Create Get Pictures Service with Flask

Estimated time needed: 90 minutes

Welcome to the **Create Get Pictures Service with Flask** hands-on lab. In this lab, you will begin to build the service that you will eventually deploy to IBM Code Engine. The lab provides a GitHub template repository to get you started. The repository also contains python unit tests. You will be asked to complete the code so that it can pass all tests.

Objectives

In this lab, you will:

- Create a Flask server
- Write RESTful APIs on picture URL resource
- Check the APIs should pass the given **pytest** tests

Note: Important Security Information

Note: Important Security Information

Welcome to the Cloud IDE. This is where all your development will take place. It has all the tools you will need to use, including **Python** and **Flask**.

It is important to understand that the lab environment is ephemeral. It only lives for a short while before it is destroyed. It is imperative that you push all changes made to your own GitHub repository so that it can be recreated in a new lab environment any time it is required.

Also, note that this environment is shared and, therefore, not secure. You should not store any personal information, usernames, passwords, or access tokens in this environment for any purpose.

Your Task

If you haven't generated a GitHub Personal Access Token you should do so now. You will need it to push code back to your repository. It should have `repo` and `write` permissions, and be set to expire in `60` days. When Git prompts you for a password in the Cloud IDE environment, use your Personal Access Token instead. Follow the steps in the Generating Git Token Lab for detailed instructions.

Note on Screenshots

Throughout this lab, you will be prompted to take screenshots and save them on your device. You will need these screenshots to either answer graded quiz questions or you will need to upload them as your submission for peer review at the end of this course. Your screenshot must have either the .jpg or .png extension.

To take screenshots, you can either use various free screen-capture tools or your operating system's shortcut keys. For example:

- Mac: You can use `Shift + Command + 3 (⇧ + ⌘ + 3)` on your keyboard to capture your entire screen or `Shift + Command + 4 (⇧ + ⌘ + 4)` to capture a window or area. The screen grabs will be saved as .jpg or .png files on your Desktop.
- Windows: You can capture your active window by pressing `Alt + Print Screen` on your keyboard. This command copies an image of your active window to the clipboard. Next, open an image editor, paste the image from your clipboard to the image editor, and save the image as a .jpg or .png file.

Initialize Development Environment

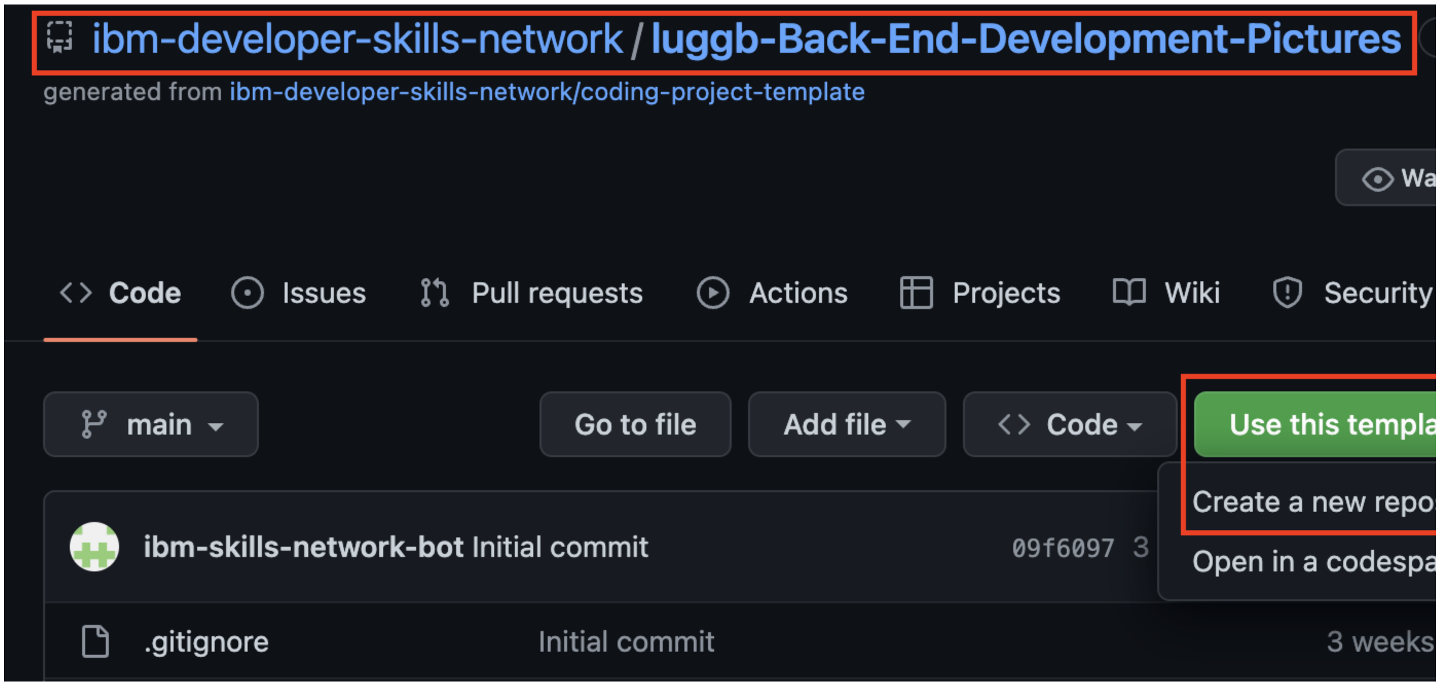
Because the Cloud IDE environment is ephemeral, it may be deleted at any time. The next time you come into the lab, a new environment may be created. Unfortunately, this means that you will need to initialize your development environment every time it is recreated. This shouldn't happen too often as the environment can last for several days at a time, but when it is removed, following is the procedure to recreate it.

Overview

Create new repository from template

1. Click this URL to open the starter code project: https://github.com/ibm-developer-skills-network/luggb-Back-End-Development-Pictures
2. Use the green **Use this template** button to clone this repository to your private GitHub account.

   Do not use Fork; use the Template button.


ibm-developer-skills-network / luggb-Back-End-Development-Pictures
generated from ibm-developer-skills-network/coding-project-template
Wa
Code
Issues
Pull requests
Actions
Projects
Wiki
Security
main
Go to file
Add file
Code
Use this templa
Create a new repo
Open in a codespa
ibm-skills-network-bot Initial commit
09f6097 3
.gitignore
Initial commit
3 weeks

3. Give your repository the name `Back-End-Development-Pictures`. This is the name that graders will look for to grade your work.

4. Ensure you select the Public option for your repository and then create it.

Initialize Development Environment

Each time you need to set up your lab development environment you will need to run three commands.

Each command will be explained in further detail, one at a time, in the following section.

`{your_github_account}` represents your GitHub account username.

The commands include:

- clone the GitHub repository from your account
- change into the `Back-End-Development-Pictures` directory
- execute the setup bash script
- exit the terminal

Now, let's discuss each of these commands and explain what needs to be done.

Task Details

Initialize your environment using the following steps:

1. Open a terminal with `Terminal` -> `New Terminal` if one is not open already.

2. Next, use the export GITHUB_ACCOUNT command to export an environment variable that contains the name of your GitHub account.

   Note: Substitute your real GitHub account for the {your_github_account} placeholder below:

```
export GITHUB_ACCOUNT={your_github_account}
```

Copied! Executed!

3. Then use the following commands to clone your repository.

```
git clone https://github.com/$GITHUB_ACCOUNT/Back-End-Development-Pictures.git
```

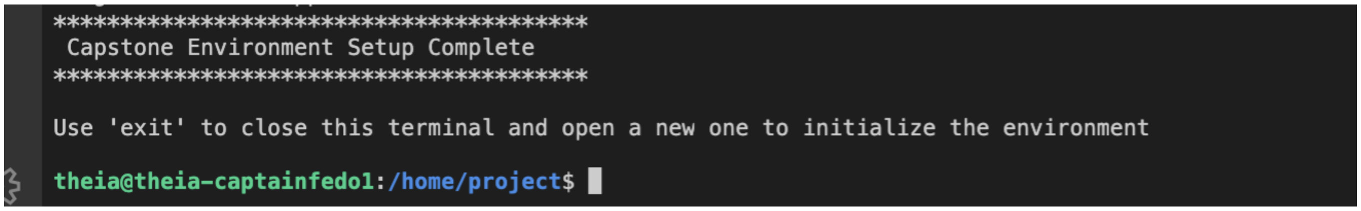
Copied! Executed!

4. Change into the devops-capstone-project directory, and execute the `./bin/setup.sh` command.

```
cd /home/project/Back-End-Development-Pictures
bash ./bin/setup.sh
```

Copied! Executed!

5. You should see the follow at the end of the setup execution:



```
******************************************
 Capstone Environment Setup Complete
******************************************

Use 'exit' to close this terminal and open a new one to initialize the environment

theia@theia-captainfedo1:/home/project$
```

6. Finally, use the `exit` command to close the current terminal. The environment will not be fully active until you open a new terminal in the next step.

1. 1

```
exit
```

Copied! Executed!

Validate

To validate that your environment is working correctly, you must open a new terminal because the Python virtual environment will only activate when a new terminal is created. Ensure that you have used the `exit` command to exit the terminal in your previous task.

1. Open a terminal using `Terminal` -> `New Terminal` command. You should see the Python virtual environment `(backend-pics-venv)` prepended to the terminal prompt. Check that everything is working correctly by using the `which python` command:

   Check which Python you are using:

   ```
   which python
   ```

   Copied! Executed!

   You should get back:

   ```
   (backend-pics-venv) theia:project$ which python
   /home/theia/backend-pics-venv/bin/python
   ```

   Copied!

   Check the Python version:

   ```
   python --version
   ```

   Copied! Executed!

   You should get back some patch level of Python 3.9:

   ```
   Python 3.8.0
   ```

   Copied!

Evidence

1. Note down the URL of your GitHub repository (not the template) to submit for peer review. Recall the graders are looking for a repository named `Back-End-Development-Pictures` in your account.

This completes the setup of the development environment. Anytime your environment is recreated, you will need to follow the above procedure.

You are now ready to start working.

Project Overview

Your client has asked you to build a website for a famous band. The backend developer on the project has recently left, and you need to finish the code so the website can go live. The application consists of some different microservices working together.

You are asked in this lab to finish the **Get Pictures** microservice. This microservice stores URLs of pictures from past events. The previous developer started a Python Flask-based REST API and wrote some tests following the TDD or test driven development process. You will need to get the code from GitHub and fill in the missing pieces so that the code can pass all tests.

REST API Guidelines Review

The architect has provided you the following schema for the endpoints:

RESTful API Endpoints

Action	Method	Return code	Body	URL Endpoint
List	GET	200 OK	Array of picture URLs `[{...}]`	`GET /picture`
Create	POST	201 CREATED	A picture resource as json `{...}`	POST `/picture`
Read	GET	200 OK	A picture as json `{...}`	GET `/picture/{id}`
Update	PUT	200 OK	A picture as json `{...}`	PUT `/picture/{id}`
Delete	DELETE	204 NO CONTENT	`""`	DELETE `/picture/{id}`

The following end points were completed by the previous developer and can be used for reference:

Action	Method	Return code	Body	URL Endpoint
Health	GET	200 OK	`""`	GET `/health`
Count	GET	200 OK	`""`	GET `/count`

Exercise 1: Test health and count endpoints

Before you implement the `Get Pictures` API, let's first test the two endpoints that the previous developer implemented.

- `/health`
- `/count`

One way to test the endpoint is to start the server and then use the `curl` command to send a request to the endpoints. Open the terminal if you don't have it open already and change into the `` directory.

```
cd /home/project/Back-End-Development-Pictures
```

Copied! Executed!

Next, run the following command to run the flask server in development mode:

```
flask --app app run --debugger --reload
```

Copied! Executed!

Since your main applicaiton is in a file called `app.py`, you don't have to specify it. The following command has the same result:

```
flask run --debugger --reload
```

Copied! Executed!

You should see the flask server running with the following output in the terminal:

```
$ flask --app app run --debugger --reload
 * Serving Flask app 'app'
 * Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
 * Running on http://127.0.0.1:5000
Press CTRL+C to quit
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 132-341-814
```

Copied!

You can now execute the following `curl` command to see the output from the `health` and the `count` endpoints. **Use the split button in the terminal to create another terminal next to the one running the server.** You will need to change back into the correct direcory before running the command:

```
cd /home/project/Back-End-Development-Pictures
```

Copied!

Execute the following commands:

```
curl --request GET --url http://localhost:5000/health
```

Copied! Executed!

and

```
curl --request GET --url http://localhost:5000/count
```

Copied! Executed!

You should see the following results:
`/health`

```
$ curl --request GET --url http://localhost:5000/health
{"status":"OK"}
```

Copied!

`/count`

```
$ curl --request GET --url http://localhost:5000/count
{"length":10}
```

Copied!

A second and preferred way to test code during development is by following the TDD method. As mentioned earlier, the previous developer has written the tests for the code. You can use the `pytest` command and see if the code passes the tests. It should pass for the `/count` and `/health` endpoints.

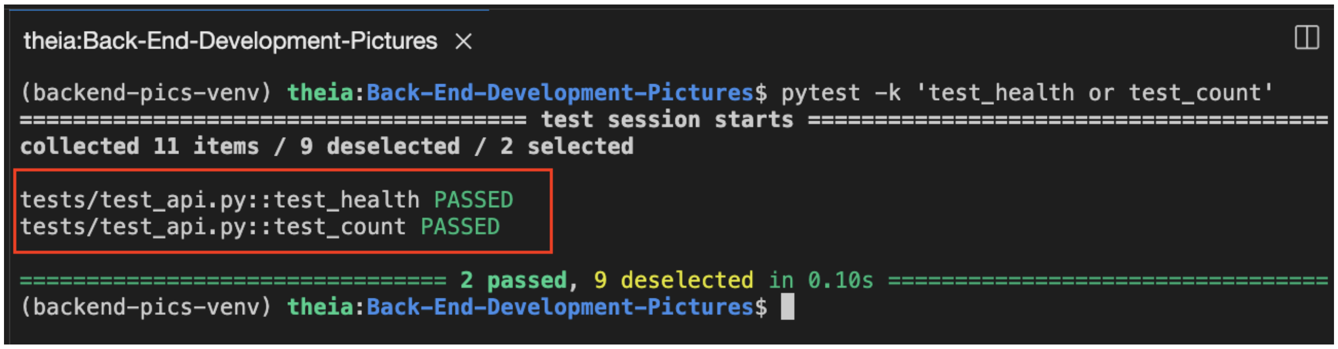
Your Task

1. Run the pytest command to run two tests for the `health` and `count` endpoints. You can use the following command:

```
pytest -k 'test_health or test_count'
```

Copied! Executed!

You should see the following output:



```
theia:Back-End-Development-Pictures ×

(backend-pics-venv) theia:Back-End-Development-Pictures$ pytest -k 'test_health or test_count'
======================================= test session starts ========================================
collected 11 items / 9 deselected / 2 selected

tests/test_api.py::test_health PASSED
tests/test_api.py::test_count PASSED

================================= 2 passed, 9 deselected in 0.10s ==================================
(backend-pics-venv) theia:Back-End-Development-Pictures$
```

If you run the `pytest` command without the `-k` flag, it will run all the tests, and you will see the other tests fail. You use the `-k` flag to trim the output to just the two endpoint tests.

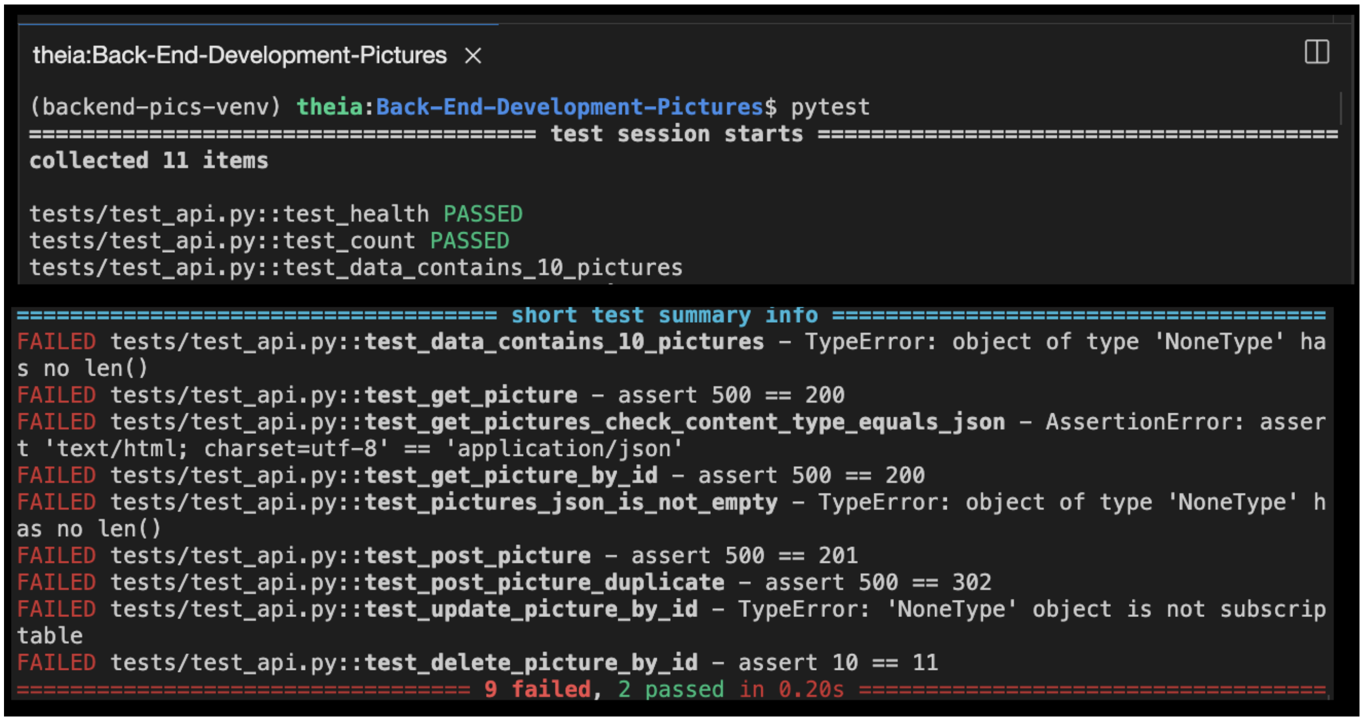
Evidence

1. Run the pytest command listed above and take a screenshot of the terminal. There is no need to add the red boxes. Save the screenshot as `exercise1-count-health-passing.jpg` (or `.png`). The screenshot should show the two tests as passed.

Congratulations! You have just completed your first story.

Exercise 2: Implement the GET /picture endpoint

It is now time to implement the rest of the endpoints. If you run the `pytest` command now, you will see 9 tests as failed. Your output might look a little different than the screenshot as we have removed all the logs of the failing tests for brevity.



```
(backend-pics-venv) theia:Back-End-Development-Pictures$ pytest
====================================== test session starts ======================================
collected 11 items

tests/test_api.py::test_health PASSED
tests/test_api.py::test_count PASSED
tests/test_api.py::test_data_contains_10_pictures
===================================== short test summary info =====================================
FAILED tests/test_api.py::test_data_contains_10_pictures - TypeError: object of type 'NoneType' ha
s no len()
FAILED tests/test_api.py::test_get_picture - assert 500 == 200
FAILED tests/test_api.py::test_get_pictures_check_content_type_equals_json - AssertionError: asser
t 'text/html; charset=utf-8' == 'application/json'
FAILED tests/test_api.py::test_get_picture_by_id - assert 500 == 200
FAILED tests/test_api.py::test_pictures_json_is_not_empty - TypeError: object of type 'NoneType' h
as no len()
FAILED tests/test_api.py::test_post_picture - assert 500 == 201
FAILED tests/test_api.py::test_post_picture_duplicate - assert 500 == 302
FAILED tests/test_api.py::test_update_picture_by_id - TypeError: 'NoneType' object is not subscrip
table
FAILED tests/test_api.py::test_delete_picture_by_id - assert 10 == 11
=================================== 9 failed, 2 passed in 0.20s ===================================
```

Your task for the rest of the lab is to complete the remaining code to pass the failed tests. Let's start with the `GET /picture` endpoint first.

Your Task

Before you write the code for the endpoint, let's create a branch so you can commit your code back to GitHub.

Task 1 : Create a Branch

Since you are working in branches, you must pull the latest changes from the main branch to stay up to date. You can then create a new branch.

Change into the `Back-End-Development-Pictures` directory and execute the following steps:

```
cd /home/project/Back-End-Development-Pictures
git checkout main
git pull
git checkout -b backend-rest
```

Copied! Executed!

This will switch to the main branch, pull the latest changes, and create a new branch. You will be asked to push all your changes to your GitHub repo and merge all code back into your main branch with a pull request.

Task 2 : Finish the code for the endpoint

You will write all the code in the `Back-End-Development-Pictures/backend/routes.py` file.

Open **routes.py** in IDE

Note: To open in File Explorer, go to this location:
`Back-End-Development-Pictures/backend/routes.py`

1. Create a Flask route that responds to the GET method for the endpoint `/picture`.
2. Create a function called `get_pictures()` to hold the implementation.
3. The URLs are loaded into a list called `data`. You need to return it in this method.
4. Run pytest until the following functions pass:

```
tests/test_api.py::test_health PASSED
tests/test_api.py::test_count PASSED
tests/test_api.py::test_data_contains_10_pictures PASSED
tests/test_api.py::test_get_picture PASSED
tests/test_api.py::test_get_pictures_check_content_type_equals_json PASSED
```

Copied!

Evidence

1. Once the functions pass, take a screenshot of the passing functions and name it as `exercise2-get-pictures-passing.jpg` (or `.png`).

Congratulations! You just added the first REST endpoint to your backend.

Exercise 3: Implement the GET /picture/id endpoint

As before, you will write the code for the endpoint in the `./backend/routes.py` file.

Open **routes.py** in IDE

Note: To open in File Explorer, go to this location:
`Back-End-Development-Pictures/backend/routes.py`

1. Create a Flask route that responds to the GET method for the endpoint `/picture/<id>`.
2. Create a function called `get_picture_by_id(id)` to hold the implementation.
3. The URLs are loaded into a list called `data`. You will need to parse through the list, find the URL with the given id, and return it back to the caller.
4. Run pytest until the following functions pass:

```
 1. 1
 2. 2
 3. 3
 4. 4
 5. 5
 6. 6
 7. 7
 1. tests/test_api.py::test_health PASSED
 2. tests/test_api.py::test_count PASSED
 3. tests/test_api.py::test_data_contains_10_pictures PASSED
 4. tests/test_api.py::test_get_picture PASSED
 5. tests/test_api.py::test_get_pictures_check_content_type_equals_json PASSED
 6. tests/test_api.py::test_get_picture_by_id PASSED
 7. tests/test_api.py::test_pictures_json_is_not_empty PASSED
```

Copied!

Congratulations! You just added the second REST endpoint to your backend.

Exercise 4: Implement the POST /picture endpoint

As before, you will write the code for the endpoint in the `./backend/routes.py` file.

Open **routes.py** in IDE

Note: To open in File Explorer, go to this location:
`Back-End-Development-Pictures/backend/routes.py`

1. Create a Flask route that responds to the POST method for the endpoint `/picture/<id>`. Use the `methods=["POST"]` in your app decorator.
2. Create a function called `create_picture()` to hold the implementation.
3. You will first need to extract the picture data from the request body and then append it to the `data` list.
4. If a picture with the id already exists, send an HTTP code of `302` back to the user with a message of `{"Message": "picture with id {picture['id']} already present"}`.
5. Run pytest until the following functions pass:

```
 1. 1
 2. 2
 3. 3
 4. 4
 5. 5
 6. 6
 7. 7
 8. 8
 9. 9
10. 10
11. 11
 1. tests/test_api.py::test_health PASSED
 2. tests/test_api.py::test_count PASSED
 3. tests/test_api.py::test_data_contains_10_pictures PASSED
 4. tests/test_api.py::test_get_picture PASSED
 5. tests/test_api.py::test_get_pictures_check_content_type_equals_json PASSED
 6. tests/test_api.py::test_get_picture_by_id PASSED
 7. tests/test_api.py::test_pictures_json_is_not_empty PASSED
 8. tests/test_api.py::test_post_picture {'id': 200, 'pic_url': 'http://dummyimage.com/230x100.png/dddddd/000000', 'event_country': 'United States', 'event_state': 'California', 'event_city': '
 9. PASSED
10. tests/test_api.py::test_post_picture_duplicate {'id': 200, 'pic_url': 'http://dummyimage.com/230x100.png/dddddd/000000', 'event_country': 'United States', 'event_state': 'California', 'even
11. PASSED
```

Copied!

Evidence

1. Once the functions pass, take a screenshot of the passing functions and name it as `exercise4-post-picture-passing.jpg` (or `.png`).

Exercise 5: Implement the PUT /picture endpoint

The PUT endpoint will be used to update an existing picture resource. As before, you will write the code for the endpoint in the `./backend/routes.py` file.

Open **routes.py** in IDE

Note: To open in File Explorer, go to this location:
`Back-End-Development-Pictures/backend/routes.py`

1. Create a Flask route that responds to the POST method for the endpoint `/picture/<int:id>`. Use the `methods=["PUT"]` in your app decorator.
2. Create a function called `update_picture(id)` to hold the implementation.
3. You will first need to extract the picture data from the request body.
4. You will then find the picture in the `data` list. If the picture exists, you will update it with the incoming request.
5. If the picture does not exist, you will send back a status of `404` with a message `{"message": "picture not found"}`.
6. Run pytest until the following functions pass:

```
 1. 1
 2. 2
 3. 3
 4. 4
 5. 5
 6. 6
 7. 7
 8. 8
 9. 9
10. 10
11. 11
12. 12
 1. tests/test_api.py::test_health PASSED
 2. tests/test_api.py::test_count PASSED
 3. tests/test_api.py::test_data_contains_10_pictures PASSED
 4. tests/test_api.py::test_get_picture PASSED
 5. tests/test_api.py::test_get_pictures_check_content_type_equals_json PASSED
 6. tests/test_api.py::test_get_picture_by_id PASSED
 7. tests/test_api.py::test_pictures_json_is_not_empty PASSED
 8. tests/test_api.py::test_post_picture {'id': 200, 'pic_url': 'http://dummyimage.com/230x100.png/dddddd/000000', 'event_country': 'United States', 'event_state': 'California', 'event_city': '
 9. PASSED
10. tests/test_api.py::test_post_picture_duplicate {'id': 200, 'pic_url': 'http://dummyimage.com/230x100.png/dddddd/000000', 'event_country': 'United States', 'event_state': 'California', 'even
11. PASSED
12. tests/test_api.py::test_update_picture_by_id PASSED
```

Copied!

Exercise 6: Implement the DELETE /picture endpoint

Task 1 : Implement the Delete endpoint

The DELETE endpoint is used to delete an existing picture resource. As before, you will write the code for the endpoint in the `./backend/routes.py` file.

Open **routes.py** in IDE

Note: To open in File Explorer go to this location:
`Back-End-Development-Pictures/backend/routes.py`

1. Create a Flask route that responds to the POST method for the endpoint `/picture/<int:id>`. Use the `methods=["DELETE"]` in your app decorator.
2. Create a function called `delete_picture(id)` to hold the implementation.
3. You will first extract the id from the URL.
4. Next, traverse the `data` list to find the picture by id. If the picture exists, you will delete the item from the list and return an empty body with a status of HTTP_204_NO_CONTENT.
5. If the picture does not exist, you will send back a status of `404` with a message `{"message": "picture not found"}`.
6. Run pytest until the following functions pass:

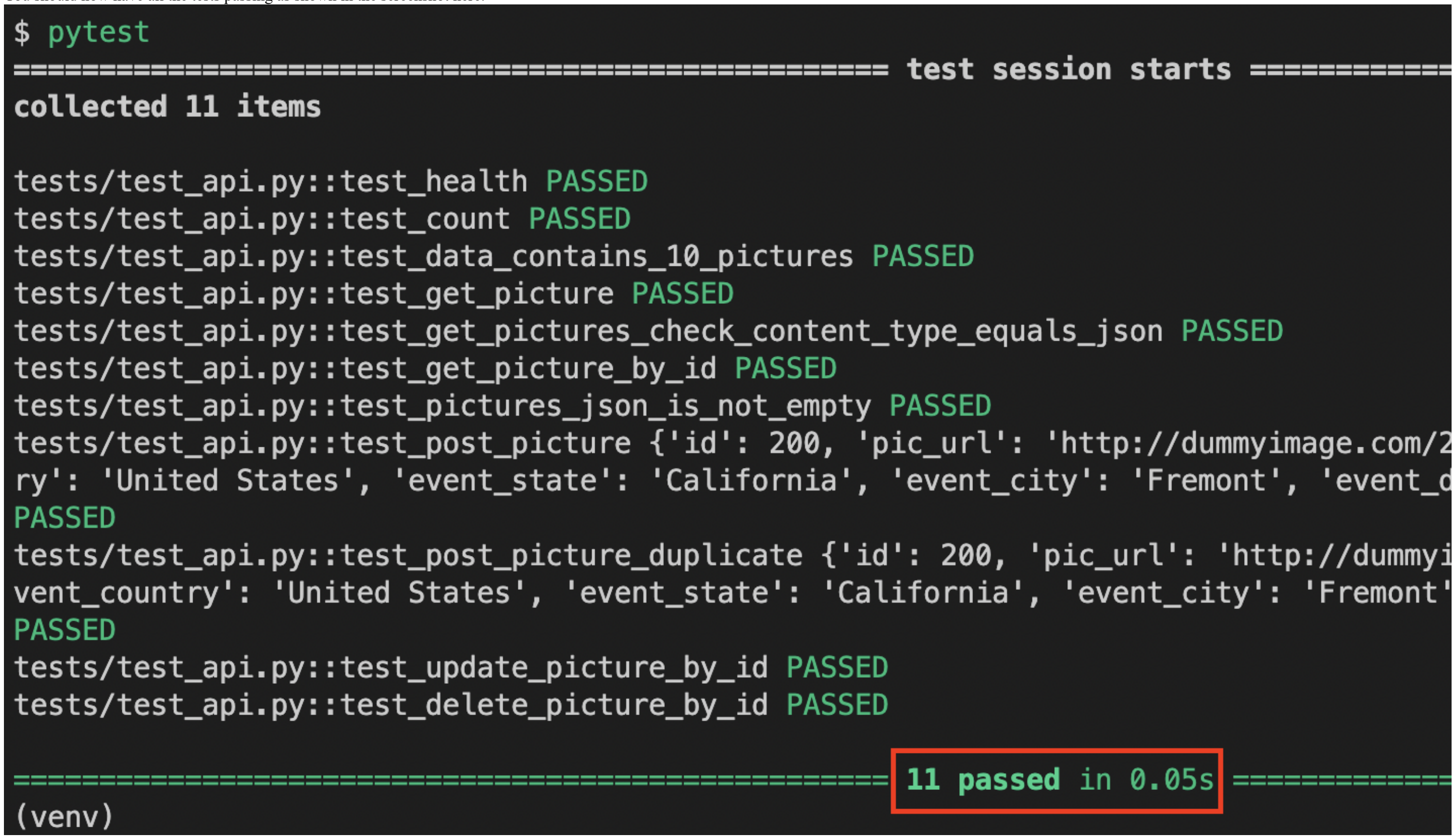
```
tests/test_api.py::test_health PASSED
tests/test_api.py::test_count PASSED
tests/test_api.py::test_data_contains_10_pictures PASSED
tests/test_api.py::test_get_picture PASSED
tests/test_api.py::test_get_pictures_check_content_type_equals_json PASSED
tests/test_api.py::test_get_picture_by_id PASSED
tests/test_api.py::test_pictures_json_is_not_empty PASSED
tests/test_api.py::test_post_picture {'id': 200, 'pic_url': 'http://dummyimage.com/230x100.png/dddddd/000000', 'event_country': 'United States', 'event_state': 'California', 'event_city': 'I
PASSED
tests/test_api.py::test_post_picture_duplicate {'id': 200, 'pic_url': 'http://dummyimage.com/230x100.png/dddddd/000000', 'event_country': 'United States', 'event_state': 'California', 'even
PASSED
tests/test_api.py::test_update_picture_by_id PASSED
tests/test_api.py::test_delete_picture_by_id PASSED
```

Copied!

Evidence

1. Once the functions pass, take a screenshot of the passing functions and name it as`exercise6-delete-picture-passing.jpg` (or `.png`).

You should now have all the tests passing as shown in the screenshot here:



```
$ pytest
======================================================= test session starts ============
collected 11 items

tests/test_api.py::test_health PASSED
tests/test_api.py::test_count PASSED
tests/test_api.py::test_data_contains_10_pictures PASSED
tests/test_api.py::test_get_picture PASSED
tests/test_api.py::test_get_pictures_check_content_type_equals_json PASSED
tests/test_api.py::test_get_picture_by_id PASSED
tests/test_api.py::test_pictures_json_is_not_empty PASSED
tests/test_api.py::test_post_picture {'id': 200, 'pic_url': 'http://dummyimage.com/2
ry': 'United States', 'event_state': 'California', 'event_city': 'Fremont', 'event_d
PASSED
tests/test_api.py::test_post_picture_duplicate {'id': 200, 'pic_url': 'http://dummyi
vent_country': 'United States', 'event_state': 'California', 'event_city': 'Fremont'
PASSED
tests/test_api.py::test_update_picture_by_id PASSED
tests/test_api.py::test_delete_picture_by_id PASSED

======================================================= 11 passed in 0.05s ============
(venv)
```

Task 2 : Push the branch to GitHub and create a PR

Now that you have finished the code for the microservice, you can push the `backend-rest` branch back to your GitHub fork. Since you are the only one working on this project, go ahead and merge the PR and delete the branch. Make sure all your code changes are pushed back to the main branch before proceeding to the next lab.

1. You will be prompted to set up your git user and email the first time you push:

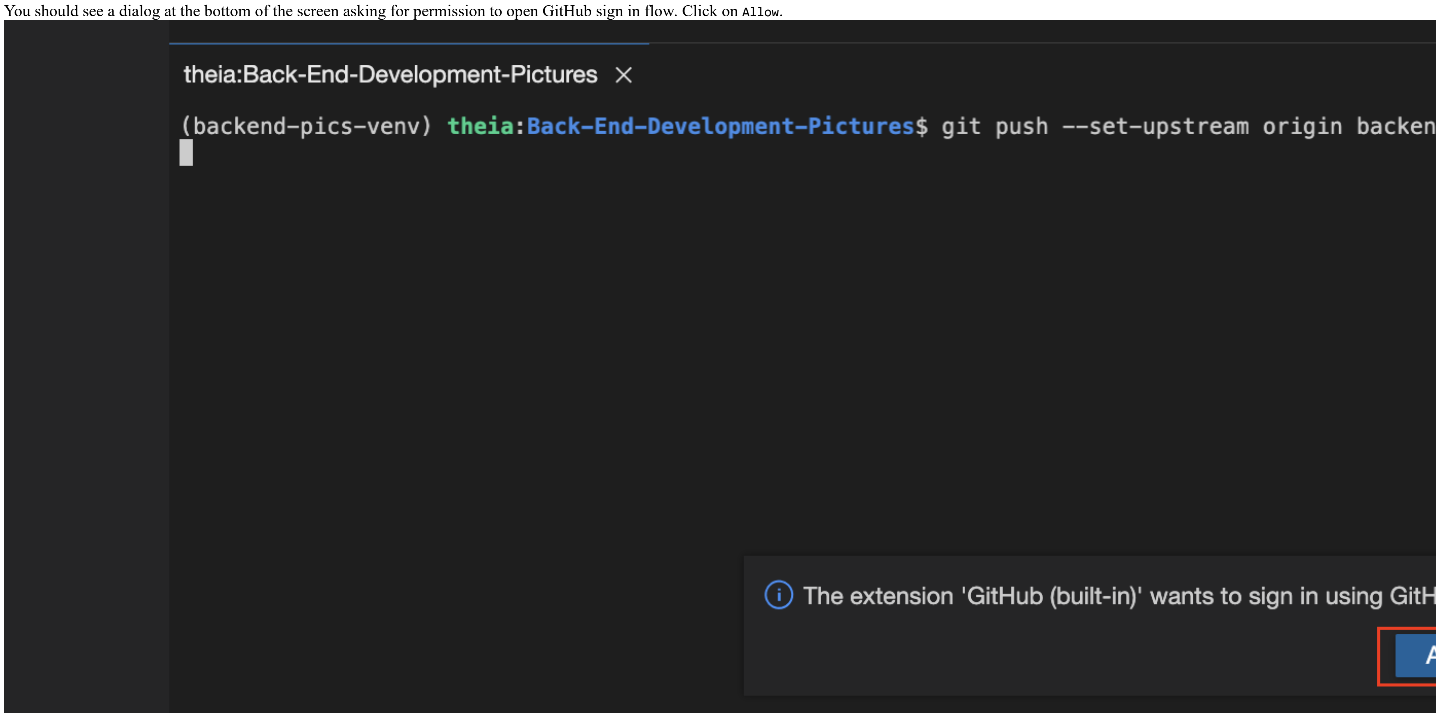
```
2. 2
1. git config --local user.name "{your GitHub name here}"
2. git config --local user.email {your GitHub email here}
```

Copied!

2. Use the `git commit -am` command to commit your changes with the message "implemented pictures service", and the `git push` command to push those changes to your repository.

   ▶ Click here for a hint.
   ▶ Click here for a hint.

3. You should see a dialog at the bottom of the screen asking for permission to open GitHub sign in flow. Click on `Allow`.

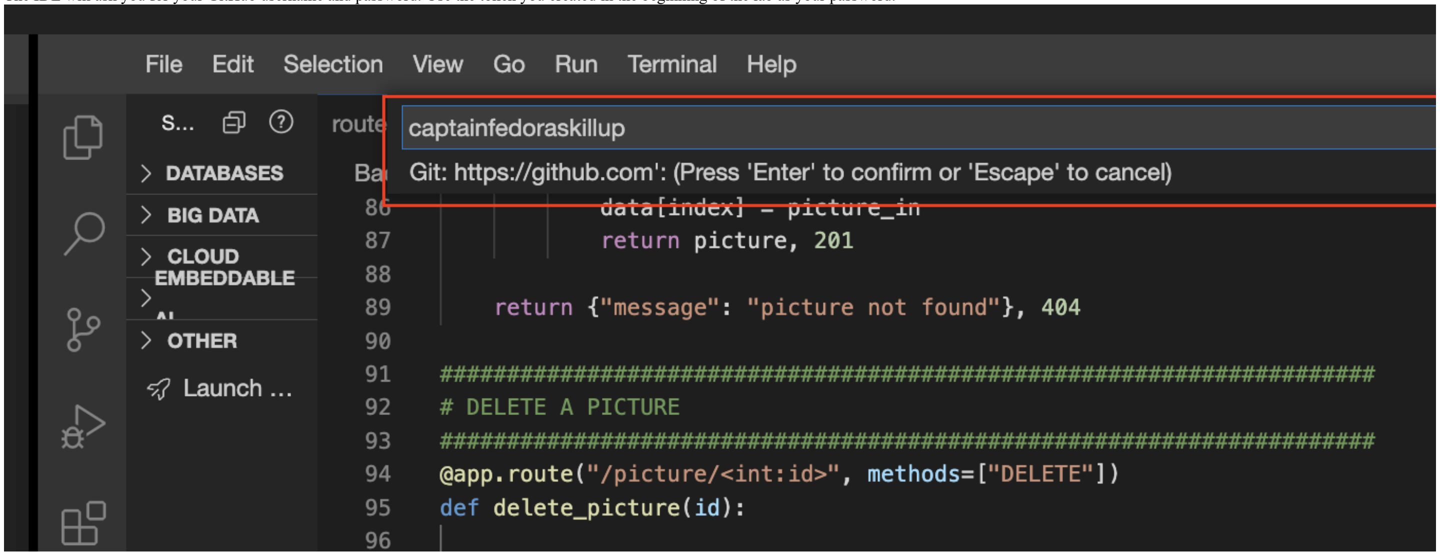


theia:Back-End-Development-Pictures

```
(backend-pics-venv) theia:Back-End-Development-Pictures$ git push --set-upstream origin backen
```

The extension 'GitHub (built-in)' wants to sign in using GitH

4. The IDE will ask you for your GitHub username and password. Use the token you created in the beginning of the lab as your password.



captainfedoraskillup

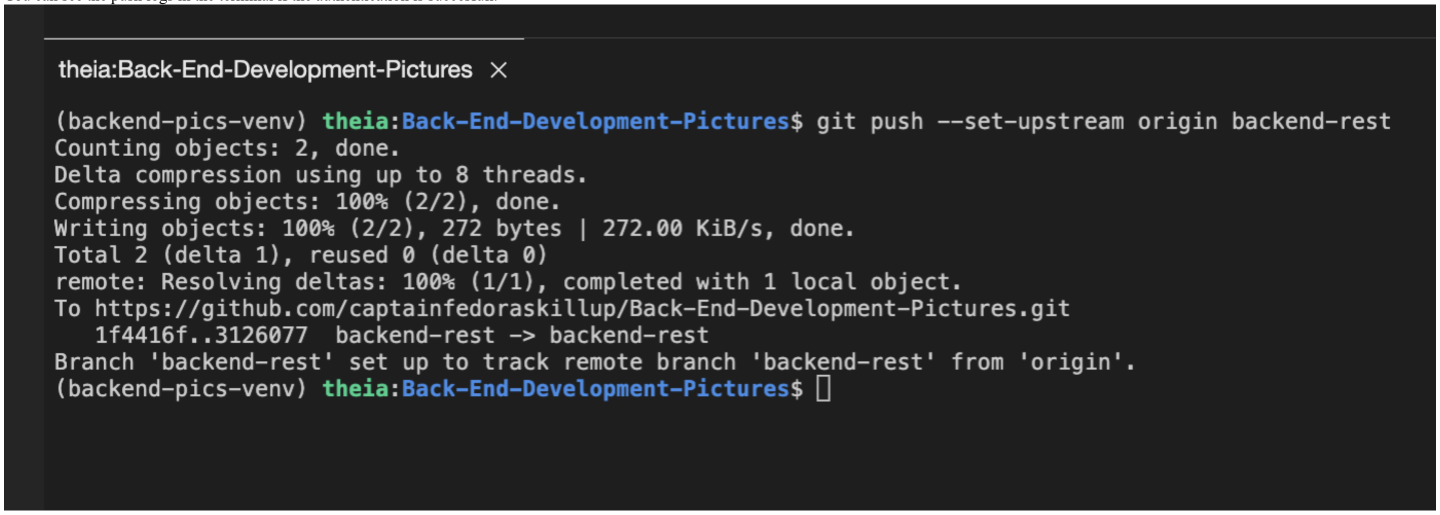
Git: https://github.com': (Press 'Enter' to confirm or 'Escape' to cancel)

```
            data[index] = picture_in
            return picture, 201

    return {"message": "picture not found"}, 404

######################################################################
# DELETE A PICTURE
######################################################################
@app.route("/picture/<int:id>", methods=["DELETE"])
def delete_picture(id):
```

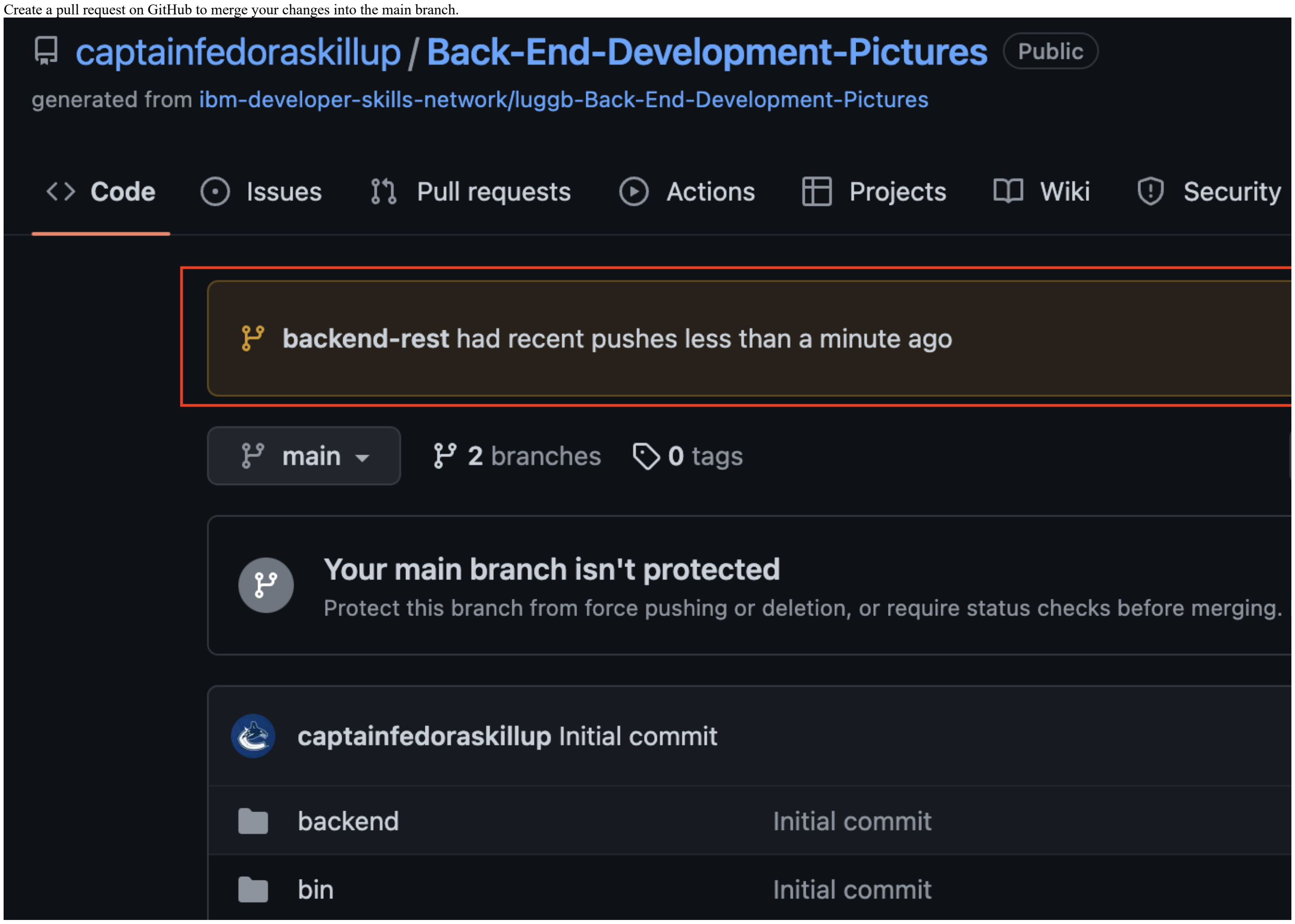
5. You can see the push logs in the terminal if the authentication is succesfull.



theia:Back-End-Development-Pictures

```
(backend-pics-venv) theia:Back-End-Development-Pictures$ git push --set-upstream origin backend-rest
Counting objects: 2, done.
Delta compression using up to 8 threads.
Compressing objects: 100% (2/2), done.
Writing objects: 100% (2/2), 272 bytes | 272.00 KiB/s, done.
Total 2 (delta 1), reused 0 (delta 0)
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
To https://github.com/captainfedoraskillup/Back-End-Development-Pictures.git
   1f4416f..3126077  backend-rest -> backend-rest
Branch 'backend-rest' set up to track remote branch 'backend-rest' from 'origin'.
(backend-pics-venv) theia:Back-End-Development-Pictures$
```

6. Create a pull request on GitHub to merge your changes into the main branch.



captainfedoraskillup / Back-End-Development-Pictures Public

generated from ibm-developer-skills-network/luggb-Back-End-Development-Pictures

backend-rest had recent pushes less than a minute ago

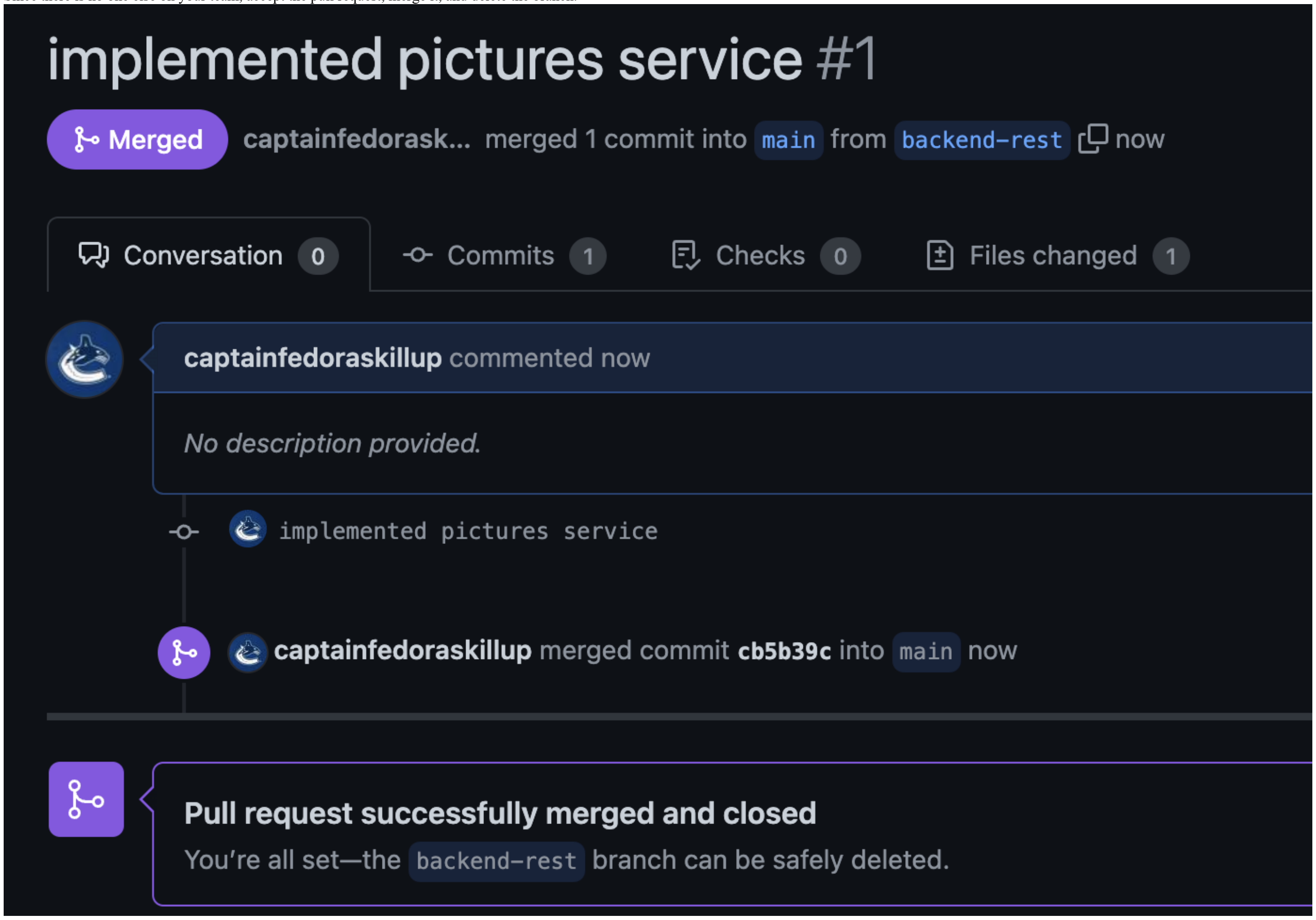
Your main branch isn't protected

Protect this branch from force pushing or deletion, or require status checks before merging.

captainfedoraskillup Initial commit

backend	Initial commit
bin	Initial commit

7. Since there is no one else on your team, accept the pull request, merge it, and delete the branch.



implemented pictures service #1

Merged captainfedorask... merged 1 commit into main from backend-rest now

captainfedoraskillup commented now

No description provided.

implemented pictures service

captainfedoraskillup merged commit cb5b39c into main now

Pull request successfully merged and closed

You're all set—the backend-rest branch can be safely deleted.

The main branch, at this point, should have your completed code.

Reference: RESTful Service

Here are some hints on the RESTful behavior of each of the endpoints.

List

- List should simply send back the list of pictures dict and return the HTTP_200_OK return code. Simply return the `data` structure.
- It should never send back a 404_NOT_FOUND.

Read

- Read should accept a picture id and traverse through the `data` to find the id.
- It should return an HTTP_404_NOT_FOUND if the picture cannot be found with a message `{"message": "picture not found"}`.
- If the picture is found, it should return the picture as a Python dictionary with a return code of HTTP_200_OK.

Create

- Create should accept only requests with the POST method.
- It will look for the picture in the incoming request.
- It should return an HTTP_302_FOUND if the picture already exists in the `data` list.
- Otherwise, it should add the incoming picture to the `data` list and return an HTTP_201_CREATED with a message `{"Message": f"picture with id {picture_in['id']} already present"}`.

Update

- Update should accept an account_id and HTTP method of PUT.
- It should return an HTTP_404_NOT_FOUND if the picture cannot be found.
- If the picture is found, it should replace the contents of the picture with the one in the request. It should return a code of HTTP_201_CREATED and the updated picture.
- If the picture is not found, it should return a code of HTTP_404_NOT_FOUND and a message `{"message": "picture not found"}`.

Delete

- Delete should accept a picture id and look for the picture in the `data` list.
- If the picture is not found, it should return a code of HTTP_404_NOT_FOUND and a message `{"message": "picture not found"}`.
- If the picture is found, it should delete the picture from the `data` list.
- It should return an empty string "" with a return code of HTTP_204_NO_CONTENT.

Write the code to make the code pass the test cases as shown above.

Hints and Solutions

This page contains the remaining hints and solutions for the List, Create, Update, and Delete REST APIs.

Hints

List

▼ Click here for a hint.

```
@app.route("{insert URL here}", methods="{insert HTTP method name here}")
def {insert method name here}():
    return {insert data list here}
```

Copied! Executed!

Read

▼ Click here for a hint.

```
@app.route("{insert URL here}", methods=["GET"])
def {insert method name here}(id):
    {enumerate the data list}:
        if picture["id"] == id:
            return picture
    return {"message": "{insert error message here}"}, {insert HTTP_NOT_FOUND_STATUS}
```

Copied! Executed!

Create

▼ Click here for a hint.

```
@app.route("{insert URL here}", methods="insert list of correct method here")
def {insert method name here}():

    # get data from the json body
    picture_in = {insert code to get json from the request here}

    # if the id is already there, return 303 with the URL for the resource
    {enumerate the picture in data list}:
        if picture_in["id"] == picture["id"]:
            return {
                "Message": f"{insert message here}"
            }, {insert HTTP code here}

    data.append(picture_in)
    return picture_in, {insert HTTP content created code here}
```

Copied! Executed!

Update

▼ Click here for a hint.

```
@app.route("{insert URL here}", methods={insert List of HTTP method here})
def {insert method name here}(id):

    # get data from the json body
    picture_in = {insert code to get json from request here}

    {insert code to enumerate picture in data list with index}:
        if picture["id"] == id:
            data[index] = picture_in
            return picture, {insert HTTP code here}

    return {"message": "insert error message here"}, {insert HTTP NOT FOUND code here}
```

Copied! Executed!

Delete

▼ Click here for a hint.

```
@app.route("{insert URL here}", methods={insert List of HTTP method here})
def {insert method name here}(id):

    {insert code to enumerate pictures in data}:
        if picture["id"] == id:
            {insert code to delete picture from data}
            return "", {insert code to return HTTP code}

    return {"message": "{insert error message here}"}, {insert code to return HTTP code}
```

Copied! Executed!

Solutions

List

▼ Click here to check your solution.

```
@app.route("/picture", methods=["GET"])
def get_pictures():
    return data
```

Copied!

Read

▼ Click here to check your solution.

```
@app.route("/picture/<int:id>", methods=["GET"])
def get_picture_by_id(id):
    for picture in data:
        if picture["id"] == id:
            return picture
    return {"message": "picture not found"}, 404
```

Copied!

Create

▼ Click here to check your solution.

```
@app.route("/picture", methods=["POST"])
def create_picture():

    # get data from the json body
    picture_in = request.json
    print(picture_in)

    # if the id is already there, return 303 with the URL for the resource
    for picture in data:
        if picture_in["id"] == picture["id"]:
            return {
                "Message": f"picture with id {picture_in['id']} already present"
            }, 302

    data.append(picture_in)
    return picture_in, 201
```

Copied!

Update

▼ Click here to check your solution.

```
@app.route("/picture/<int:id>", methods=["PUT"])
def update_picture(id):

    # get data from the json body
    picture_in = request.json

    for index, picture in enumerate(data):
        if picture["id"] == id:
            data[index] = picture_in
            return picture, 201

    return {"message": "picture not found"}, 404
```

Copied!

Delete

▼ Click here to check your solution.

```
@app.route("/picture/<int:id>", methods=["DELETE"])
def delete_picture(id):

    for picture in data:
        if picture["id"] == id:
            data.remove(picture)
            return "", 204

    return {"message": "picture not found"}, 404
```

Copied!

Conclusion

Congratulations! You have finished implementing the first microservice for getting pictures. This microservice will be used by the main site in the final lab for the project.

Next Steps

You can resume the course at this point. You will be asked to create another microservice in the next module.

Author(s)

CF

Changelog

Date	Version	Changed by	Change Description
2023-02-04	0.1	CF	Initial version created
2023-02-09	0.2	SH	QA pass with edits