Types of Errors

In Python, there are several types of errors that can occur during the execution of a program. These errors are categorized into three main types:

1. Syntax Errors:

- Syntax errors, also known as parsing errors, occur when the code violates the syntax rules of Python.
 - These errors prevent the code from being executed.

```
Example:

print("Hello, World!)

Output:

File "<stdin>", line 1

print("Hello, World!)

^

SyntaxError: EOL while scanning string literal
```

Explanation:

- In this example, a closing quotation mark (`"`) is missing in the `print` statement. This violates the syntax rules, causing a `SyntaxError`.

2. Logical Errors:

- Logical errors occur when the code is syntactically correct, but it does not produce the expected output due to a mistake in the logic of the program.

```
Example:

def add_numbers(a, b):
    return a * b

result = add_numbers(2, 3)
print(result)

Output:

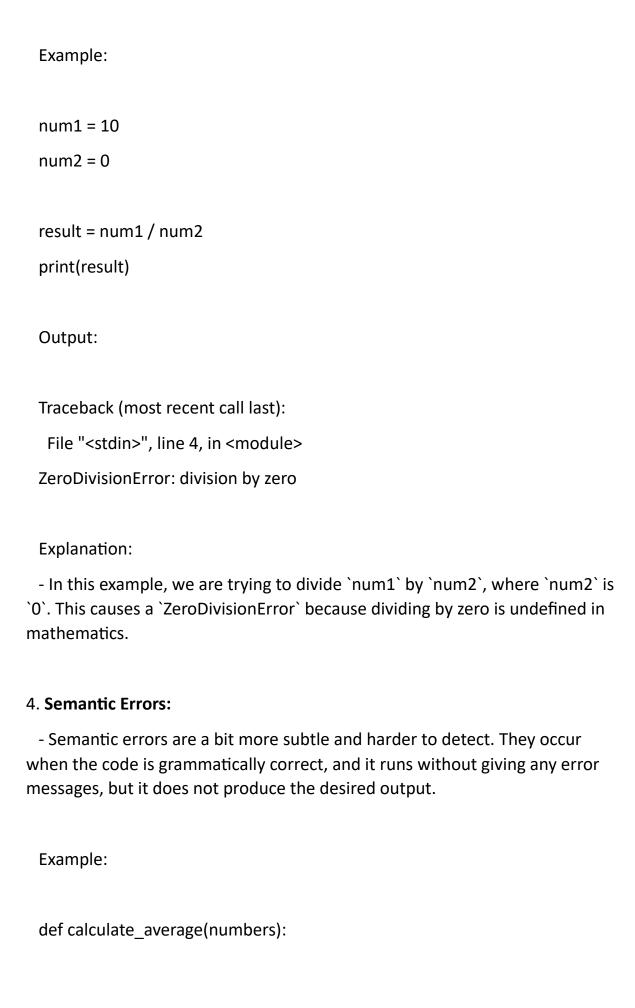
6
```

Explanation:

- In this example, the `add_numbers` function is supposed to add two numbers, but it is actually multiplying them. This is a logical error.

3. Runtime Errors (Exceptions):

- Runtime errors, also known as exceptions, occur during the execution of a program. They are not detected by the Python interpreter until the code is actually running.
- There are various types of runtime errors, such as `ZeroDivisionError`, `NameError`, `TypeError`, `ValueError`, etc.



```
total = 0
  for number in numbers:
    total = total + number
  average = total / len(numbers)
  return average
numbers = [10, 20, 30, "40"]
result = calculate_average(numbers)
print(result)
Output:
Traceback (most recent call last):
 File "<stdin>", line 9, in <module>
 File "<stdin>", line 5, in calculate_average
TypeError: unsupported operand type(s) for +: 'int' and 'str'
Explanation:
- In this example, the 'calculate average' function expects a list of numbers,
```

Understanding these different types of errors can help you debug and improve your Python programs.

but one of the elements in the list is a string ("40"). This causes a 'TypeError'

when trying to add an integer to a string.