

SENG3011: Deliverable 2

Testing Documentation

Team: git push --force

Members:

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Testing Processes Used In The Development of the API

Testing Environment and Tools Used:

Our team used “Postman” for automated manual testing with plans to integrate them into our AWS CI/CD pipeline to ensure that any code changes don’t break existing functionality.

Our API is hosted as a Lambda function on AWS and retrieves records from our DynamoDB NoSQL Database.

We also used Swagger’s API calling feature to continually verify that our API documentation matched the results outputted by the API request responses.

Limitations:

There were certain cases that we didn’t test due to the limitations that postman’s manual acceptance testing framework has. For example, one major limitation is that when testing each acceptance test case, we needed to define every single GET request manually. While we were able to change what kind of values we use in the request, it would ultimately be too confusing to do subrequest test cases within each request to showcase each test case properly. As a result, we decided to only test a few values for each test case so that we reasonably handle all common edge cases. Also, our API Auth Requests that we had in our documentation are just placeholders for future authorisation requirements that we planned for our web application so there were no tests for those.

Testing Process Conducted:

The Team's Process:

Summary of process:

Creation of initial base API

(Start of Testing)

-> Create New Test Case:

-> Run Test Suite

-> Result:

-> Success: Move to end of process

-> Fail: Make code changes to API to match criteria

(End of Testing)

Our team used postman to automate our manual acceptance tests whenever we made any code changes to the API or wanted to add more acceptance criteria. We used test driven development as our main process in the development of the API. This involved creating test cases based on our discussions on acceptance criteria and writing API code to fulfil those criteria. Our first priority when it came to adding test cases was to define invalid input and invalid use of the api url when making requests. Then came verification of output data returned from valid input requests. What we are doing from now is consolidating and adding more tests to ensure all cases have multiple examples for each case and making our test output more readable and easier to use.

Test Cases:

For the full list, refer to the Postman Test Suite Link and Screenshot in the Appendix.

For the test cases, they are partitioned for each type of response the API returns:

- Error Code 400: Bad Request
- Error Code 403: Forbidden
- Error Code 404: Not Found
- Error Code 502: Bad Gateway
- Code 200: OK

For error codes 403 and 502, these types of responses only occur in the case of typos and incorrect usage of the API request URL. The test cases that handle these responses will ensure that any errors from any code change in the web application get caught before pushing to production. Some examples of test cases include:

- Test Case:
 - Calling the API base url
 - <https://6u977749j2.execute-api.ap-southeast-2.amazonaws.com/staging/>
- Returns:
 - Missing Authentication Token
- Test Case:
 - Calling the API host url or any typos in the url after
 - <https://6u977749j2.execute-api.ap-southeast-2.amazonaws.com/>
- Returns:
 - Forbidden

For error code 404, this response occurs when the API request returns no results. The test cases that handle these responses will ensure that any user input for the API query that is either too specific or does not match anything in the database returns “no results”. Since all of these tests return the same response, here are some examples of tests cases without what they return

- Test Case:
 - Searching based on a term that doesn't match any records in the db
 - <https://6u977749j2.execute-api.ap-southeast-2.amazonaws.com/staging/reports?terms=a>
- Test Case:
 - Searching based on a location that doesn't match any records in the db
 - <https://6u977749j2.execute-api.ap-southeast-2.amazonaws.com/staging/reports?location=a>
- Test Case:
 - Searching based on location, terms, period that filter too specifically so that no records match in the db

- https://6u977749j2.execute-api.ap-southeast-2.amazonaws.com/staging/reports?terms=fever%2Cinfection&location=sydney&start_date=2020-06-15T00%3A00%3A00&end_date=2021-01-21T00%3A00%3A00

For error code 400, this response occurs when invalid input is passed into the API request queries. The tests cases that handle these responses will ensure that any input for the API query follows the specification requirements. Some examples of test cases include:

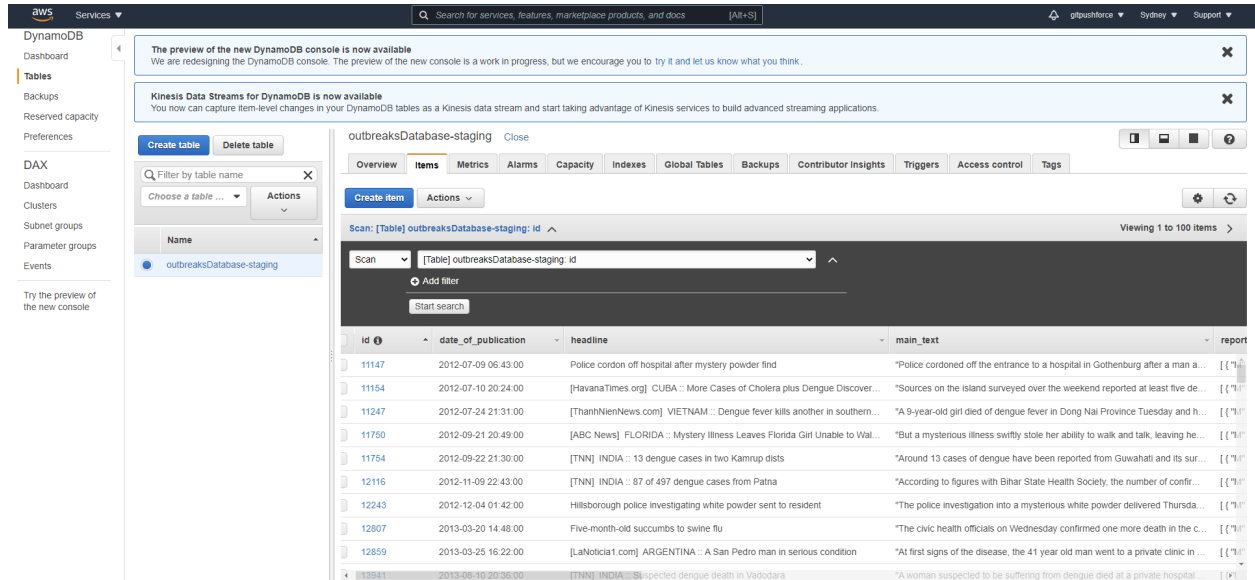
- Test case:
 - No query specified
 - <https://6u977749j2.execute-api.ap-southeast-2.amazonaws.com/staging/reports?>
- Returns:
 - Please provide a period of interest, key terms, or a location
- Test case:
 - Inputted date(s) are incorrectly formatted
 - https://6u977749j2.execute-api.ap-southeast-2.amazonaws.com/staging/reports?start_date=2015-10-01T08:45:10&end_date=2015-11
- Returns:
 - Invalid start date and/or end date
- Test case:
 - End date is before Start Date
 - https://6u977749j2.execute-api.ap-southeast-2.amazonaws.com/staging/reports?start_date=2015-11-01T19:37:12&end_date=2015-10-01T08:45:10
- Returns:
 - Start date cannot be after end date

For code 200, this response occurs when the API query returns a result. The test cases that handle these responses will ensure that valid, matching input returns corresponding valid results. Since these responses return large response bodies, here are some examples of test cases without what they return:

- Test case:
 - Searching based on terms is not case specific
 - <https://6u977749j2.execute-api.ap-southeast-2.amazonaws.com/staging/reports?terms=fever>
- Test case:
 - Searching based on terms can have multiple terms specified
 - <https://6u977749j2.execute-api.ap-southeast-2.amazonaws.com/staging/reports?terms=infection,Fever>
- Test case:
 - Searching works with multiple filters (e.g. location AND period)
 - https://6u977749j2.execute-api.ap-southeast-2.amazonaws.com/staging/reports?location=Australia&start_date=2021-03-08T13:06:00&end_date=2021-03-09T13:06:00

Testing Data:

Our API data source was our DynamoDB database:



The screenshot shows the AWS DynamoDB console interface. On the left is a navigation sidebar with options like Dashboard, Tables, Backups, Reserved capacity, Preferences, DAX, and Events. The main area displays the 'outbreaksDatabase-staging' table. At the top, there are two informational banners: one about the new DynamoDB console preview and another about Kinesis Data Streams for DynamoDB. Below these, the table's 'Items' tab is selected, showing a list of records. Each record contains fields for 'id', 'date_of_publication', 'headline', 'main_text', and 'report'. The table is currently displaying 100 items, with the first few visible in the screenshot.

id	date_of_publication	headline	main_text	report
11147	2012-07-09 06:43:00	Police cordon off hospital after mystery powder find	*Police cordoned off the entrance to a hospital in Gothenburg after a man a...	{ "id": "11147", "date_of_publication": "2012-07-09 06:43:00", "headline": "Police cordon off hospital after mystery powder find", "main_text": "*Police cordoned off the entrance to a hospital in Gothenburg after a man a...", "report": "{ \"id\": \"11147\", \"date_of_publication\": \"2012-07-09 06:43:00\", \"headline\": \"Police cordon off hospital after mystery powder find\", \"main_text\": \"*Police cordoned off the entrance to a hospital in Gothenburg after a man a...\", \"report\": \"{ \"id\": \"11147\", \"date_of_publication\": \"2012-07-09 06:43:00\", \"headline\": \"Police cordon off hospital after mystery powder find\", \"main_text\": \"*Police cordoned off the entrance to a hospital in Gothenburg after a man a...\", \"report\": \"...\" } } } }
11154	2012-07-10 20:24:00	[HavanaTimes.org] CUBA :: More Cases of Cholera plus Dengue Discover...	*Sources on the island surveyed over the weekend reported at least five de...	{ "id": "11154", "date_of_publication": "2012-07-10 20:24:00", "headline": "[HavanaTimes.org] CUBA :: More Cases of Cholera plus Dengue Discover...", "main_text": "*Sources on the island surveyed over the weekend reported at least five de...", "report": "{ \"id\": \"11154\", \"date_of_publication\": \"2012-07-10 20:24:00\", \"headline\": \"[HavanaTimes.org] CUBA :: More Cases of Cholera plus Dengue Discover...\", \"main_text\": \"*Sources on the island surveyed over the weekend reported at least five de...\", \"report\": \"...\" } } }
11247	2012-07-24 21:31:00	[ThanhNienNews.com] VIETNAM :: Dengue fever kills another in southern...	*A 9-year-old girl died of dengue fever in Dong Nai Province Tuesday and h...	{ "id": "11247", "date_of_publication": "2012-07-24 21:31:00", "headline": "[ThanhNienNews.com] VIETNAM :: Dengue fever kills another in southern...", "main_text": "*A 9-year-old girl died of dengue fever in Dong Nai Province Tuesday and h...", "report": "{ \"id\": \"11247\", \"date_of_publication\": \"2012-07-24 21:31:00\", \"headline\": \"[ThanhNienNews.com] VIETNAM :: Dengue fever kills another in southern...\", \"main_text\": \"*A 9-year-old girl died of dengue fever in Dong Nai Province Tuesday and h...\", \"report\": \"...\" } } }
11750	2012-09-21 20:49:00	[ABC News] FLORIDA :: Mystery illness Leaves Florida Girl Unable to Wat...	*But a mysterious illness swiftly stole her ability to walk and talk, leaving he...	{ "id": "11750", "date_of_publication": "2012-09-21 20:49:00", "headline": "[ABC News] FLORIDA :: Mystery illness Leaves Florida Girl Unable to Wat...", "main_text": "*But a mysterious illness swiftly stole her ability to walk and talk, leaving he...", "report": "{ \"id\": \"11750\", \"date_of_publication\": \"2012-09-21 20:49:00\", \"headline\": \"[ABC News] FLORIDA :: Mystery illness Leaves Florida Girl Unable to Wat...\", \"main_text\": \"*But a mysterious illness swiftly stole her ability to walk and talk, leaving he...\", \"report\": \"...\" } } }
11754	2012-09-22 21:30:00	[TNN] INDIA :: 13 dengue cases in two Kamrup dists	*Around 13 cases of dengue have been reported from Guwahati and its sur...	{ "id": "11754", "date_of_publication": "2012-09-22 21:30:00", "headline": "[TNN] INDIA :: 13 dengue cases in two Kamrup dists", "main_text": "*Around 13 cases of dengue have been reported from Guwahati and its sur...", "report": "{ \"id\": \"11754\", \"date_of_publication\": \"2012-09-22 21:30:00\", \"headline\": \"[TNN] INDIA :: 13 dengue cases in two Kamrup dists\", \"main_text\": \"*Around 13 cases of dengue have been reported from Guwahati and its sur...\", \"report\": \"...\" } } }
12116	2012-11-09 22:43:00	[TNN] INDIA :: 87 of 497 dengue cases from Patna	*According to figures with Bihar State Health Society, the number of confr...	{ "id": "12116", "date_of_publication": "2012-11-09 22:43:00", "headline": "[TNN] INDIA :: 87 of 497 dengue cases from Patna", "main_text": "*According to figures with Bihar State Health Society, the number of confr...", "report": "{ \"id\": \"12116\", \"date_of_publication\": \"2012-11-09 22:43:00\", \"headline\": \"[TNN] INDIA :: 87 of 497 dengue cases from Patna\", \"main_text\": \"*According to figures with Bihar State Health Society, the number of confr...\", \"report\": \"...\" } } }
12243	2012-12-04 01:42:00	Hillsborough police investigating white powder sent to resident	*The police investigation into a mysterious white powder delivered Thursda...	{ "id": "12243", "date_of_publication": "2012-12-04 01:42:00", "headline": "Hillsborough police investigating white powder sent to resident", "main_text": "*The police investigation into a mysterious white powder delivered Thursda...", "report": "{ \"id\": \"12243\", \"date_of_publication\": \"2012-12-04 01:42:00\", \"headline\": \"Hillsborough police investigating white powder sent to resident\", \"main_text\": \"*The police investigation into a mysterious white powder delivered Thursda...\", \"report\": \"...\" } } }
12807	2013-03-20 14:48:00	Five-month-old succumbs to swine flu	*The civic health officials on Wednesday confirmed one more death in the c...	{ "id": "12807", "date_of_publication": "2013-03-20 14:48:00", "headline": "Five-month-old succumbs to swine flu", "main_text": "*The civic health officials on Wednesday confirmed one more death in the c...", "report": "{ \"id\": \"12807\", \"date_of_publication\": \"2013-03-20 14:48:00\", \"headline\": \"Five-month-old succumbs to swine flu\", \"main_text\": \"*The civic health officials on Wednesday confirmed one more death in the c...\", \"report\": \"...\" } } }
12859	2013-03-25 16:22:00	[LaNoticia1.com] ARGENTINA :: A San Pedro man in serious condition	*At first signs of the disease, the 41 year old man went to a private clinic in ...	{ "id": "12859", "date_of_publication": "2013-03-25 16:22:00", "headline": "[LaNoticia1.com] ARGENTINA :: A San Pedro man in serious condition", "main_text": "*At first signs of the disease, the 41 year old man went to a private clinic in ...", "report": "{ \"id\": \"12859\", \"date_of_publication\": \"2013-03-25 16:22:00\", \"headline\": \"[LaNoticia1.com] ARGENTINA :: A San Pedro man in serious condition\", \"main_text\": \"*At first signs of the disease, the 41 year old man went to a private clinic in ...\", \"report\": \"...\" } } }
13341	2013-06-10 20:36:00	[TNN] INDIA :: SI suspected dengue death in Vadodara	*A woman suspected to be suffering from dengue died at a private hospital ...	{ "id": "13341", "date_of_publication": "2013-06-10 20:36:00", "headline": "[TNN] INDIA :: SI suspected dengue death in Vadodara", "main_text": "*A woman suspected to be suffering from dengue died at a private hospital ...", "report": "{ \"id\": \"13341\", \"date_of_publication\": \"2013-06-10 20:36:00\", \"headline\": \"[TNN] INDIA :: SI suspected dengue death in Vadodara\", \"main_text\": \"*A woman suspected to be suffering from dengue died at a private hospital ...\", \"report\": \"...\" } } }

The Postman automated test suite calls API requests using sample values that match records in the database and compares the result with the expected result

Output of Testing and Improvements Made:

The automated test suite collection continually follows certain acceptance criteria for each set of responses. For example, error code responses have less test cases since we don't need to test the contents of the outputted json response since it will always be a string, whereas successful responses return actual data that needs to be tested.

Initially, our tests were very basic, with all the tests for each case merged into one, but by separating the tests, it helped us pinpoint exactly what was going wrong with a particular request. For example, looking at a screenshot of our current testing execution:



The screenshot shows a test execution report for a GET request to 'Search Reports with Period Old version'. The report includes a URL, status code (400 Bad Request), response time (889 ms), and response size (574 B). The test results are as follows:

Test Case	Result	Message
Has JSON Body	Pass	
Valid Response	Fail	AssertionError: expected response to have status reason 'OK' but got 'BAD REQUEST'
Is Array	Fail	AssertionError: expected { Object (message) } to be an array
The response reports not empty	Fail	TypeError: Cannot read property 'reports' of undefined
The response url valid	Fail	TypeError: Cannot read property 'url' of undefined

Before any improvements were made, we were able to know which requests were failing but we weren't sure what exactly was wrong with them. Splitting up each part of the test output really helped us quickly fix any errors in the API that we found and also made testing easier.

Testing Execution Example:

GET Report Tests ...

GET Report Tests ...

+

No Environment

GET Report Tests Suite

No Environment, just now

View Summary

Run Again

No

All Tests

Passed (149)

Failed (0)

Pass

Is Object

Pass

No Results Found

GET

Search Reports with Terms Single Lower Case

https://b09777492.execute-api.ap-southeast-2.amazonaws.com/staging/reports/terms+fever

/ Code 200: OK / Search Reports based on Terms &OR Period &OR Location / Search Report...

200 OK

1516 ms

49.338 KB

Pass

Has JSON Body

Pass

Valid Response

Pass

Is Array

Pass

The response reports not empty

Pass

The response url valid

GET

Search Reports with Terms Single UpperCase

https://b09777492.execute-api.ap-southeast-2.amazonaws.com/staging/reports/terms+FEVER

/ Code 200: OK / Search Reports based on Terms &OR Period &OR Location / Search Report...

200 OK

733 ms

49.338 KB

Pass

Has JSON Body

Pass

Valid Response

Pass

Is Array

Pass

The response reports not empty

Pass

The response url valid

Pass

compare responses

Pass

Test Upper Case Input Returns Same Results As Lower

GET

Search Reports with Location LowerCase

https://b09777492.execute-api.ap-southeast-2.amazonaws.com/staging/reports/location+australia

/ Code 200: OK / Search Reports based on Terms &OR Period &OR Location / Search Reports ...

200 OK

920 ms

1.523 KB

Pass

Has JSON Body

Pass

Valid Response

Pass

Is Array

Pass

The response reports not empty

Bootcamp

Auto-select agent

Runner

Trash

Test Summary Example:

GET Report Tests ...

GET Report Tests ...

+

No Environment

GET Report Tests Suite

No Environment, a min ago

View Results

Run Again

RUN SUMMARY

1

GET

No Results Found Location

4 | 0

GET

No Results Found Terms & Location & Peri...

4 | 0

GET

No Results Found Disease

4 | 0

GET

No Results Found Syndrome

4 | 0

GET

Search Reports with Terms Single Lower ...

5 | 0

GET

Search Reports with Terms Single UpperC...

7 | 0

GET

Search Reports with Location LowerCase

5 | 0

GET

Search Reports with Location UpperCase

7 | 0

GET

Search Reports with Period

5 | 0

GET

Search Reports with Location and Period

5 | 0

GET

Search Reports with Location and Terms

5 | 0

GET

Search Reports with Location and Terms a...

5 | 0

GET

Search Reports with Terms Multiple

5 | 0

GET

Search Reports with Disease Single Lower...

5 | 0

GET

Search Reports with Disease Single Upper...

7 | 0

GET

Search Reports with Syndrome Single Lo...

5 | 0

GET

Search Reports with Syndrome Single Up...

7 | 0

GET

Search Reports with no query

5 | 0

GET

Search Reports with Invalid Date

5 | 0

GET

Search Reports with only Start Date

5 | 0

GET

Search Reports with only End Date

5 | 0

GET

Search Reports with End Date before Star...

5 | 0

GET

Search Reports with no Disease

5 | 0

GET

Search Reports with no Disease Params

5 | 0

GET

Search Reports with no Syndrome

5 | 0

GET

Search Reports with no Syndrome Params

5 | 0

Bootcamp

Auto-select agent

Runner

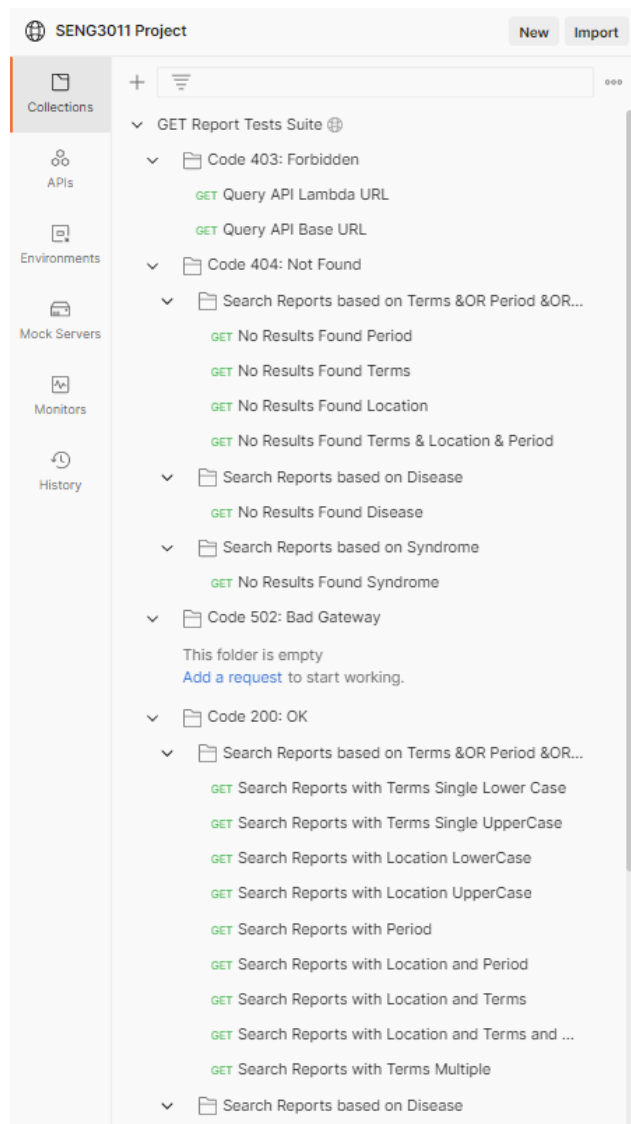
Tr

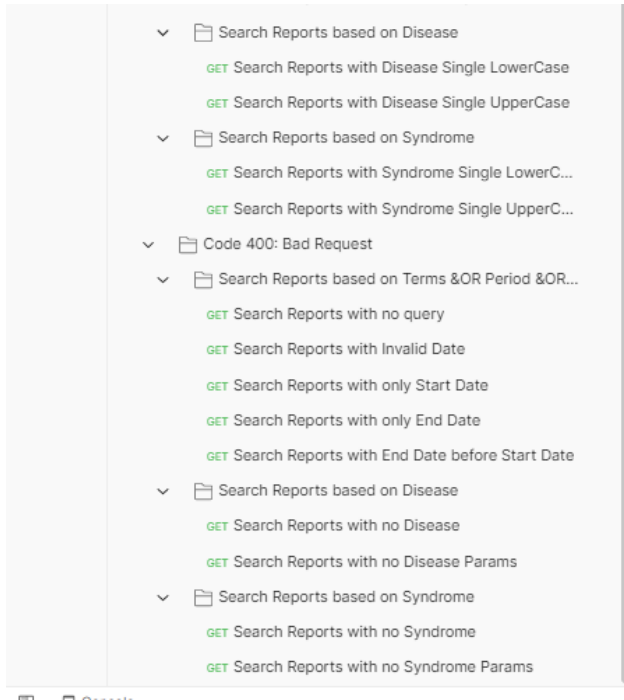
Appendix:

Link to Postman Test Suite:

<https://www.postman.com/joint-operations-operator-27798769/workspace/seng3011-project/overview>

FULL TEST SUITE SCREENSHOT:





Comparing API documentation with testing data:

Link: <https://app.swaggerhub.com/apis/AlvinRC/OutbreaksAPI/1.0.0>

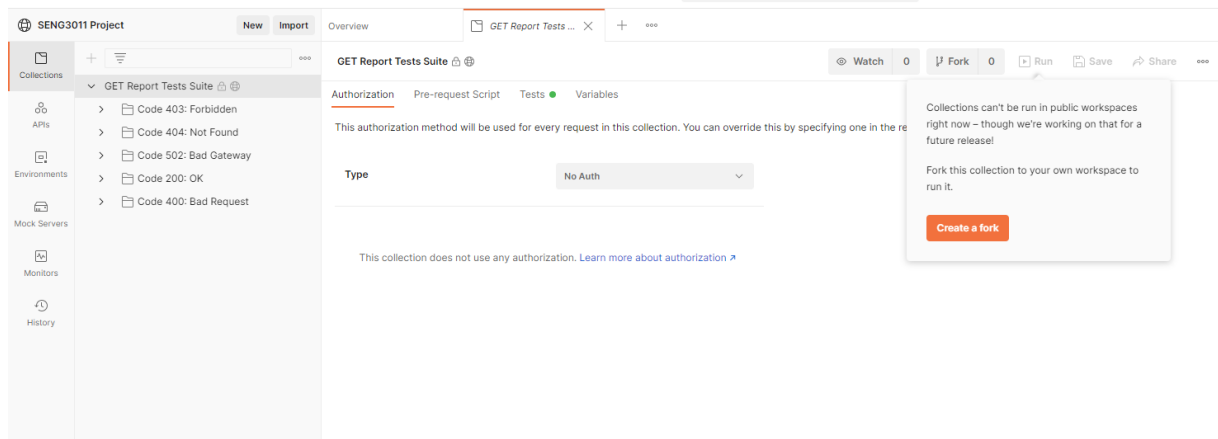
Our team used Swagger's built in API caller to call our API with example data and compared it with what we had in our documentation to increase accuracy of what we had in our documentation

Running Postman as a Foreign User:

Link:

<https://www.postman.com/joint-operations-operator-27798769/workspace/seng3011-project/overview>

To verify how our testing works, do the following steps:



Using the link, you can view all of the Request details and test cases used for each collection of requests. However, to actually run the tests, you need to fork the project workspace and run it there. You can run individual request test cases or the folder test cases by selecting the item and clicking “Run”.