

# Testing Report

## 1. Automated Testing

To start automatic testing, you need to select the 5th menu item “Automated testing” in our application:

```
Software_Security_Project.ipynb
File Edit View Insert Runtime Tools Help Unsaved changes since 12:
+ Code + Text
# main App bloock #
#####
menu_processing()

... Welcome to Application - List of nearby schools!
Please select an option:
1. Setting Google Maps API key
2. Set cloud API key
3. Getting nearby schools from the Map
4. Reading saved schools from the file
5. Automated testing
6. Exit
Enter your choice: 5
```

Let's prepare a test environment by deleting the file containing the list of schools:

first-s3-store [Info](#)

[Objects](#) [Properties](#) [Permissions](#) [Metrics](#) [Management](#) [Access Points](#)

**Objects (3)** [Info](#)

[Refresh](#) [Copy S3 URI](#) [Copy URL](#) [Download](#) [Open](#) [Delete](#) [Actions](#) [Create folder](#) [Upload](#)

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. [Learn more](#)

<input type="checkbox"/>	Name	Type	Last modified	Size	Storage class
<input type="checkbox"/>	<a href="#">populations_copy.csv</a>	csv	February 6, 2024, 15:52:33 (UTC+00:00)	63.0 B	Standard
<input type="checkbox"/>	<a href="#">populations.csv</a>	csv	February 6, 2024, 15:01:52 (UTC+00:00)	70.0 B	Standard
<input type="checkbox"/>	<a href="#">schools_list.csv</a>	csv	March 9, 2024, 17:59:18 (UTC+00:00)	1.1 KB	Standard

Objects (2) [Info](#)[Copy S3 URI](#)[Copy URL](#)[Download](#)[Open](#)[Delete](#)[Actions](#)[Create folder](#)[Upload](#)

Objects are the fundamental entities stored in Amazon S3. You can use [Amazon S3 inventory](#) to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. [Learn more](#)

&lt; 1 &gt;

<input type="checkbox"/>	Name	Type	Last modified	Size	Storage class
<input type="checkbox"/>	populations_copy.csv	csv	February 6, 2024, 15:52:33 (UTC+00:00)	63.0 B	Standard
<input type="checkbox"/>	populations.csv	csv	February 6, 2024, 15:01:52 (UTC+00:00)	70.0 B	Standard

After which the first phase of testing is launched to test the menu construction module with normal, abnormal and extreme data for construction. It also reads data from the AWS S3 basket, obtains a list of schools and writes it to a file in the AWS S3 basket, but on the condition that the secret keys are not specified at all, even in environment variables.

Then the second phase starts and the same actions are performed but with the wrong secret keys.

```
*** Welcome to Application - List of nearby schools!
Please select an option:
1. Setting Google Maps API key
2. Set cloud API key
3. Getting nearby schools from the Map
4. Reading saved schools from the file
5. Automated testing
6. Exit
Enter your choice: 5
You selected: 5. Automated testing

Automated testing started...
Testing the app_menu.py module...

Welcome to Schools App (Auto Test)!
Please select an option:
1. Menu Test Point 1
2. Menu Test Point 2
3. Menu Test Point 3
4. Menu Test Point 4
5. Menu Test Point 5
Testing the app_menu.py module with normal data... OK

Welcome to 1234535.456456!
Please select an option:
1. 983465876453
2. 876345.6578
3. 9876435.34
4. -987234876.56
5. -976554
Testing the app_menu.py module with abnormal data... OK

Welcome to ['Extrim data test menu', 'Second subj']!
Please select an option:
1. Setting Google Maps API key
2. Set cloud API key
3. Getting nearby schools from the Map
4. Reading saved schools from the file
5. Automated testing
6. Exit
Testing the app_menu.py module with extrim data... OK

Reads schools wthout API key for "read_schools_from_file" wrong executed: Error reading the schools from the file on S3: 'function' object has no attribute 'load'
Saves schools wthout API key for "get_nearby_schools_from_map" wrong executed: Google Maps API creates a connection error: Invalid API key provided.
Reads schools wth wrong API key for "read_schools_from_file" wrong executed: Error reading the schools from the file on S3: 'function' object has no attribute 'load'
Saves schools wth wrong API key for "get_nearby_schools_from_map" wrong executed: Google Maps API creates a connection error: Invalid API key provided.
Enter your GMAPS_API_KEY: 
```

To launch the third final phase of automatic testing, we need to enter the correct Google Maps API and AWS Lambda API keys. For simplicity, when understanding the AWS Lambda API key, I named it CLOUD\_API\_KEY, so that it would be clear to any user without strong technical skills

```

*** API key saved successfully!
Reads schools with correct API key and without file for "read_schools_from_file" mexecuted successfully
Saves schools and display after request with incorrect coordinates for "get_nearby_schools_from_map" wrong executed: Google Maps API response error is not a dictionary: Google Maps API error: INVALID_REQUEST
Saves without schools for "get_nearby_schools_from_map" wrong executed: Google Maps API response error: results is an empty list: {'html_attributions': [], 'results': [], 'status': 'ZERO_RESULTS'}
Reading schools from the file on S3...
20 schools were saved on S3:
+-----+-----+-----+
| name | address | distance |
+-----+-----+-----+
| 0 | Hutchesons' Grammar School | 21 Beaton Road, Glasgow | 2.81 |
+-----+-----+-----+
| 1 | Eastwood High School | Capelrig Road, Newton Mearns, Glasgow, Glasgow | 3.47 |
+-----+-----+-----+
| 2 | Glasgow Club Bellahouston | 31 Bellahouston Drive, Glasgow | 3.39 |
+-----+-----+-----+
| 3 | Bellahouston Academy | 30 Gower Terrace, Glasgow | 3.56 |
+-----+-----+-----+
| 4 | Pro-Soccer | Rouken Glen Park, Glasgow | 2.16 |
+-----+-----+-----+
| 5 | St Vincent's Primary School | 40 Crebar Street, Thornliebank, Glasgow | 1.17 |
+-----+-----+-----+
| 6 | Cleaves Primary School | 271 Househillmuir Road, Glasgow | 2.89 |
+-----+-----+-----+
| 7 | Thornliebank Primary School | 10 Main Street, Thornliebank, Glasgow | 0.85 |
+-----+-----+-----+
| 8 | Our Lady of the Mission Primary School | Robslee Road, Thornliebank, Glasgow | 1.66 |
+-----+-----+-----+
| 9 | Hillpark Autise Unit | 36 Cairngorm Road, Glasgow | 0.76 |
+-----+-----+-----+
| 10 | Fotheringay Centre | 57 Fotheringay Road, Glasgow | 2.83 |
+-----+-----+-----+
| 11 | Animal Pan Parties | 19 Pentland Road, Newlands, Glasgow | 0.93 |
+-----+-----+-----+
| 12 | Woodland Outdoor Kindergartens | 5 Mansewood Road, Glasgow | 0.54 |
+-----+-----+-----+
| 13 | Kumon Maths & English | Library, Giffnock, Station Road, Giffnock, Glasgow | 1.72 |
+-----+-----+-----+
| 14 | Carmichael Nursery School | 44 Carmichael Place, Glasgow | 2.53 |
+-----+-----+-----+
| 15 | Wendy King | 8 Saint Ronan's Drive, Glasgow | 1.85 |
+-----+-----+-----+
| 16 | Burnbrae Children's Centre | 271 Househillmuir Road, Glasgow | 2.88 |
+-----+-----+-----+
| 17 | Zippytoztz | 48, Burnfield Avenue, Thornliebank, Glasgow | 0.92 |
+-----+-----+-----+
| 18 | Tinto Primary School | 61 Nether Auldhouse Road, Glasgow | 1.08 |
+-----+-----+-----+
| 19 | St Vincent's Autise Unit Co St Vincent's Primary | 40 Crebar Street, Glasgow | 1.15 |
+-----+-----+-----+
Reads schools and display after request with incorrect coordinates for "read_schools_from_file" mexecuted successfully
Saves with correct coordinates for "get_nearby_schools_from_map" mexecuted successfully
Reads schools and display after request with correct coordinates for "read_schools_from_file" mexecuted successfully

13 Total tests
0 Crashes tests
6 Failed tests

Automated testing finished...

```

I got the following test result:

- 13 Total tests
- 0 Crashes tests
- 6 Failed tests

This means that all planned tests were completed successfully without crashing the system.

## Summarize

Based on the results of automatic testing, we can conclude that our application is reliable and stable.

## 2.Manual Testing

Test no.	Name Test	Used Data	Expected Outcome	Actual Outcome	Notes
1	Entering a menu item: app_menu.get_user_choice() app_menu.handle_user_choice(choice)	Extreme data: Good Day!	Invalid choice. Please try again.	As was expected	N/A
2	Entering a menu item: app_menu.get_user_choice() app_menu.handle_user_choice(choice)	Abnormal data: 8	Invalid choice. Please try again.	As was expected	N/A
3	Entering a menu item: app_menu.get_user_choice() app_menu.handle_user_choice(choice)	Normal data: 6	Goodbye!	As was expected	N/A

4	Setting Google Maps API key get_api_key()	Normal data: Incorrect key	API key saved successfully! It is successfully	As was expected	An incorrect key has now been entered for subsequent testing of the API functionality
5	Set cloud API key set_cloud_api_key(set_key=True)	Normal data: Incorrect key	API key saved successfully! It is successfully	As was expected	An incorrect key has now been entered for subsequent testing of the API functionality
6	Reading saved schools from the file on S3: read_schools_from_file(False)	Abnormal data: Incorrect key	<ul style="list-style-type: none"> <li>• A message about the selected menu item should appear</li> <li>• Error message</li> <li>• Request to press Enter</li> <li>• Then updating the terminal window with a list of choices from the menu.</li> </ul>	As was expected	N/A
7	Saving schools to the file on S3: get_nearby_schools_from_map(False)	Abnormal data: Incorrect key	<ul style="list-style-type: none"> <li>• A message about the selected menu item should appear</li> <li>• Error message</li> <li>• Request to press Enter</li> <li>• Then updating the terminal window with a list of choices from the menu</li> </ul>	As was expected	N/A

8	Reading saved schools from the file on S3: read_schools_from_file(False)	Extreme data: File is not exist	<ul style="list-style-type: none"> <li>• A message about the selected menu item should appear</li> <li>• Error message</li> <li>• Request to press Enter</li> <li>• Then updating the terminal window with a list of choices from the menu</li> </ul>	As was expected	N/A
9	Saving schools to the file on S3: get_nearby_schools_from_map(False)	Extreme data:  Coord: Lat: 99.999995 Lon: 0 Radius: 5km	<ul style="list-style-type: none"> <li>• A message about the selected menu item should appear</li> <li>• Error message</li> <li>• Request to press Enter</li> <li>• Then updating the terminal window with a list of choices from the menu</li> </ul>	As was expected	N/A
10	Saving schools to the file on S3: get_nearby_schools_from_map(False)	Abnormal data:  Coord: Lat: 87.543255 Lon: 0 Radius: 10km	<ul style="list-style-type: none"> <li>• A message about the selected menu item should appear</li> <li>• Error message</li> <li>• Request to press Enter</li> <li>• Then updating the terminal window with a list of choices from the menu</li> </ul>	As was expected	N/A
11	Reading saved schools from the file on S3: read_schools_from_file(False)	Extreme data: File is not exist	<ul style="list-style-type: none"> <li>• A message about the selected menu item should appear</li> <li>• Error message</li> <li>• Request to press Enter</li> <li>• Then updating the terminal window with a list of choices from the menu</li> </ul>	As was expected	We made sure that the file is not created in case of recording errors

12	Saving schools to the file on S3: get_nearby_schools_from_map(False)	Normal data:  Coord: Lat: 55.816555 Lon: - 4.309890 Radius: 4km	<ul style="list-style-type: none"> <li>• A list of schools will appear on the screen</li> <li>• Next, you will be asked whether you need to write this to a file.</li> <li>• We answer "y"</li> <li>• A message appears indicating that the file was successfully written to S3</li> <li>• Request to press Enter</li> <li>• Then updating the terminal window with a list of choices from the menu</li> </ul>	As was expected	N/A
13	Reading saved schools from the file on S3: read_schools_from_file(False)	Normal data: The file exists and includes a list of schools in the correct format	<ul style="list-style-type: none"> <li>• A list of schools will appear on the screen</li> <li>• Request to press Enter</li> <li>• Then updating the terminal window with a list of choices from the menu</li> </ul>	As was expected	N/A
14	Reading saved schools from the file on S3: read_schools_from_file(False)	Extreme data: Using the PostMan, we write data in the wrong format to a file	<ul style="list-style-type: none"> <li>• A message will be displayed stating that the data was read successfully, but the file does not contain a list of schools</li> <li>• Request to press Enter</li> <li>• Then updating the terminal window with a list of choices from the menu</li> </ul>	As was expected	N/A

My Workspace    New    Import    <    Final F    POST AWS    Final F    API dc    POST AWS    CD Cr    AWS    >    +    HCP\_OpenAPI

API documentation / AWS Test S3    Save    Edit    Comments

POST    https://lfops3aa06.execute-api.eu-north-1.amazonaws.com/test/first-s3    Send    v

Params    Authorization    Headers (9)    Body    Pre-request Script    Tests    Settings    Cookies

☐ none    ☐ form-data    ☐ x-www-form-urlencoded    ☒ raw    ☐ binary    ☐ GraphQL    JSON    Beautify

```
2  {
3    "action_www": "put_file",
4    "data_stream": "987623uhgsdfkjhsdflkjdgf"
}
```

Body    Cookies    Headers (10)    Test Results    422 Unprocessable Entity (WebDAV) (RFC 4918)    80 ms    529 B    Save as example

Pretty    Raw    Preview    Visualize    JSON    v

```
1  Cloud API error: Invalid parameters
```

My Workspace    New    Import    <    Final F    POST AWS    Final F    API dc    POST AWS    CD Cr    AWS    >    +    HCP\_OpenAPI

API documentation / AWS Test S3    Save    Edit    Comments

POST    https://lfops3aa06.execute-api.eu-north-1.amazonaws.com/test/first-s3    Send    v

Params    Authorization    Headers (9)    Body    Pre-request Script    Tests    Settings    Cookies

☐ none    ☐ form-data    ☐ x-www-form-urlencoded    ☒ raw    ☐ binary    ☐ GraphQL    JSON    Beautify

```
2  {
3    "action": "put_file",
4    "data_stream_ueu": "987623uhgsdfkjhsdflkjdgf"
}
```

Body    Cookies    Headers (10)    Test Results    400 Bad Request    89 ms    504 B    Save as example

Pretty    Raw    Preview    Visualize    JSON    v

```
1  Cloud API error: data_stream is not set
```

My Workspace    New    Import    <    Final F    POST AWS    Final F    API dc    POST AWS    CD Cr    AWS    >    +    HCP\_OpenAPI

API documentation / AWS Test S3    Save    Edit    Comments

POST    https://lfops3aa06.execute-api.eu-north-1.amazonaws.com/test/first-s3    Send    v

Params    Authorization    Headers (9)    Body    Pre-request Script    Tests    Settings    Cookies

☐ none    ☐ form-data    ☐ x-www-form-urlencoded    ☒ raw    ☐ binary    ☐ GraphQL    JSON    Beautify

```
1  {
2    "action": "put_file",
3    "data_stream": "987623uhgsdfkjhsdflkjdgf"
4  }
```

Body    Cookies    Headers (10)    Test Results    200 OK    3.31 s    1.07 KB    Save as example

Pretty    Raw    Preview    Visualize

```
{
  "ResponseMetadata": {
    "RequestId": "SJ1P8FAWP0K0WJWM",
    "HostId": "3CCcv3t2eq+QaB/0xGhF97gvJBriNenx2xn7jgDtZgfk/YRJKSCN0Gzo3oLfn2jopvQBuE80EIGXGyk3MJpn7yZI8sLyRQPhc",
    "HTTPStatusCode": 200,
    "HTTPHeaders": {
      "x-amz-id-2": "3CCcv3t2eq+QaB/0xGhF97gvJBriNenx2xn7jgDtZgfk/YRJKSCN0Gzo3oLfn2jopvQBuE80EIGXGyk3MJpn7yZI8sLyRQPhc",
      "x-amz-request-id": "SJ1P8FAWP0K0WJWM",
      "date": "Tue, 19 Mar 2024 13:31:15 GMT",
      "x-amz-server-side-encryption": "AES256",
      "etag": "\"4319708c181676c1d3aff3916e80f988\"",
      "server": "AmazonS3",
      "content-length": "0"
    },
    "RetryAttempts": 0,
    "ETag": "\"4319708c181676c1d3aff3916e80f988\"",
    "ServerSideEncryption": "AES256"
  }
}
```

My Workspace New Import

Collections

- API documentation
  - POST AWS Test S3
  - POST AWS Test S3
- CD Chelenges
- Final Project
- HCP OpenAPI
- My Collection

API documentation / AWS Test S3

POST <https://fops3aao6.execute-api.eu-north-1.amazonaws.com/test/first-s3> Send

Params Authorization Headers (9) Body Pre-request Script Tests Settings Cookies

☐ none ☐ form-data ☐ x-www-form-urlencoded ☒ raw ☐ binary ☐ GraphQL JSON Beautify

```
1 {
2   "action": "put_file01",
3   "data_stream": "987623uhgsdfkjhsdfilkjdgf"
4 }
```

Body Cookies Headers (10) Test Results 400 Bad Request 628 ms 496 B Save as example

Pretty Raw Preview Visualize

Cloud API error: Invalid action

My Workspace New Import

Collections

- API documentation
  - POST AWS Test S3
  - POST AWS Test S3
- CD Chelenges
- Final Project
- HCP OpenAPI
- My Collection

API documentation / AWS Test S3

POST <https://fops3aao6.execute-api.eu-north-1.amazonaws.com/test/first-s3> Send

Params Authorization Headers (9) Body Pre-request Script Tests Settings Cookies

☐ none ☐ form-data ☐ x-www-form-urlencoded ☒ raw ☐ binary ☐ GraphQL JSON Beautify

```
1 {
2   "action": "get_file"
3 }
```

Body Cookies Headers (10) Test Results 200 OK 2.94 s 480 B Save as example

Pretty Raw Preview Visualize JSON

```
1 987623uhgsdfkjhsdfilkjdgf
```

My Workspace New Import

Collections

- API documentation
  - POST AWS Test S3
  - POST AWS Test S3
- CD Chelenges
- Final Project
- HCP OpenAPI
- My Collection

API documentation / AWS Test S3

POST <https://fops3aao6.execute-api.eu-north-1.amazonaws.com/test/first-s3> Send

Params Authorization Headers (9) Body Pre-request Script Tests Settings Cookies

☐ none ☐ form-data ☐ x-www-form-urlencoded ☒ raw ☐ binary ☐ GraphQL JSON Beautify

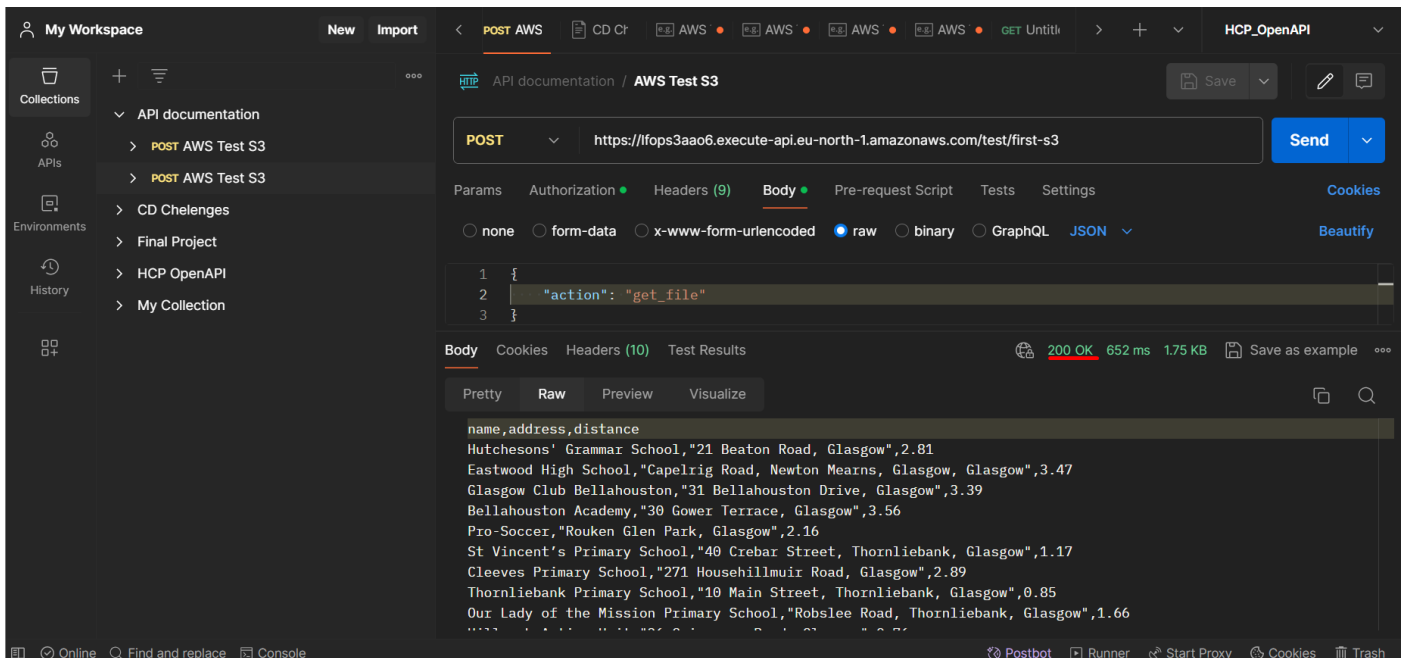
```
1 {
2   "action": "getfile"
3 }
```

Body Cookies Headers (10) Test Results 400 Bad Request 251 ms 496 B Save as example

Pretty Raw Preview Visualize JSON

```
1 Cloud API error: Invalid action
```





### 3. Conclusive Summarizing

Considering the results of the threat design and the completed tests, you can finally conclude that I received a highly reliable and stable code that works not only with normal data, but also with abnormal and extreme data, and at the same time, the application behaves stable and reliable and does not crash.