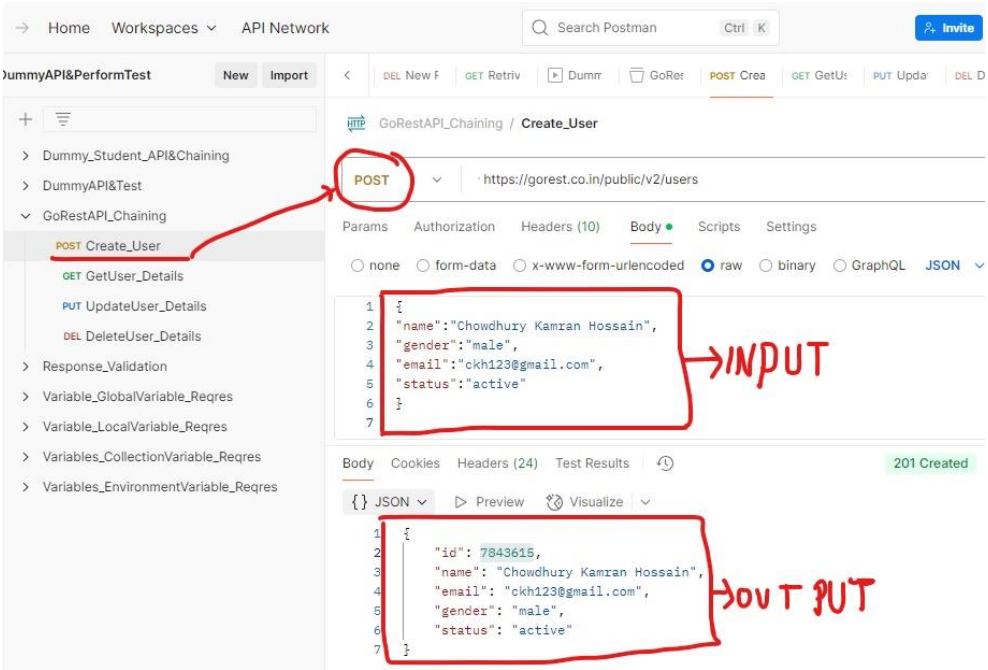
Step-1: Create a Collection called “GoRestAPI_Chaining

Step-2: Create Post , Get, Put and Delete Request along with the given Url

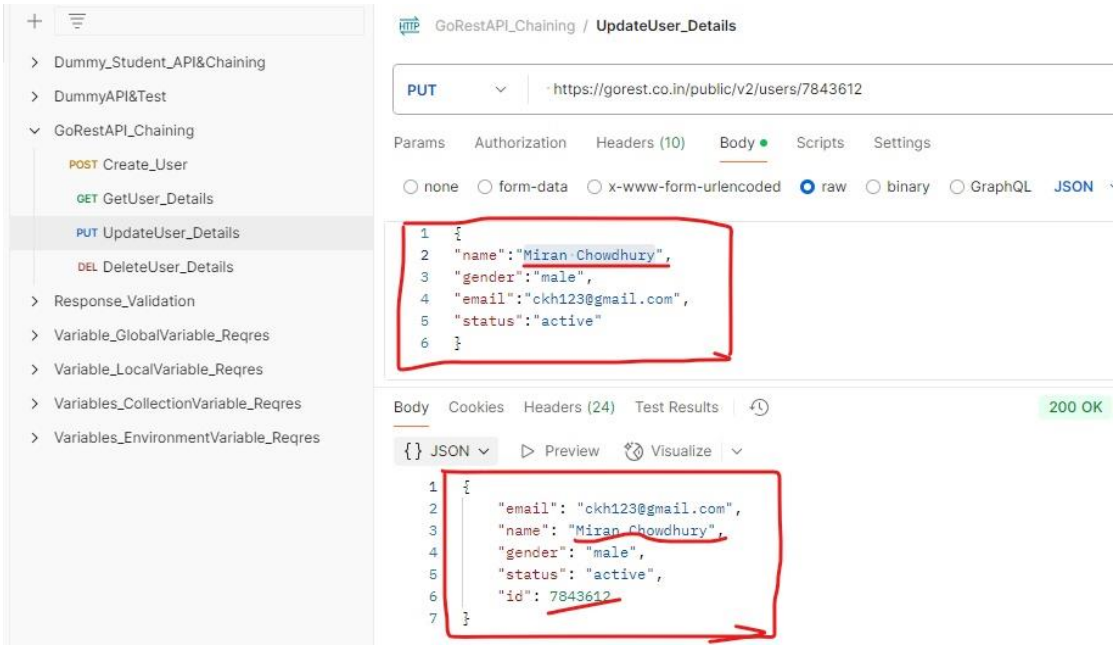
Step-3: Set the Token in the collection Level for authorization

Step-4 : Then Execute all the request

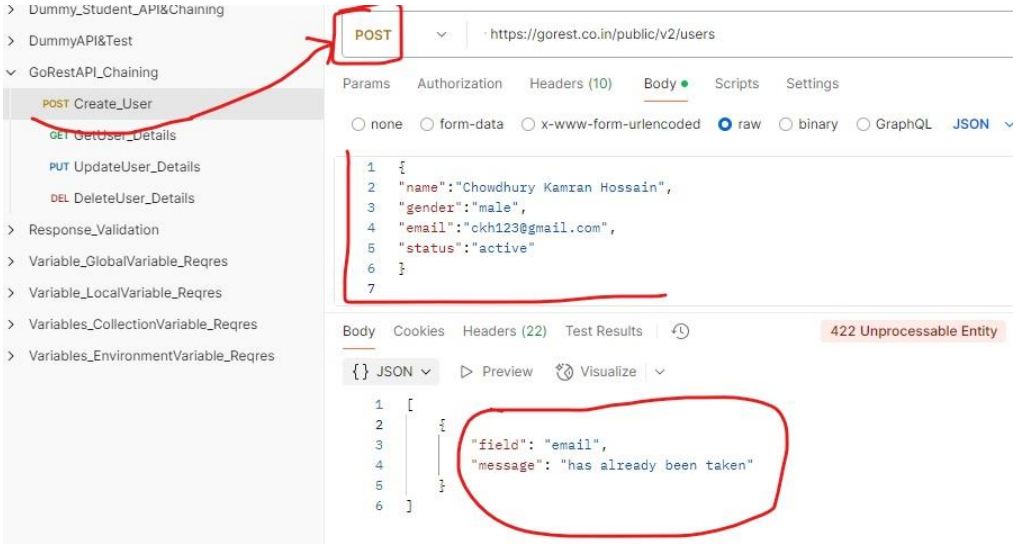
Step-1: First of all execute a " Post Request " create a record.

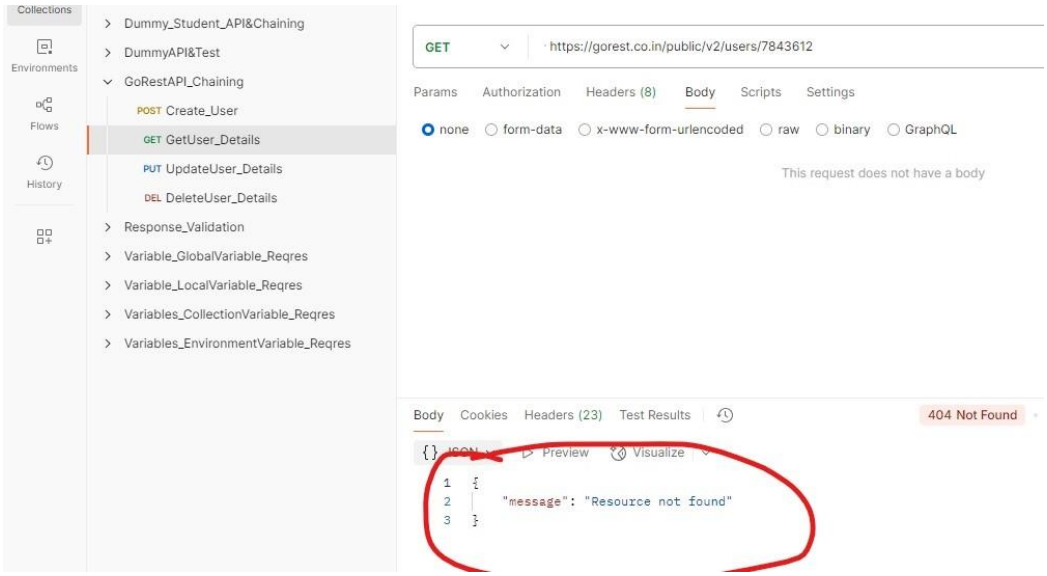


After getting the result I have updated some informations aginst the ID which is generated.



The request will not be executed further with the same records. Below you can see the result Image:





That is why we need to change the information of the record simultaneously.But it is difficult to change the data manually in everytime, that is why we need to make it as automated.

How to change the data in the records automatically every time?

Ans: Before sending the 'Post Request' we need to write some script to change the date in the record automatically.

We will write the Script in the 'Pre-request ' section.

Here will change the Name and Email automatically

Here is the process ;

Firstly , Write the script in the pre-request section with this

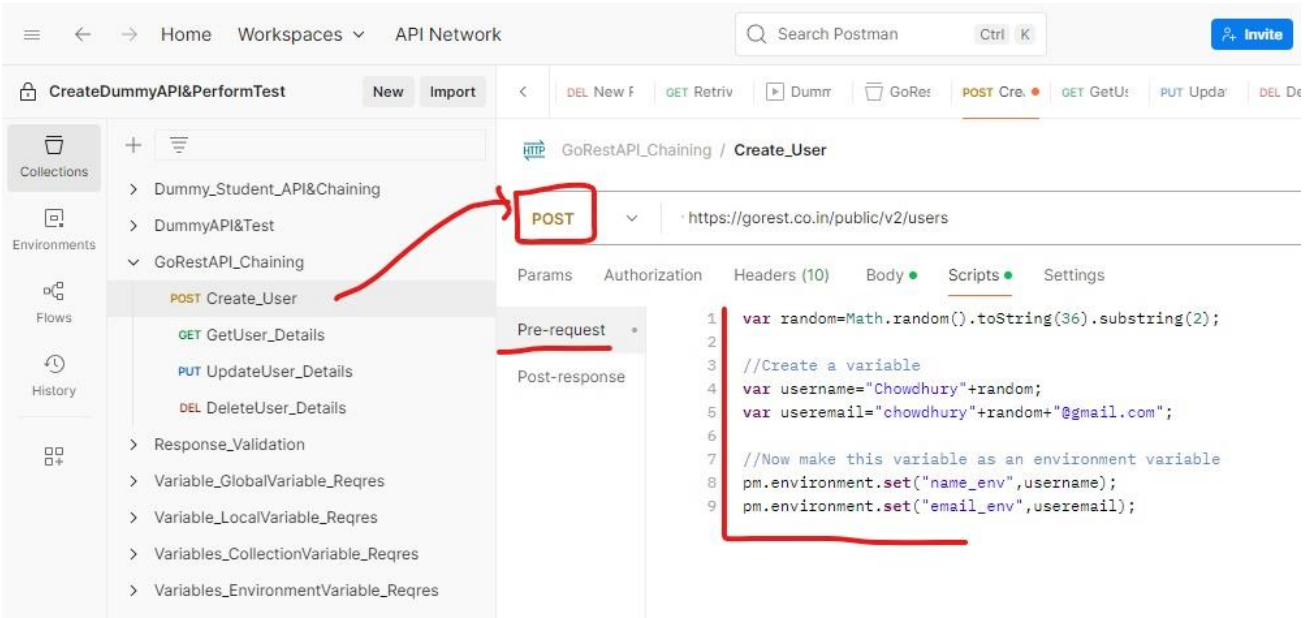
<u>code:</u>

var random=Math.random().toString(36).substring(2);

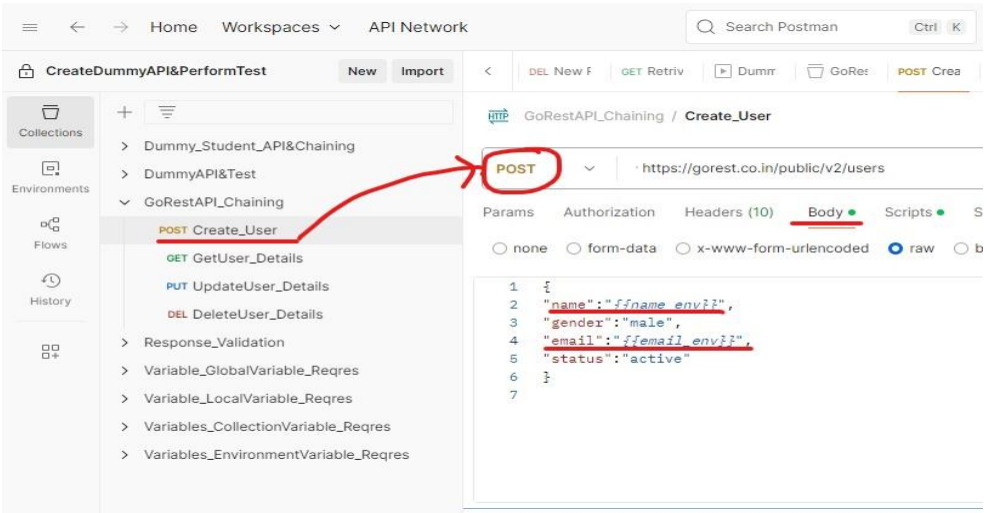
var username="Chowdhury"+random;

var useremail="chowdhury"+random+"@gmail.com";

Input:



Secondly, same script should write in the body of the post request

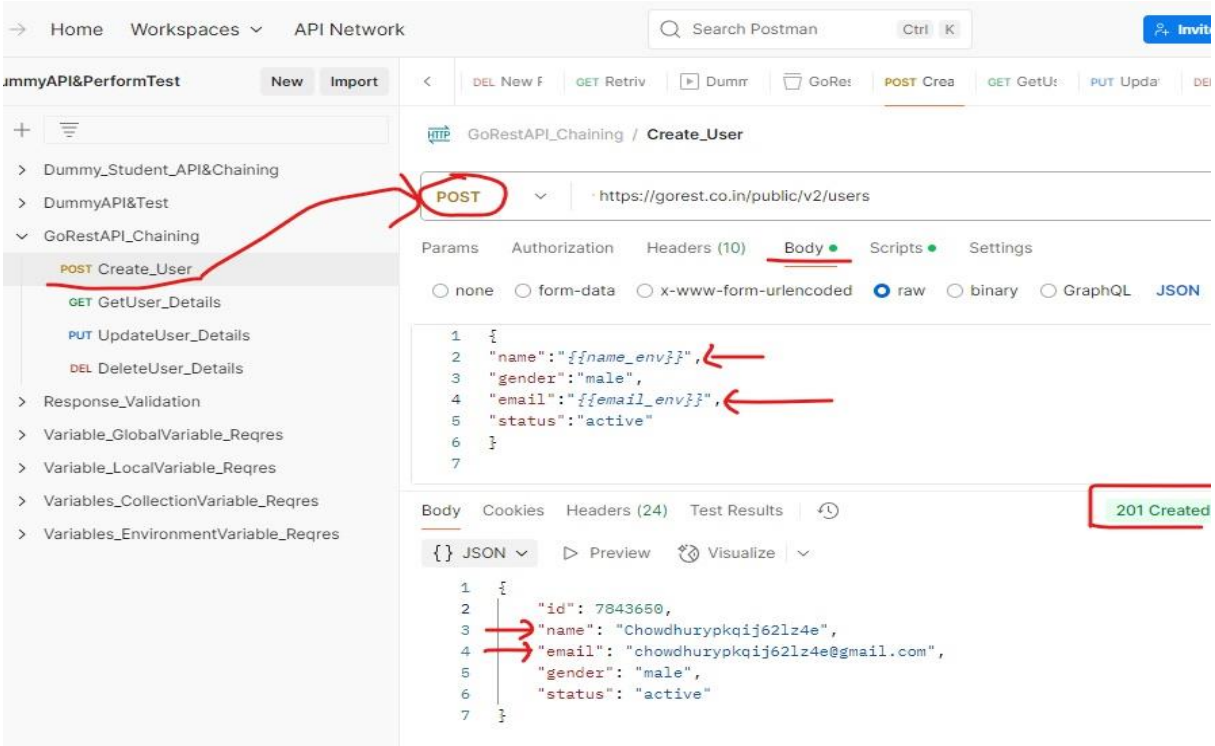


Same script is written in the body of the post request here is that code

<u>Code:</u>

```
{
"name":"{{name_env}}",
"gender":"male",
"email":"{{email_env}}",
"status":"active"
}
```

Output:



After execute the post request then an ID will generate . This ID will need for other request .so, we need to extract this ID from the response .

So write this script in the Post- Request section.

Code:

var json.Data= JSON.parse(responseBody);

pm.environment.set("userid_env",jsonData.id);

Parameterisation | Data Driven Testing:

How can we use data parameter/Data variable?

Process: We can specify the variables and value in the external files like CSV file.CSV or Json file.

BooksApi: Two things are going to describe I) Books (Do not need token)II) Order . For order request, (we need to use a token for authentication.)

URL: http://simple-books-api.glitch.me/

BooksAPI: Endpoint

Types of request:

Status: Check the books are available or not .

GET /Status

List of Books:

GET /books

Get a single Book:

GET /books/ :bookid

Task: Now we are going to perform Data Driven testing on this Particular API.

Step-1: First, we need to execute a Post request to generate a Toke for Authentication through the given link and body.

Link/Url: http://simple-books-api.glitch.me/api-clients/

Body:

Generated Token:

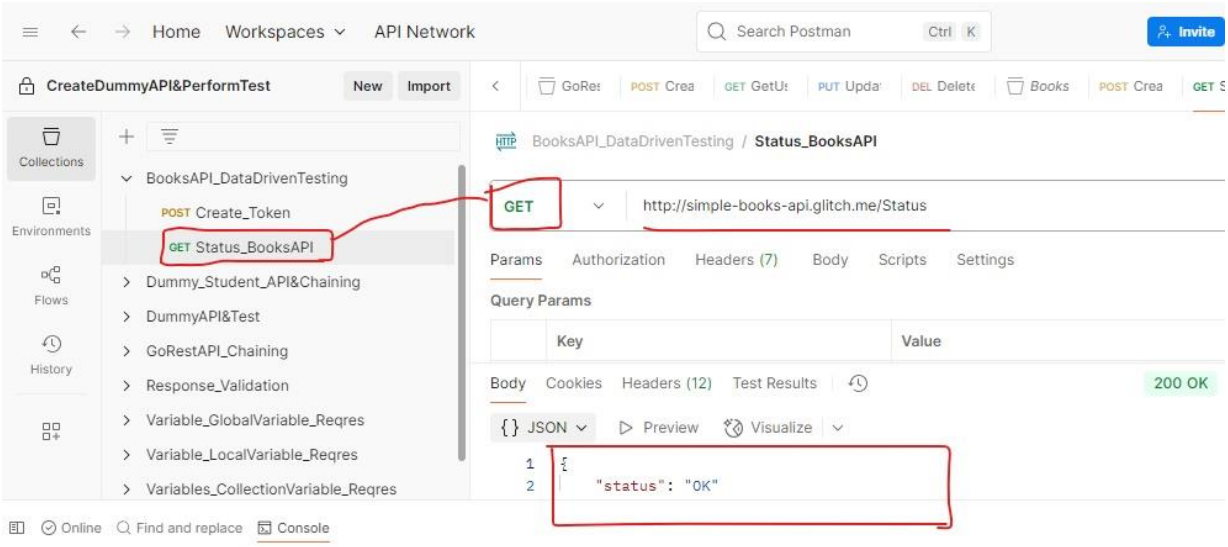
Step-2 : Perform Get request using this

Url : http://simple-books-api.glitch.me

And End Point: /Status

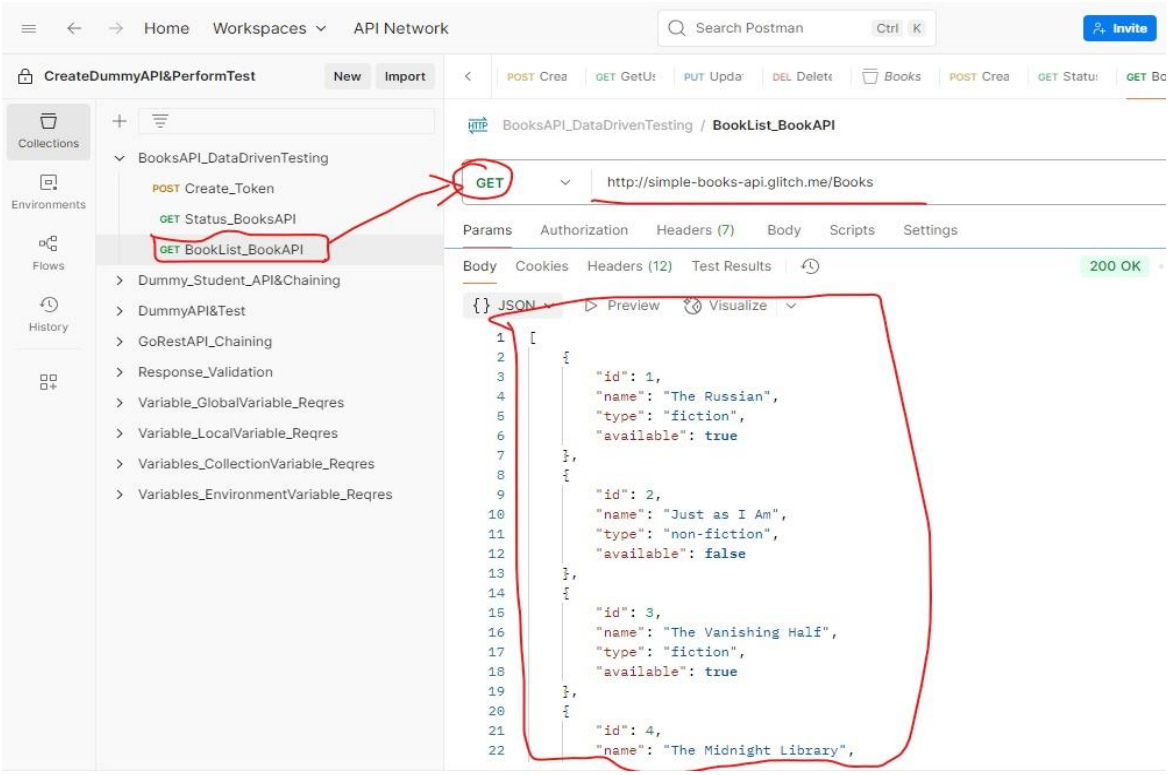
Get Request : http://simple-books-api.glitch.me/Status

Image:



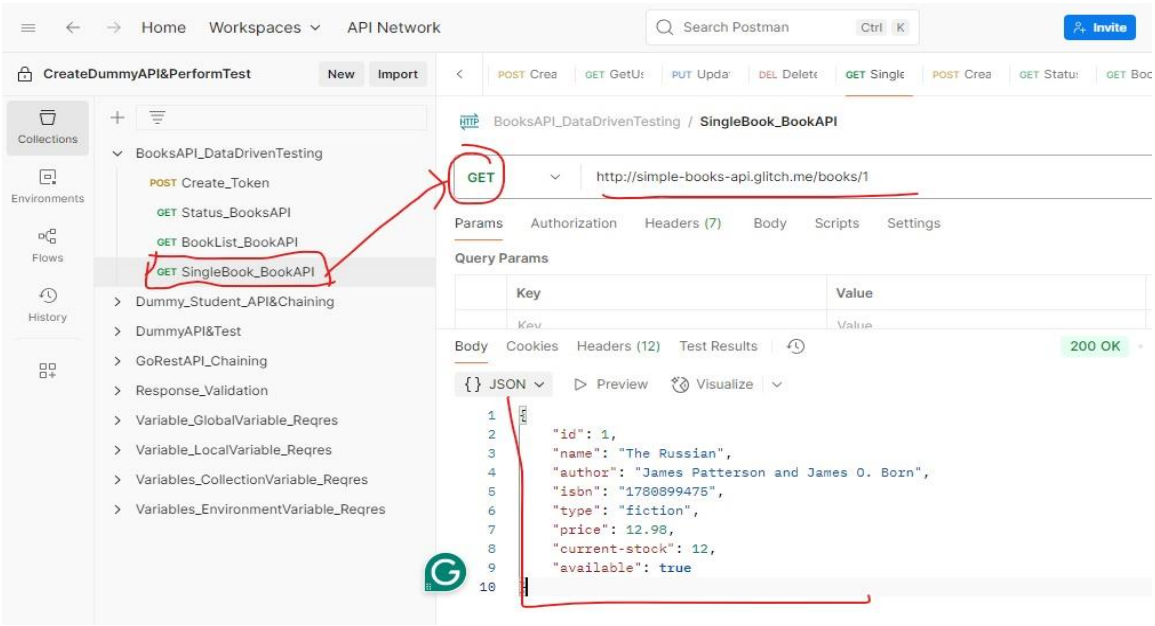
<u>Step -3 :</u> Perform get request usng the given url for getting BookList from the BookAPI.

URL: http://simple-books-api.glitch.me/books



Step -4: Perform get request for getting single book/specific book from the BookAPI.

Url: http://simple-books-api.glitch.me/books/1



Swagger:

Petstore: It's a free API .

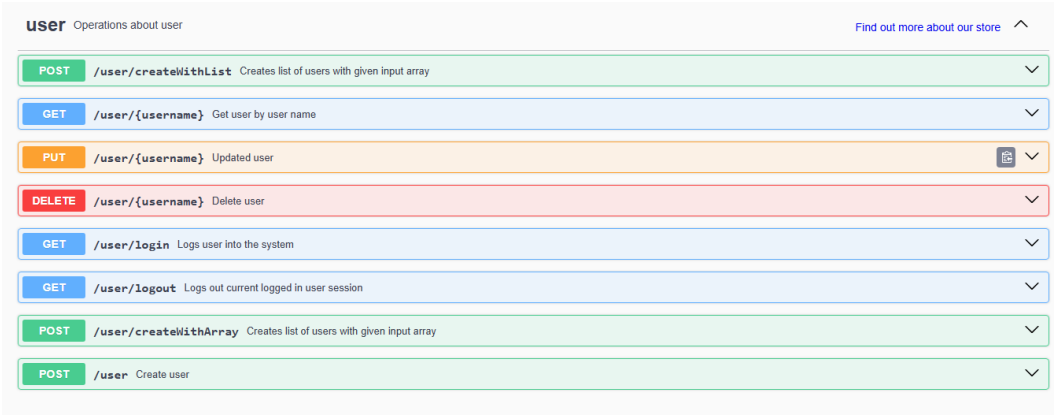
Petstore support two types of response json and xml

Here will see how to validate JSON and xml response. for this, we need to access a API called Petstore.

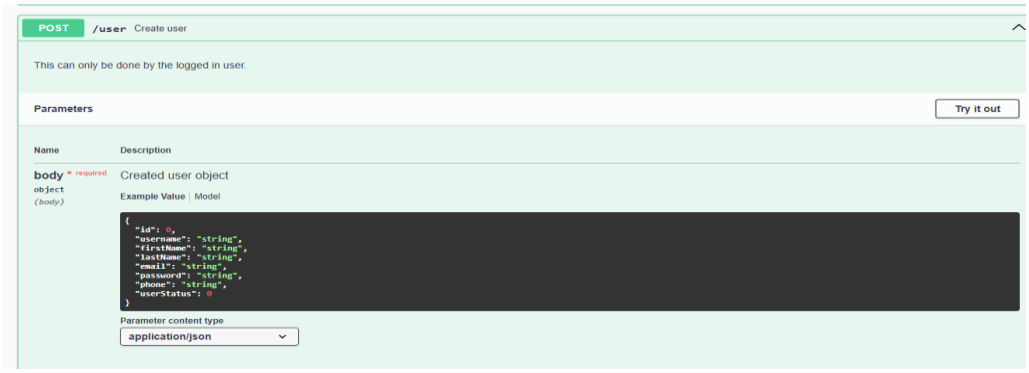
How to access the Petstore documentations?

Url of the Petsore documentation: https://petstore.swagger.io/

User model provides the responses in the Json format.Different API request in User model

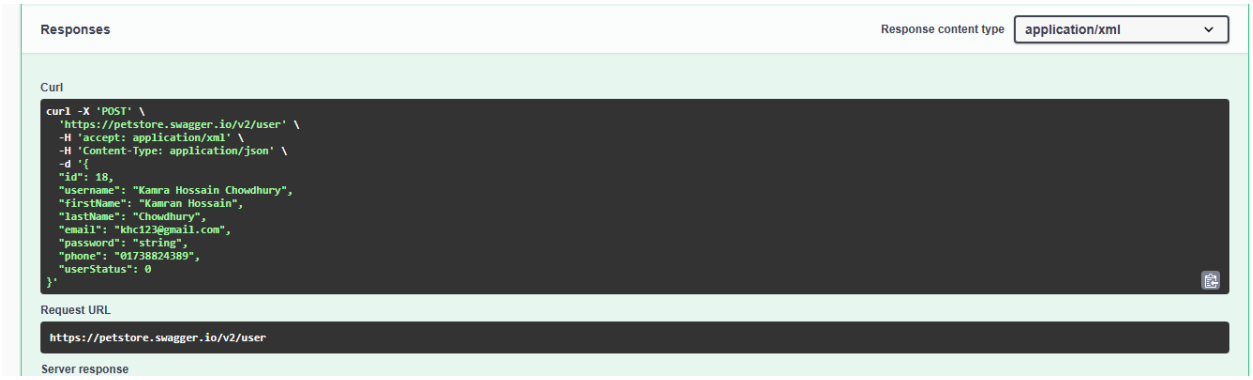


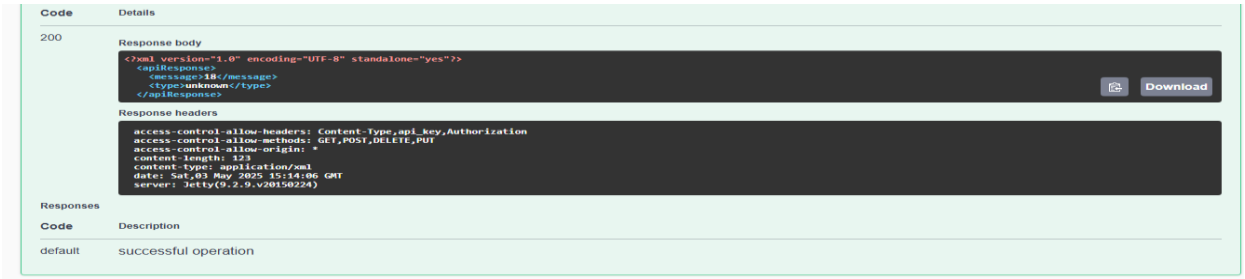
Now click on Post request, which is in the given screenshot. Then this page will appear



Now click on the Try it out to insert the data in the body.

After inserting the data the click on execute and get the output which is in below





Now I will import this API in the PostMan softwarez:

<u>First copy the curl:</u>

```
curl -X 'POST' \
  'https://petstore.swagger.io/v2/user' \
  -H 'accept: application/xml' \
  -H 'Content-Type: application/json' \
  -d '{
  "id": 18,
  "username": "Kamra Hossain Chowdhury",
  "firstName": "Kamran Hossain",
  "lastName": "Chowdhury",
  "email": "khc123@gmail.com",
  "password": "string",
  "phone": "01738824389",
  "userStatus": 0
}'
```

Then Create a collection in the postman and import the curl