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## Unit 7: Introduction to Operating Systems

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### Activity: Developing an API for a Distributed Environment

#### Task:

In this session, you will create a RESTful API which can be used to create and delete user records. Responses to the questions should be recorded in your e-portfolio.

- **Question 1**  
Run the API.py code. Take a screenshot of the terminal output. What command did you use to compile and run the code?
- **Question 2**  
Run the following command at the terminal prompt: w3m  
http://127.0.0.1:5000/user/Ann  
What happens when this command is run, and why?
- **Question 3**  
Run the following command at the terminal prompt: w3m  
http://127.0.0.1:5000/user/Adam  
What happens when this command is run, and why?
- **Question 4**  
What capability is achieved by the flask library?
- **Architecture Evolution Activity**  
Based on your reading this week, could you write a section that might be appended to this paper, Salah et al, 2016, which would present the next phase of evolution history, from microservices to the technologies which are commonly in use today?

#### Answers:

##### Question 1

Run the API.py code. Take a screenshot of the terminal output. What command did you use to compile and run the code?

1. Flask installation

```
PROBLEMS 2 OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\pc> pip install flask flask-restful
Collecting flask
  Downloading flask-3.1.0-py3-none-any.whl.metadata (2.7 kB)
Collecting flask-restful
  Downloading Flask_RESTful-0.3.10-py2.py3-none-any.whl.metadata (1.0 kB)
Collecting Werkzeug>=3.1 (from flask)
  Downloading werkzeug-3.1.3-py3-none-any.whl.metadata (3.7 kB)
Collecting Jinja2>=3.1.2 (from flask)
  Downloading jinja2-3.1.4-py3-none-any.whl.metadata (2.6 kB)
Collecting itsdangerous>=2.2 (from flask)
  Downloading itsdangerous-2.2.0-py3-none-any.whl.metadata (1.9 kB)
Requirement already satisfied: click>=8.1.3 in c:\users\pc\appdata\local\programs\python\python312\lib\site-packages (from flask) (8.1.7)
Collecting blinker>=1.9 (from flask)
  Downloading blinker-1.9.0-py3-none-any.whl.metadata (1.6 kB)
Collecting aniso8601>=0.82 (from flask-restful)
  Downloading aniso8601-9.0.1-py2.py3-none-any.whl.metadata (23 kB)
Requirement already satisfied: six>=1.3.0 in c:\users\pc\appdata\local\programs\python\python312\lib\site-packages (from flask-restful) (1.16.0)
Collecting pytz (from flask-restful)
  Downloading pytz-2024.2-py2.py3-none-any.whl.metadata (22 kB)
Requirement already satisfied: colorama in c:\users\pc\appdata\local\programs\python\python312\lib\site-packages (from click>=8.1.3->flask) (0.4.6)
Collecting MarkupSafe>=2.0 (from Jinja2>=3.1.2->flask)
  Downloading MarkupSafe-3.0.2-cp312-cp312-win_amd64.whl.metadata (4.1 kB)
Downloading flask-3.1.0-py3-none-any.whl (102 kB)
Downloading Flask_RESTful-0.3.10-py2.py3-none-any.whl (26 kB)
```

## 2. Run the API.py code

```
cd "C:\Users\pc\Documents\00000_Essex\03_Secure Software Development\07_Unit\Activity\"
python api.py
```

```
api.py 2 X
C: > Users > pc > Documents > 00000_Essex > 03_Secure Software Development > 07_Unit > Activity > api.py > ...
25 class User(Resource):
70     def delete(self, name):
71         global users
72         users = [user for user in users if user["name"] != name]
73         return "{} is deleted.".format(name), 200
74
75 api.add_resource(User, "/user/<string:name>")

PROBLEMS 2 OUTPUT DEBUG CONSOLE TERMINAL PORTS python + v [] [] ... ^ x
PS C:\Users\pc> cd "C:\Users\pc\Documents\00000_Essex\03_Secure Software Development\07_Unit\Activity\"
PS C:\Users\pc\Documents\00000_Essex\03_Secure Software Development\07_Unit\Activity> python api.py
* Serving Flask app 'api'
* Debug mode: on
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: 467-957-544
```

## Question 2

Run the following command at the terminal prompt:

```
w3m http://127.0.0.1:5000/user/Ann
```

What happens when this command is run, and why?

1. Install w3m:

```
api.py 2 x
C: > Users > pc > Documents > 00000_Essex > 03_Secure Software Development > 07_Unit > Activity > api.py > ...
25 class User(Resource):
70 def delete(self, name):
71     global users
72     users = [user for user in users if user["name"] != name]
73     return "{} is deleted.".format(name), 200
74
75 api.add_resource(User, "/user/<string:name>")

PROBLEMS 2 OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\pc> pip install flask
Requirement already satisfied: flask in c:\users\pc\appdata\local\programs\python\python312\lib\site-packages (3.1.0)
Requirement already satisfied: Werkzeug>=3.1 in c:\users\pc\appdata\local\programs\python\python312\lib\site-packages (from flask) (3.1.3)
Requirement already satisfied: Jinja2>=3.1.2 in c:\users\pc\appdata\local\programs\python\python312\lib\site-packages (from flask) (3.1.4)
Requirement already satisfied: itsdangerous>=2.2 in c:\users\pc\appdata\local\programs\python\python312\lib\site-packages (from flask) (2.2.0)
Requirement already satisfied: click>=8.1.3 in c:\users\pc\appdata\local\programs\python\python312\lib\site-packages (from flask) (8.1.7)
Requirement already satisfied: blinker>=1.9 in c:\users\pc\appdata\local\programs\python\python312\lib\site-packages (from flask) (1.9.0)
Requirement already satisfied: colorama in c:\users\pc\appdata\local\programs\python\python312\lib\site-packages (from click>=8.1.3->flask) (0.4.6)
Requirement already satisfied: MarkupSafe>=2.0 in c:\users\pc\appdata\local\programs\python\python312\lib\site-packages (from Jinja2>=3.1.2->flask) (3.0.2)

[notice] A new release of pip is available: 24.2 -> 24.3.1
[notice] To update, run: python.exe -m pip install --upgrade pip
PS C:\Users\pc>
```

## 2. Run the API.py code

```
cd "C:\Users\pc\Documents\00000_Essex\03_Secure Software Development\07_Unit\Activity\"

python api.py
```

```
api.py 2 x
C: > Users > pc > Documents > 00000_Essex > 03_Secure Software Development > 07_Unit > Activity > api.py > ...
25 class User(Resource):
70 def delete(self, name):
71     global users
72     users = [user for user in users if user["name"] != name]
73     return "{} is deleted.".format(name), 200
74
75 api.add_resource(User, "/user/<string:name>")

PROBLEMS 2 OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\pc> cd "C:\Users\pc\Documents\00000_Essex\03_Secure Software Development\07_Unit\Activity\"
PS C:\Users\pc\Documents\00000_Essex\03_Secure Software Development\07_Unit\Activity> python api.py
* Serving Flask app 'api'
* Debug mode: on
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: 467-957-544
```

## 3. Open browser:

```
127.0.0.1:5000/user/Ann x +
127.0.0.1:5000/user/Ann
Pretty-print
{
  "name": "Ann",
  "age": 32,
  "occupation": "Doctor"
}
```

### Question 3

Run the following command at the terminal prompt: `w3m`

`http://127.0.0.1:5000/user/Adam`

What happens when this command is run, and why?



### Question 4

What capability is achieved by the flask library?

### Architecture Evolution Activity

