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LEVEL 2

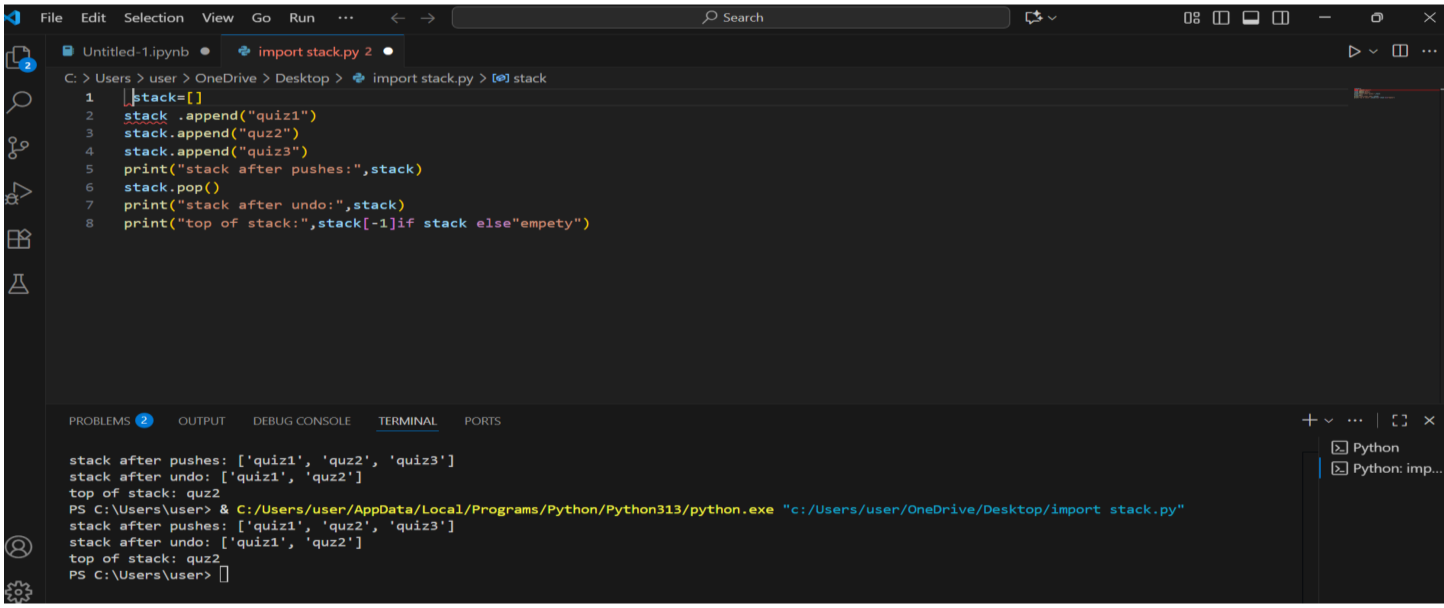
DATA STRUCTURE -BIT EXRCISES NO:4

PROJECT 60

STACK QUESTION

- ❖ Practical (RWANDA): UR pushes [“Quiz1”,” Quiz2”, “Quiz3”. Undo is top. The top of stack is Quiz 2

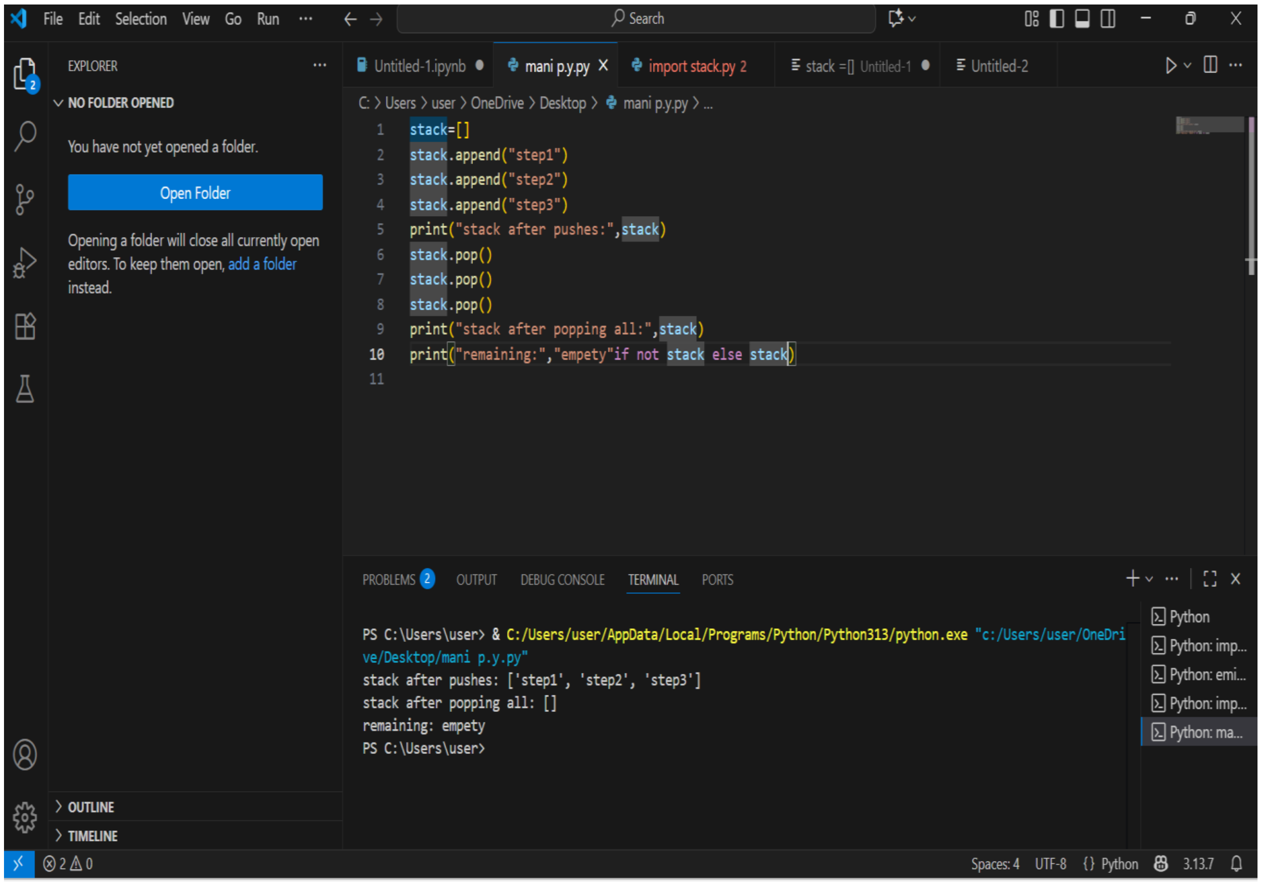
Practical



```
stack=[]
stack .append("quiz1")
stack.append("quz2")
stack.append("quiz3")
print("stack after pushes:",stack)
stack.pop()
print("stack after undo:",stack)
print("top of stack:",stack[-1]if stack else"empety")
```

```
stack after pushes: ['quiz1', 'quz2', 'quiz3']
stack after undo: ['quiz1', 'quz2']
top of stack: quz2
PS C:\Users\user> & C:/Users/user/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/user/OneDrive/Desktop/import stack.py"
stack after pushes: ['quiz1', 'quz2', 'quiz3']
stack after undo: ['quiz1', 'quz2']
top of stack: quz2
PS C:\Users\user> 
```

- ❖ Practical (RWANDA): In Irembo push [“step1”, “step2”, “step3”]. Pop all The remain is empty


File Edit Selection View Go Run ···
Search
EXPLORER
NO FOLDER OPENED
You have not yet opened a folder.
Open Folder
Opening a folder will close all currently open editors. To keep them open, add a folder instead.
OUTLINE
TIMELINE
Untitled-1.ipynb
mani p.y.py
import stack.py 2
stack =[] Untitled-1
Untitled-2
C: > Users > user > OneDrive > Desktop > mani p.y.py > ...
PROBLEMS 2
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
Python
Python: imp...
Python: emi...
Python: imp...
Python: ma...
Spaces: 4 UTF-8 {} Python 3.13.7

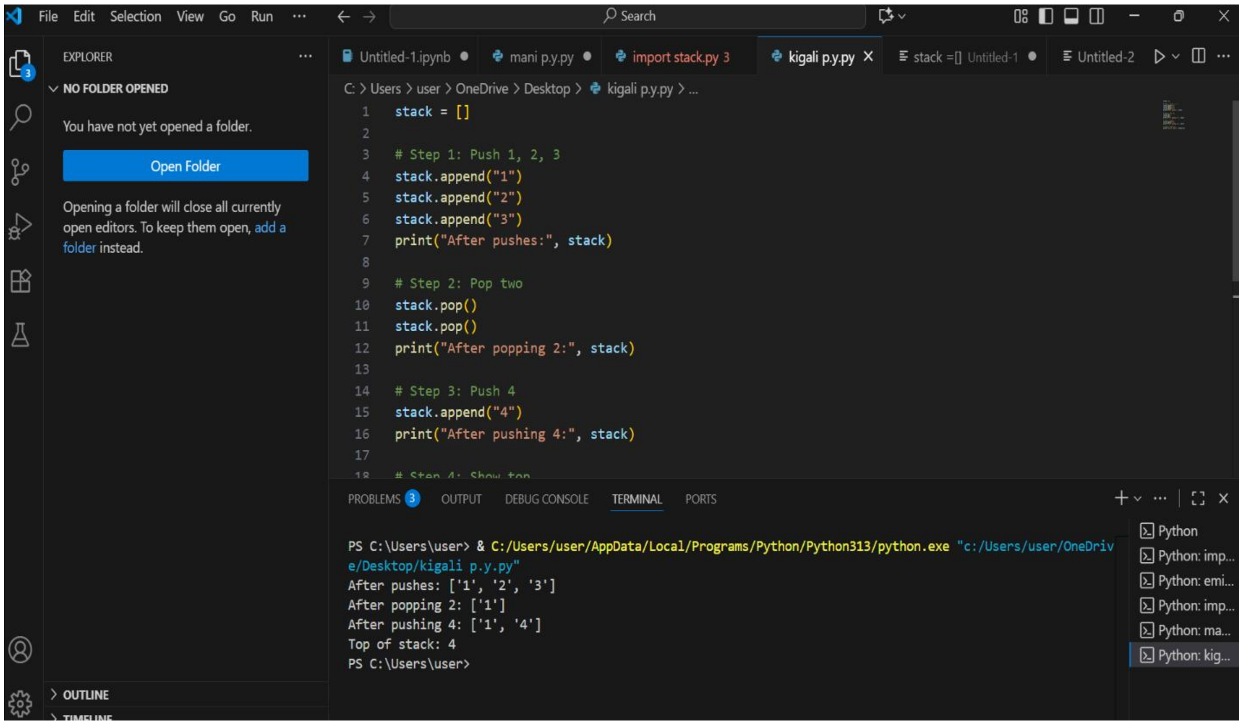
```python
stack=[]
stack.append("step1")
stack.append("step2")
stack.append("step3")
print("stack after pushes:",stack)
stack.pop()
stack.pop()
stack.pop()
print("stack after popping all:",stack)
print("remaining:","empety"if not stack else stack)
```

```
PS C:\Users\user> & C:/Users/user/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/user/OneDri
ve/Desktop/mani p.y.py"
stack after pushes: ['step1', 'step2', 'step3']
stack after popping all: []
remaining: empety
PS C:\Users\user>
```

❖ Challenge push [“1”, “2”, “3”] pop2, push”4”.

✓ Algorithmic step

- Initialize empty stack
- Push “1”, “2”, “3”
- Pop two times removes “3” then “2”
- Push”4”
- Top element is last item

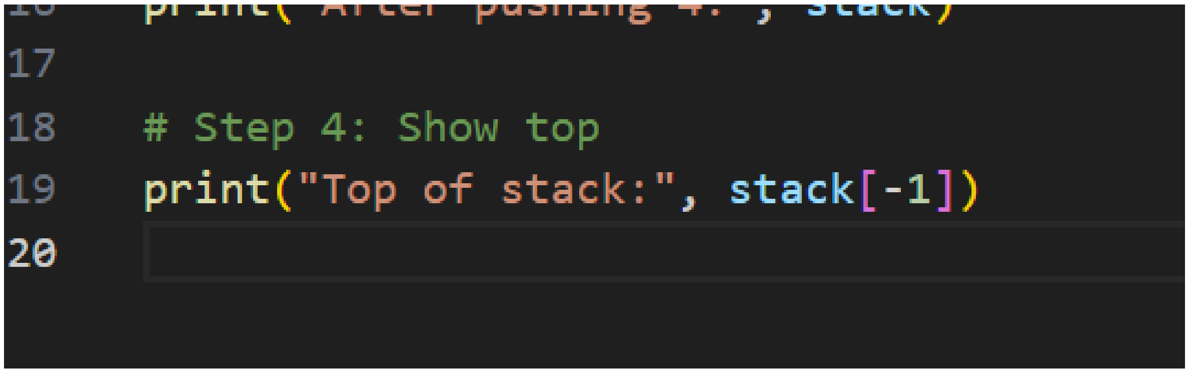


You have not yet opened a folder.

Opening a folder will close all currently open editors. To keep them open, add a folder instead.

```python
stack = []

# Step 1: Push 1, 2, 3
stack.append("1")
stack.append("2")
stack.append("3")
print("After pushes:", stack)

# Step 2: Pop two
stack.pop()
stack.pop()
print("After popping 2:", stack)

# Step 3: Push 4
stack.append("4")
print("After pushing 4:", stack)
```

```
PS C:\Users\user> & C:/Users/user/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/user/OneDriv
e/Desktop/kigali p.y.py"
After pushes: ['1', '2', '3']
After popping 2: ['1']
After pushing 4: ['1', '4']
Top of stack: 4
PS C:\Users\user>
```



```python

# Step 4: Show top
print("Top of stack:", stack[-1])

```

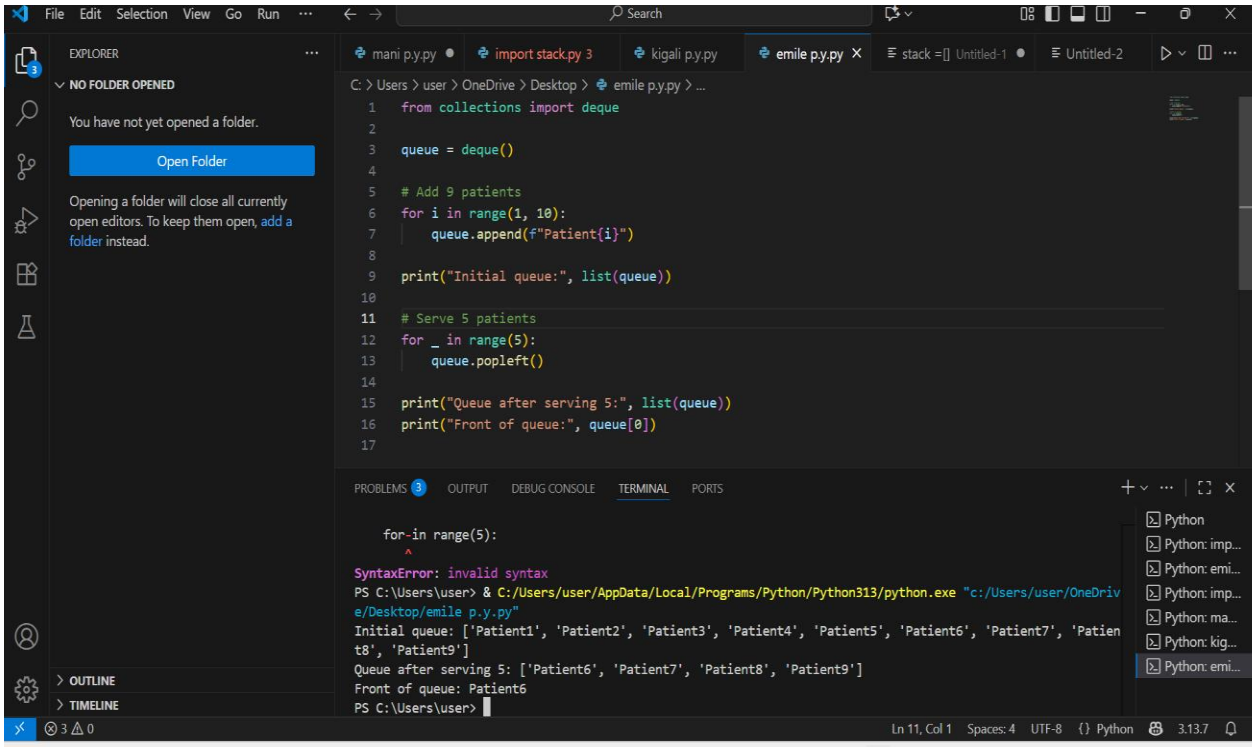
❖ Reflection: Why stack represents temporary action storage?

- Why stack represent temporary action storage?
- Because stacks follow LIFO (Last In, First Out).
- Temporary actions (like typing, navigation, undo, redo) are stored so the last action can be undone first.

- This mimics human behavior of correcting the most recent step before earlier on

  QUESTUONS

❖ Practical (RWANDA): At CHUK 9 patients' queue. After 5 who served. The front of queue :is patient 6

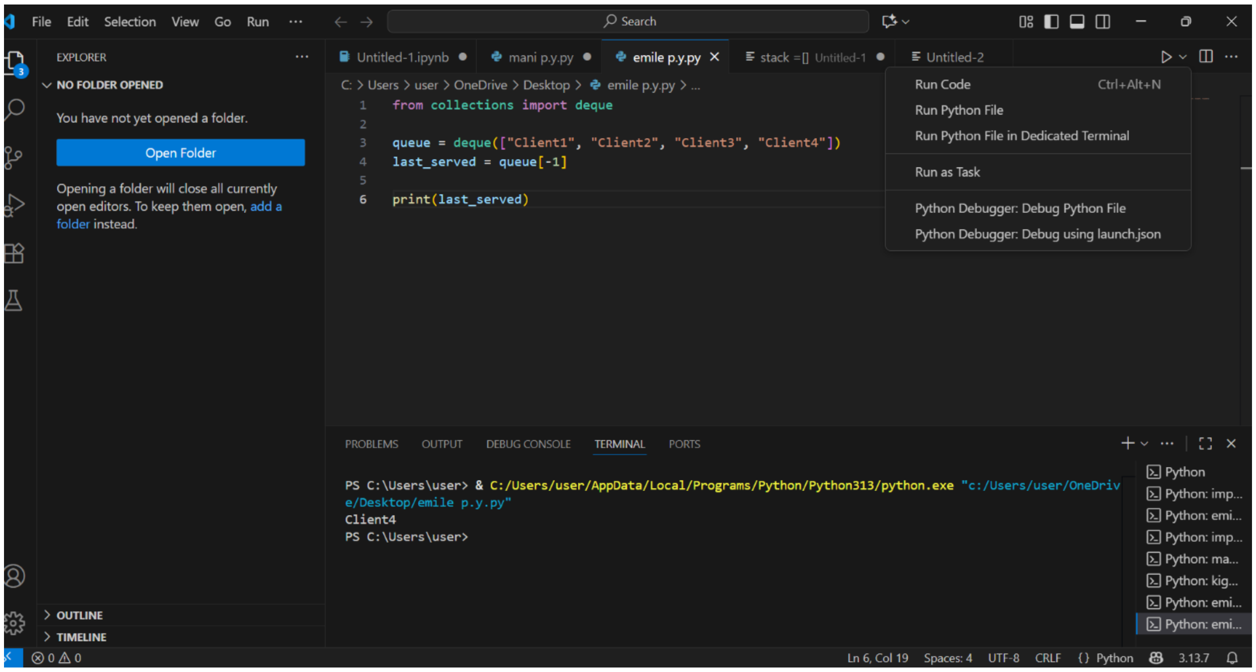


```python
from collections import deque

queue = deque()

# Add 9 patients
for i in range(1, 10):
    queue.append(f"Patient{i}")

print("Initial queue:", list(queue))

# Serve 5 patients
for _ in range(5):
    queue.popleft()

print("Queue after serving 5:", list(queue))
print("Front of queue:", queue[0])
```

```
    for-in range(5):
       ^
SyntaxError: invalid syntax
PS C:\Users\user> & C:/Users/user/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/user/OneDriv
e/Desktop/emile p.y.py"
Initial queue: ['Patient1', 'Patient2', 'Patient3', 'Patient4', 'Patient5', 'Patient6', 'Patient7', 'Patien
t8', 'Patient9']
Queue after serving 5: ['Patient6', 'Patient7', 'Patient8', 'Patient9']
Front of queue: Patient6
PS C:\Users\user>
```

❖

- Practical (Rwanda): At RSSB, 4 client's queue. The At RSSB, 4 client's queue



```python
from collections import deque

queue = deque(["Client1", "Client2", "Client3", "Client4"])
last_served = queue[-1]

print(last_served)
```

```
PS C:\Users\user> & C:/Users/user/AppData/Local/Programs/Python/Python313/python.exe "c:/Users/user/OneDrive/Desktop/emile p.y.py"
Client4
PS C:\Users\user>
```

- ❖ Challenge of Queue vs stack for boarding planes.

Queue vs Stack for boarding planes. Which is correct?

Algorithmic Reasoning:

- ➢ In boarding planes, first come, first board.
- ➢ Queue follows FIFO → correct.
- ➢ Stack would mean last to arrive boards first → unfair.
  Correct = Queue (FIFO)

- ❖ Reflection: Why FIFO maintains order at airports

- FIFO ensures fairness: passengers who arrived first board first.
- Prevents disorder, pushing, or conflict.
- Keeps the process smooth and efficient, just like queues in banks or hospitals

• Reflection: Why stack represents temporary action storage? • Reflection: Why stack represents temporary action storage?