Assignment - 7.3

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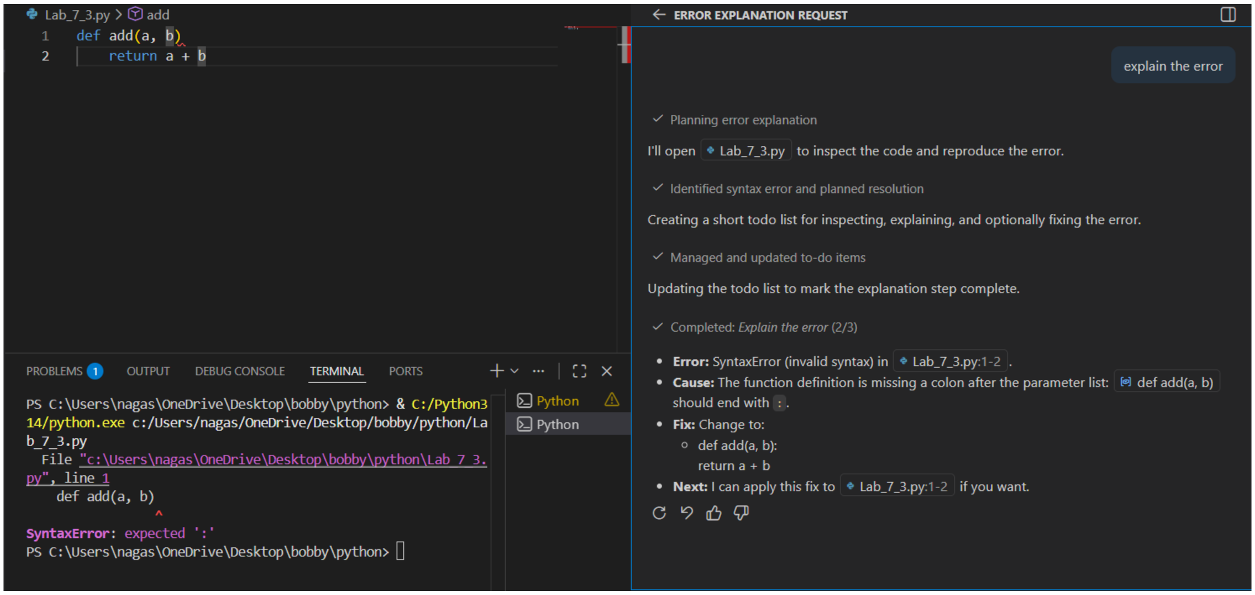
B - 27

Task 1: Fixing Syntax Errors

Buggy Code (Before Debugging):

```
def add(a, b)
    return a + b
print(add(3, 5))
```



```
def add(a, b)
    return a + b
```

```
PS C:\Users\nagas\OneDrive\Desktop\bobby\python> & C:/Python3
14/python.exe c:/Users/nagas/OneDrive/Desktop/bobby/python/La
b_7_3.py
  File "c:\Users\nagas\OneDrive\Desktop\bobby\python\Lab_7_3.
py", line 1
    def add(a, b)
                 ^
SyntaxError: expected ':'
PS C:\Users\nagas\OneDrive\Desktop\bobby\python> 
```

explain the error

✓ Planning error explanation

I'll open Lab_7_3.py to inspect the code and reproduce the error.

✓ Identified syntax error and planned resolution

Creating a short todo list for inspecting, explaining, and optionally fixing the error.

✓ Managed and updated to-do items

Updating the todo list to mark the explanation step complete.

✓ Completed: *Explain the error* (2/3)

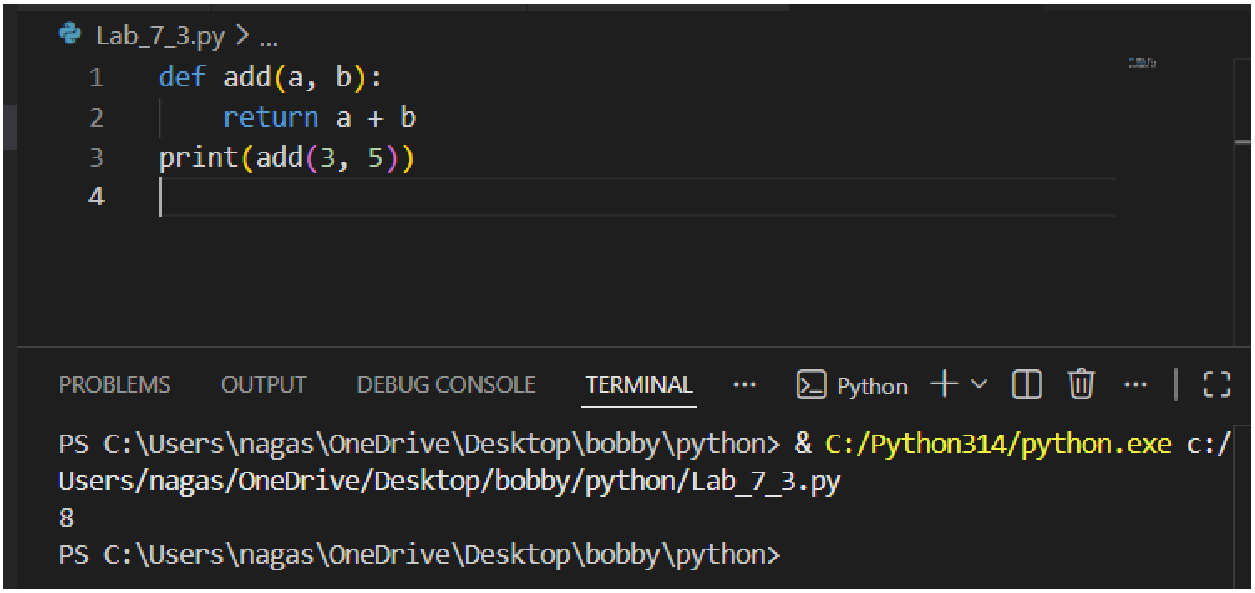
- **Error:** SyntaxError (invalid syntax) in Lab_7_3.py:1-2 .
- **Cause:** The function definition is missing a colon after the parameter list: def add(a, b) should end with `:`.
- **Fix:** Change to:
  - def add(a, b):
    return a + b
- **Next:** I can apply this fix to Lab_7_3.py:1-2 if you want.

AI-Detected Issue

- Missing colon (`:`) at the end of the function definition.
- This causes a **SyntaxError**.

Corrected Code (After Debugging):

```
def add(a, b):
    return a + b
print(add(3, 5))
```



```python
def add(a, b):
    return a + b
print(add(3, 5))

```

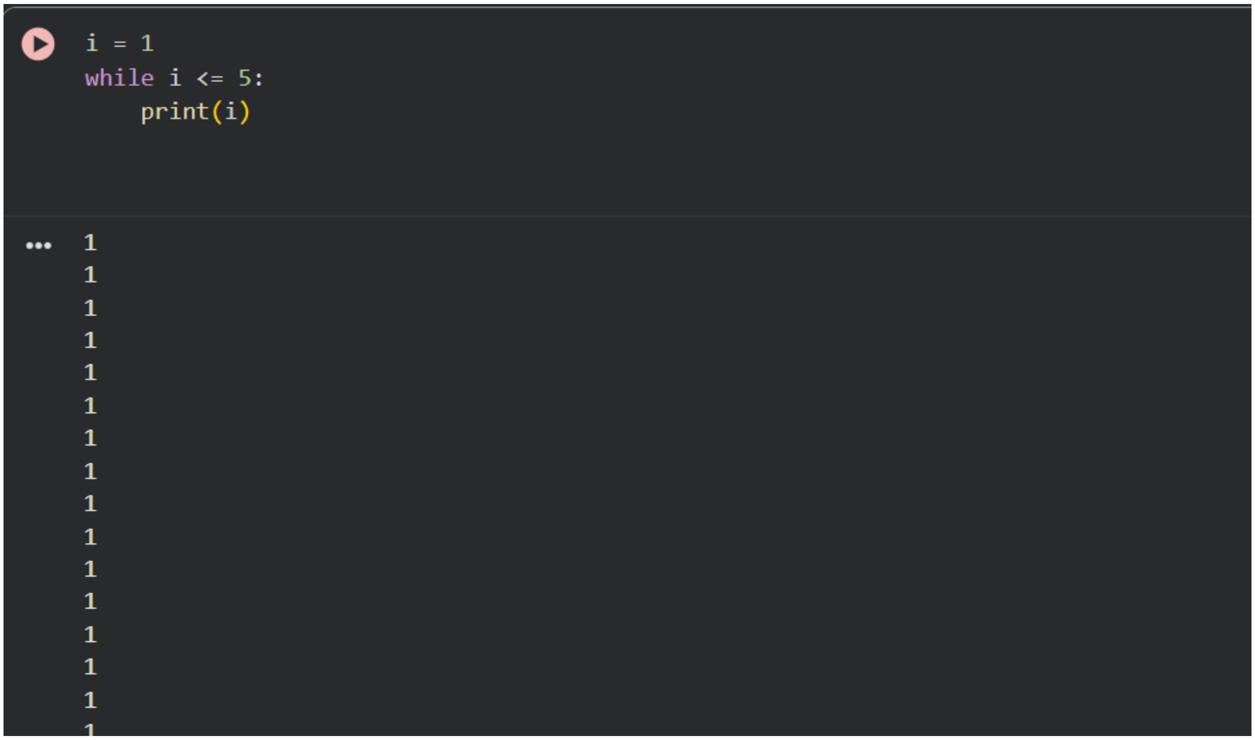
```
PS C:\Users\nagas\OneDrive\Desktop\bobby\python> & C:/Python314/python.exe c:/
Users/nagas/OneDrive/Desktop/bobby/python/Lab_7_3.py
8
PS C:\Users\nagas\OneDrive\Desktop\bobby\python>
```

AI Explanation

In Python, every function definition must end with a colon.
The missing colon caused the syntax error. Adding it fixes the issue.

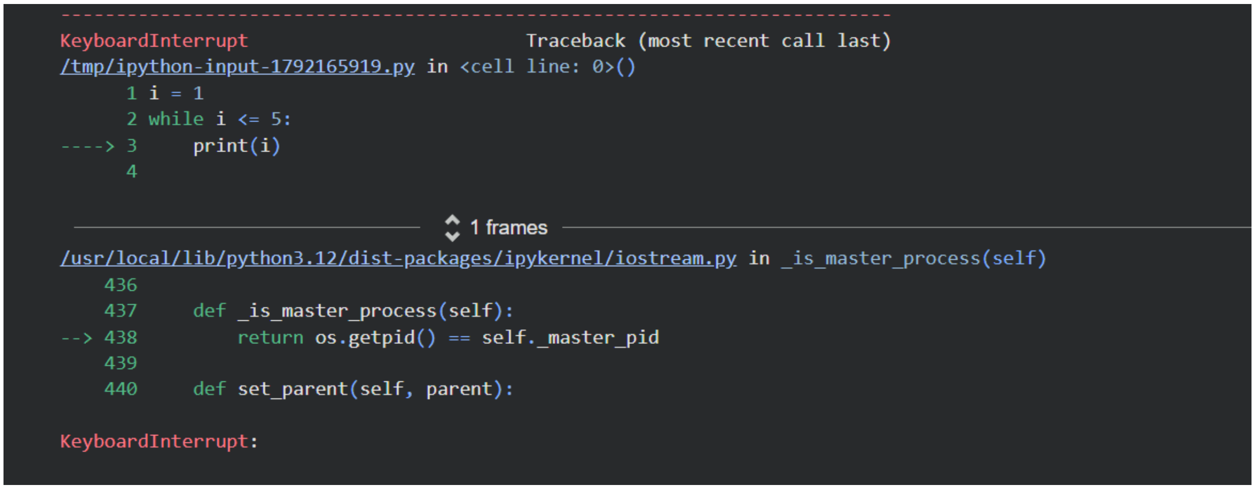
Task 2: Debugging Logic Errors in Loops

Buggy Code (Before Debugging):



```
i = 1
while i <= 5:
    print(i)
```

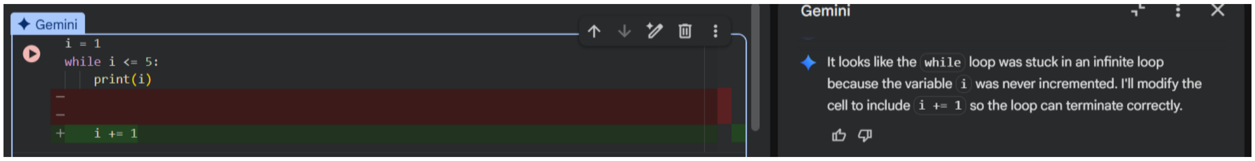
```
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
1
```



```
---------------------------------------------------------------------------
KeyboardInterrupt                         Traceback (most recent call last)
/tmp/ipython-input-1792165919.py in <cell line: 0>()
      1 i = 1
      2 while i <= 5:
----> 3     print(i)
      4

                          1 frames
/usr/local/lib/python3.12/dist-packages/ipykernel/iostream.py in _is_master_process(self)
    436
    437     def _is_master_process(self):
--> 438         return os.getpid() == self._master_pid
    439
    440     def set_parent(self, parent):

KeyboardInterrupt:
```



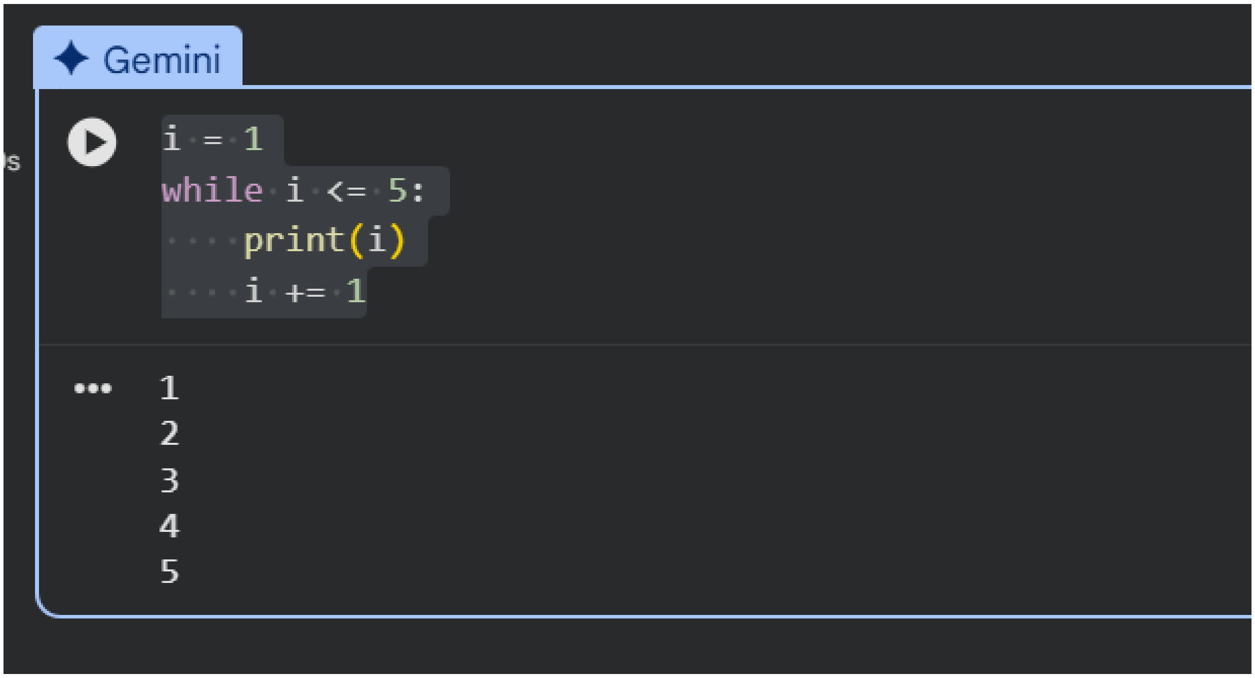
```
i = 1
while i <= 5:
    print(i)
-
-
+   i += 1
```

It looks like the `while` loop was stuck in an infinite loop because the variable `i` was never incremented. I'll modify the cell to include `i += 1` so the loop can terminate correctly.

AI-Detected Issue

- The loop variable `i` is never incremented.
- This causes an **infinite loop**.

Corrected Code (After Debugging)

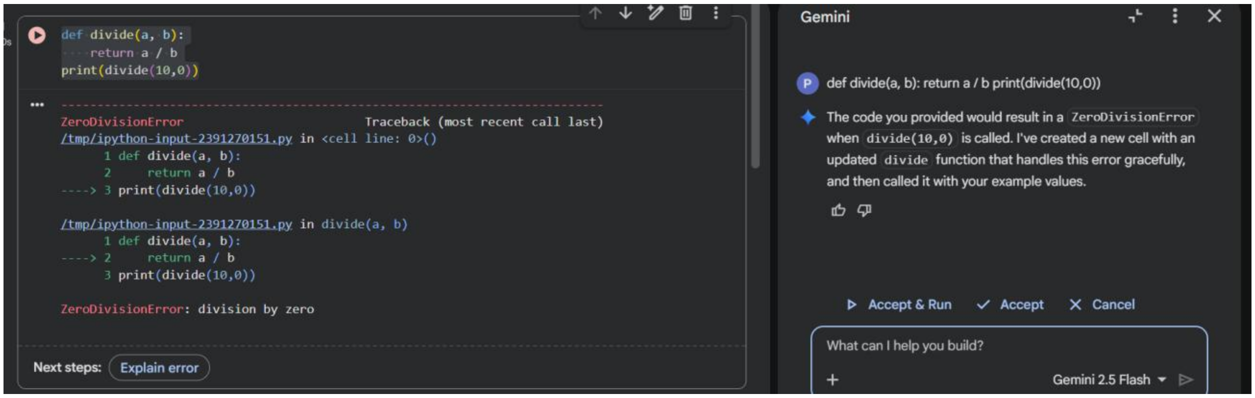


```python
i = 1
while i <= 5:
    print(i)
    i += 1
```

```
1
2
3
4
5
```

Task 3: Handling Runtime Errors (Division by Zero)

Buggy Code (Before Debugging):



```python
def divide(a, b):
    return a / b
print(divide(10,0))
```

```
---------------------------------------------------------------------------
ZeroDivisionError                         Traceback (most recent call last)
/tmp/ipython-input-2391270151.py in <cell line: 0>()
      1 def divide(a, b):
      2     return a / b
----> 3 print(divide(10,0))

/tmp/ipython-input-2391270151.py in divide(a, b)
      1 def divide(a, b):
----> 2     return a / b
      3 print(divide(10,0))

ZeroDivisionError: division by zero
```

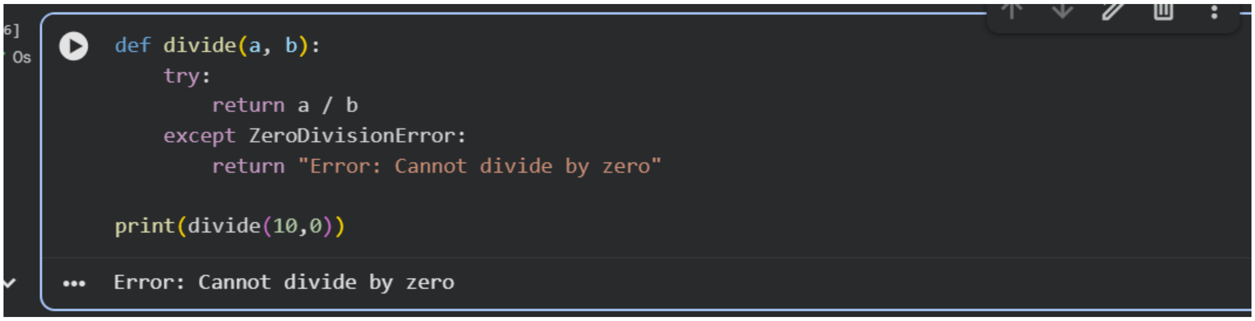
P def divide(a, b): return a / b print(divide(10,0))

The code you provided would result in a `ZeroDivisionError` when `divide(10,0)` is called. I've created a new cell with an updated `divide` function that handles this error gracefully, and then called it with your example values.

AI-Detected Issue

- If b is zero, the program crashes with **ZeroDivisionError**.

Corrected Code (After Debugging):



```
def divide(a, b):
    try:
        return a / b
    except ZeroDivisionError:
        return "Error: Cannot divide by zero"

print(divide(10,0))
```

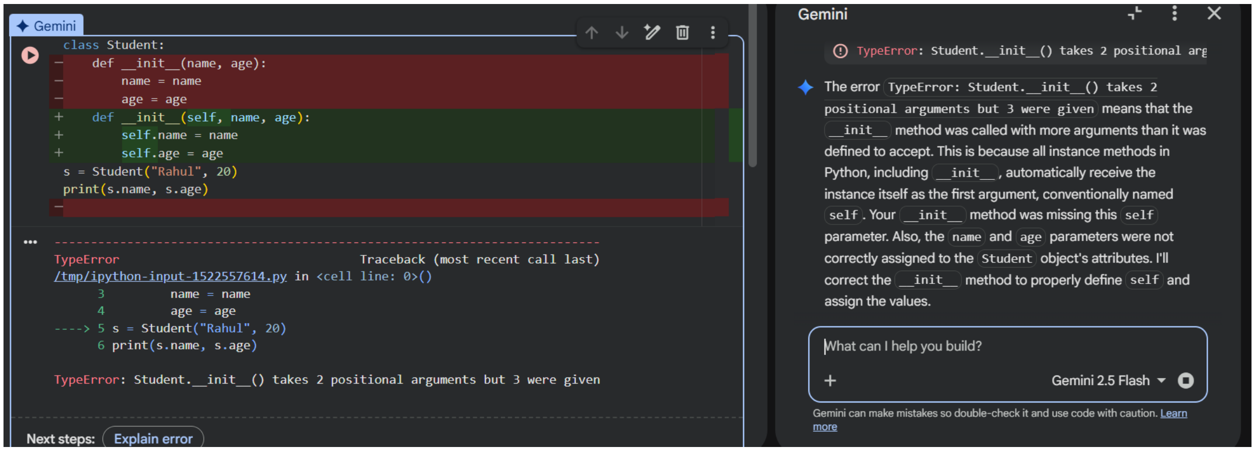
```
Error: Cannot divide by zero
```

AI Explanation

The AI used a `try-except` block to handle runtime errors safely.
This prevents the program from crashing.

Task 4: Debugging Class Definition Errors

Buggy Code (Before Debugging):



```
 class Student:
-    def __init__(name, age):
-        name = name
-        age = age
+    def __init__(self, name, age):
+        self.name = name
+        self.age = age
 s = Student("Rahul", 20)
 print(s.name, s.age)
-
```

```
---------------------------------------------------------------------------
TypeError                                 Traceback (most recent call last)
/tmp/ipython-input-1522557614.py in <cell line: 0>()
      3         name = name
      4         age = age
----> 5 s = Student("Rahul", 20)
      6 print(s.name, s.age)

TypeError: Student.__init__() takes 2 positional arguments but 3 were given
```

```
TypeError: Student.__init__() takes 2 positional arg
```

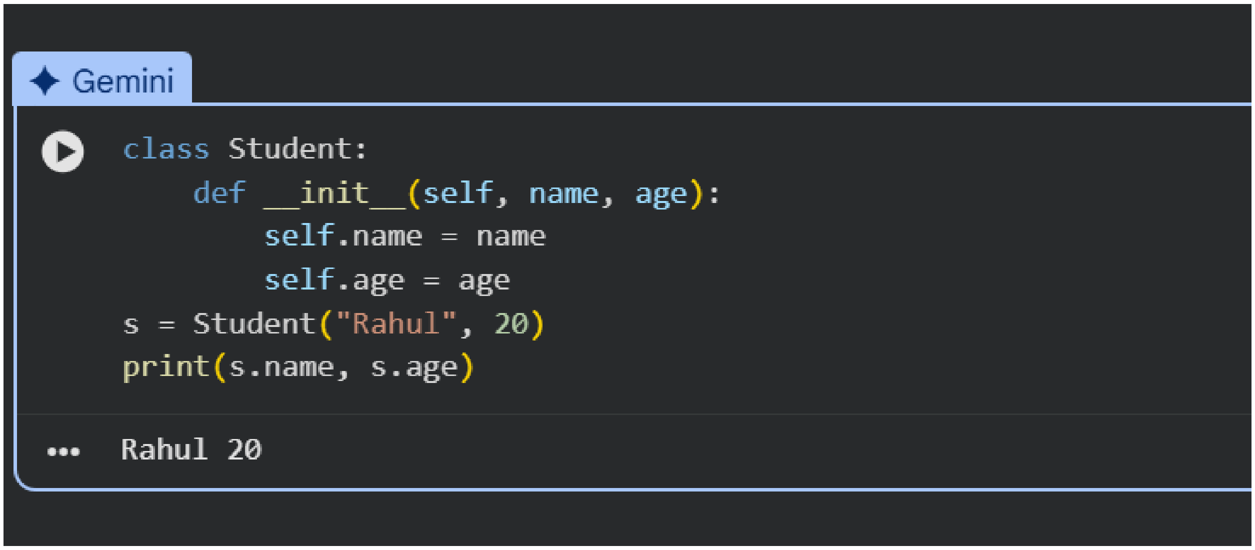
The error `TypeError: Student.__init__() takes 2 positional arguments but 3 were given` means that the `__init__` method was called with more arguments than it was defined to accept. This is because all instance methods in Python, including `__init__`, automatically receive the instance itself as the first argument, conventionally named `self`. Your `__init__` method was missing this `self` parameter. Also, the `name` and `age` parameters were not correctly assigned to the `Student` object's attributes. I'll correct the `__init__` method to properly define `self` and assign the values.

Gemini can make mistakes so double-check it and use code with caution. Learn more

AI-Detected Issue

- Missing `self` parameter in the constructor.
- Instance variables are not assigned correctly.

Corrected Code (After Debugging):

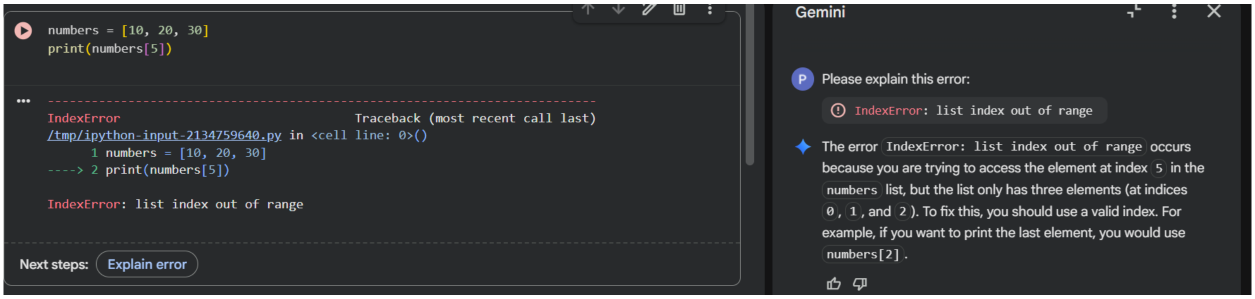


```python
class Student:
    def __init__(self, name, age):
        self.name = name
        self.age = age
s = Student("Rahul", 20)
print(s.name, s.age)
```

```
Rahul 20
```

Task 5: Resolving Index Errors in Lists

Buggy Code (Before Debugging):



```python
numbers = [10, 20, 30]
print(numbers[5])
```

```
---------------------------------------------------------------------------
IndexError                                Traceback (most recent call last)
/tmp/ipython-input-2134759640.py in <cell line: 0>()
      1 numbers = [10, 20, 30]
----> 2 print(numbers[5])

IndexError: list index out of range
```

Please explain this error:

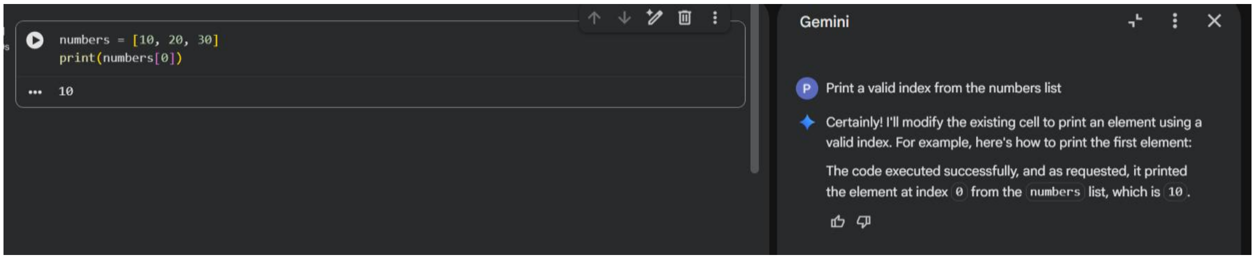
`IndexError: list index out of range`

The error `IndexError: list index out of range` occurs because you are trying to access the element at index `5` in the `numbers` list, but the list only has three elements (at indices `0`, `1`, and `2`). To fix this, you should use a valid index. For example, if you want to print the last element, you would use `numbers[2]`.

AI-Detected Issue

- Index 5 does not exist in the list.
- Causes an **IndexError**.

Corrected Code (After Debugging):



```python
numbers = [10, 20, 30]
print(numbers[0])
```

```
10
```

Print a valid index from the numbers list

Certainly! I'll modify the existing cell to print an element using a valid index. For example, here's how to print the first element:

The code executed successfully, and as requested, it printed the element at index `0` from the `numbers` list, which is `10`.