

Hands-on Lab: Building and Deploying a Web App using Flask



Introduction

In this lab, we create a basic application of mathematical functions and deploy it over a web interface using Flask. The purpose is to connect all the pieces of knowledge gained in the course till now, and see the application development and deployment steps in action.

Estimated time needed: **30** minutes

Objectives

In this assignment you will:

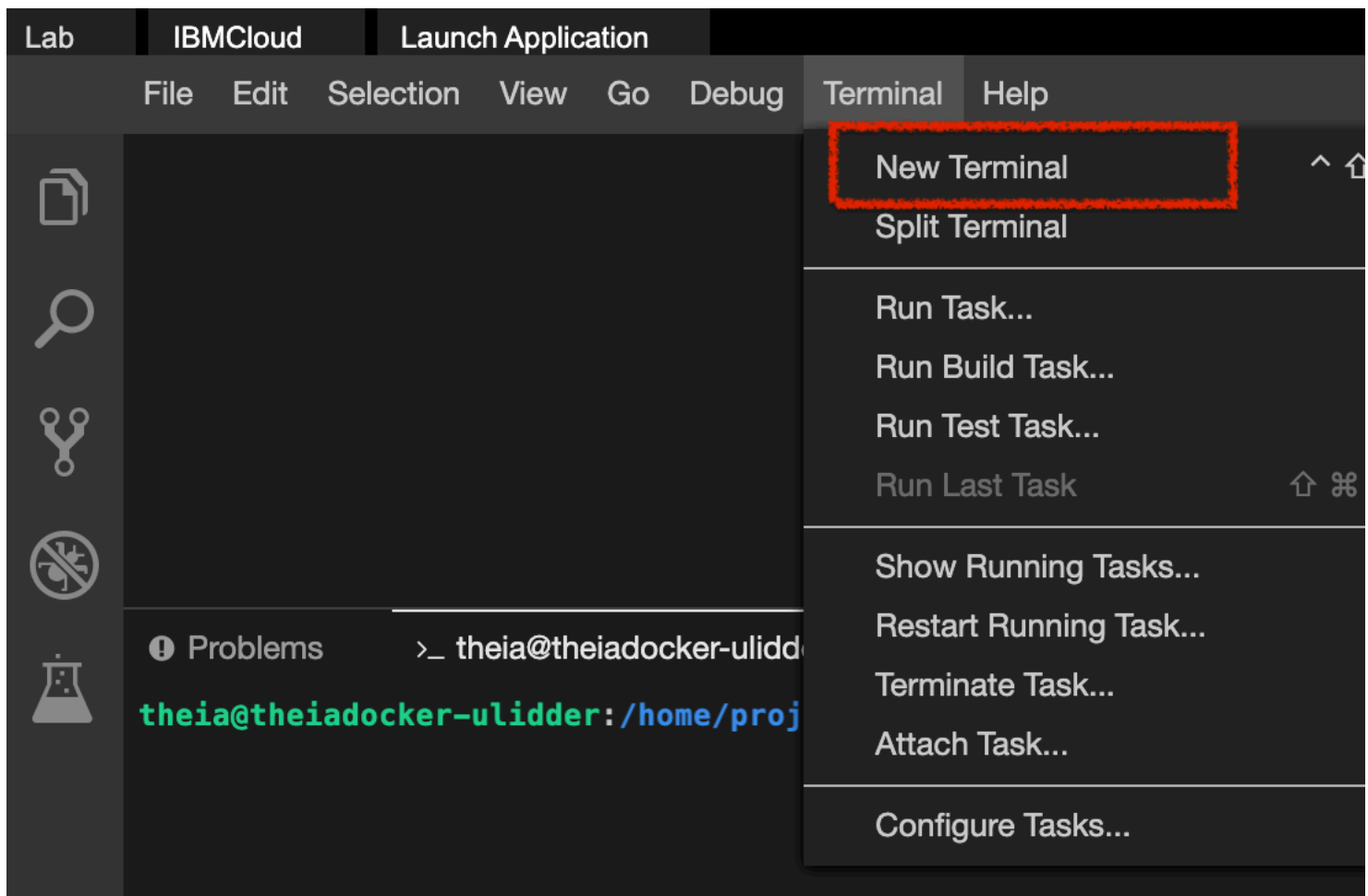
- Task 1: Create the mathematical functions.
- Task 2: Package the functions and test the package.
- Task 3: Web Deployment of the application package using Flask.

Task 1: Write the mathematical functions

In this task, you are required to write a script that has functions to add, subtract and multiply two values. Let's call this script `mathematics.py`

Follow the steps for this task.

1. Open a terminal window by using the menu in the editor: Terminal > New Terminal.



2. Go to the project home directory.

```
cd /home/project
```

3. Run the following command to Git clone the project directory from the clone URL you had copied in the prework lab.

```
git clone https://github.com/ibm-developer-skills-network/hjbsk-build_deploy_app_flask
```

4. Change to the `practice_project` folder.

```
cd /home/project/hjbsk-build_deploy_app_flask
```

5. Create folder named `Maths` and change to that directory.

```
mkdir Maths
cd Maths
```

6. In the explorer, go to the `Maths` directory and create a new file called `mathematics.py`.

7. Add function **summation** which takes in the `a` and `b` as a number arguments, in `mathematics.py`.

▼ Click here for solution

```
```python
def summation(a, b):
 result = a + b
 return result
```
```

8. Add function **subtraction** which takes in the `a` and `b` as a number arguments, in `mathematics.py`.

▼ Click here for solution

```
```python
def subtraction(a, b):
 result = a - b
 return result
```
```

9. Add function **multiplication** which takes in the `a` and `b` as a number arguments, in `mathematics.py`.

▼ Click here for solution

```
```python
def multiplication(a, b):
 result = a * b
 return result
```
```

```

mathematics.py × server.py
Maths > mathematics.py > multiplication
1  def summation(a, b):
2      result=a+b
3      return result
4
5  def subtraction(a, b):
6      result=a-b
7      return result
8
9  def multiplication(a, b):
10     result=a*b
11     return result
12

```

Task 2: Package the functions

1. Create `__init__.py` file in the directory `Maths`.

2. Import the file `mathematics.py` to the `__init__.py` file.

```
from . import mathematics
```

3. Import the package `Maths` in `server.py`.

```
from Maths.mathematics import summation, subtraction, multiplication
```

4. In the server.py, for end-point /, implement a method that renders the index.html.

```
@app.route("/")
def render_index_page():
    return render_template('index.html')
```

5. In the space provided in server.py for end-point /sum implement a method that uses the appropriate summation function through the package you created in the previous part. The function should take the arguments num1 and num2 as a float input through the request parameter and return a string output.
6. In the space provided in server.py for end-point /sub implement a method that uses the appropriate subtraction function through the package you created in the previous part. The function should take the arguments num1 and num2 as a float input through the request parameter and return a string output.
7. In the space provided in server.py for end-point /mul implement a method that uses the appropriate multiplication function through the package you created in the previous part. The function should take the arguments num1 and num2 as a float input through the request parameter and return a string output.

```
server.py > mul_route

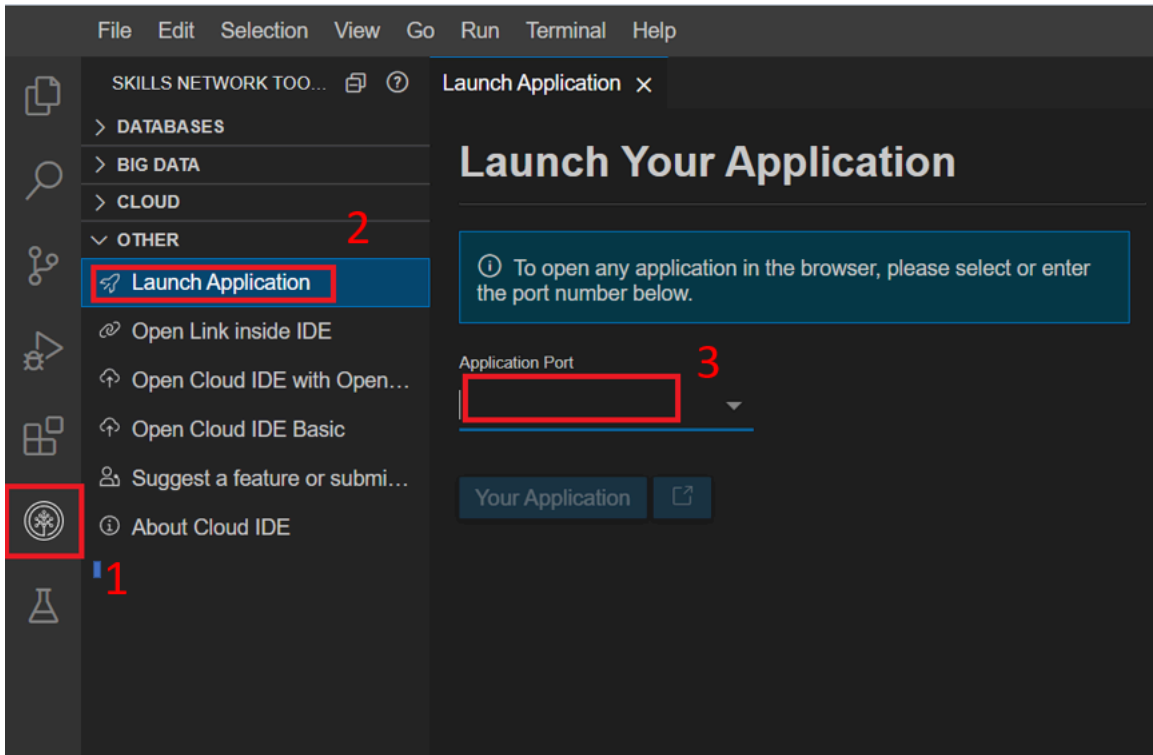
7
8   app = Flask("Mathematics Problem Solver")
9
10  @app.route("/sum")
11  def sum_route():
12      num1 = float(request.args.get('num1'))
13      num2 = float(request.args.get('num2'))
14      result = summation(num1, num2)
15      return str(result)
16
17  @app.route("/sub")
18  def sub_route():
19      num1 = float(request.args.get('num1'))
20      num2 = float(request.args.get('num2'))
21      result = subtraction(num1, num2)
22      return str(result)
23
24  @app.route("/mul")
25  def mul_route():
26      num1 = float(request.args.get('num1'))
27      num2 = float(request.args.get('num2'))
28      result = multiplication(num1, num2)
29      return str(result)
30
```

Task 3: Web Deployment of the application package using Flask

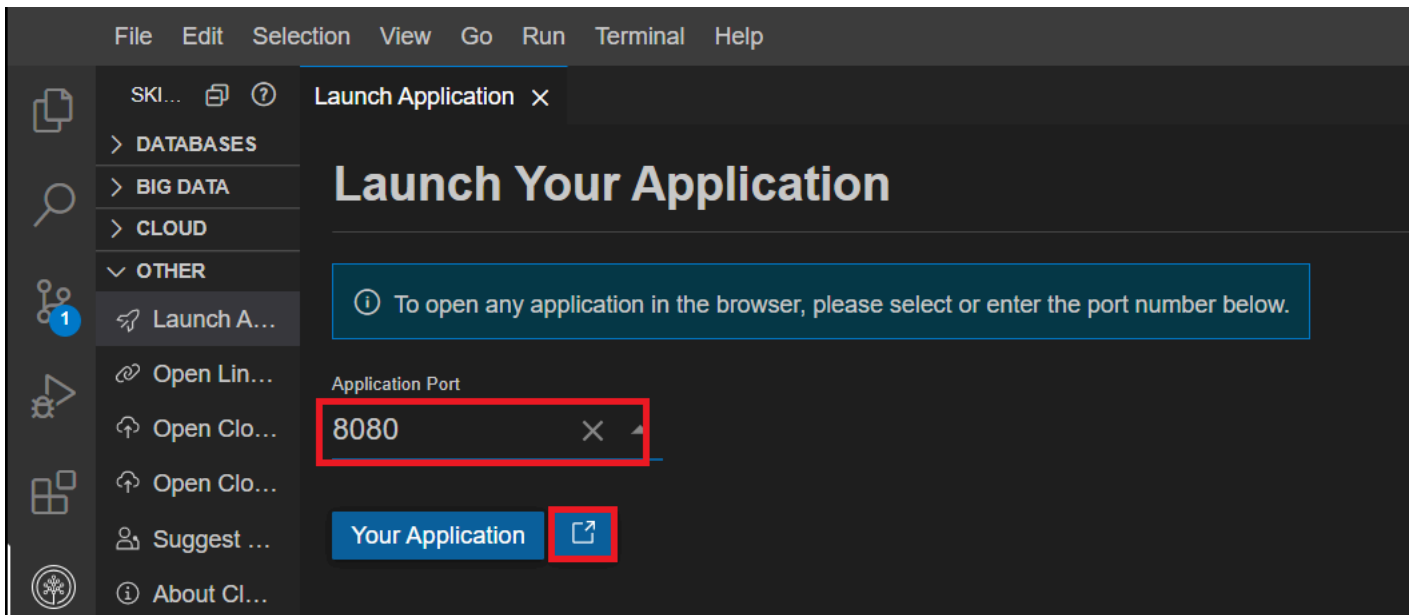
1. Change current directory on the terminal to the hjsk-build_deploy_app_flask directory and run the server from your terminal.

```
cd /home/project/hjsk-build_deploy_app_flask && python3.11 server.py
```

2. You will see that the server starts up in port 8080.
3. Click on the Skills Network button on the left, it will open the Skills Network Toolbox. Then click the Other then Launch Application. From there you should be able to enter the port number.



Connect to port 8080 and click Launch button.



4. A new browser window opens up with the index page as shown below.

Basic Mathematical App

Number 1

Number 2

Add

Subtract

Multiply

Response from server

Test your application for the desired outputs. Some examples are shown below.

Basic Mathematical App

Number 1

Number 2

Add

Subtract

Multiply

Response from server

Result: 30

Basic Mathematical App

Number 1

20

Number 2

10

Add

Subtract

Multiply

Response from server

Result: 10

Basic Mathematical App

Number 1

20

Number 2

10

Add

Subtract

Multiply

Response from server

Result: 200

(Optional) Practice exercise

Interested learners can try to incorporate error handling capability in this deployed application. For e.g. in case the interface receives non numerical entries for mathematical operations, what should the system response be?

Conclusion

Congratulations! You have completed the tasks for this project.

By the end of this lab, you have:

- 1. Created functions that perform mathematical operations.
- 2. Created a package for these functions.
- 3. Deployed the application that uses this package on localhost using Flask.

Authors

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Change Log

| Date (YYYY-MM-DD) | Version | Changed By | Change Description |
|-------------------|---------|------------------|------------------------------------|
| 2023-07-13 | 1.1 | Abhishek Gagneja | Modified the instruction set |
| 2023-06-28 | 1.0 | Shivam | Created initial version of the lab |

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