Assignment- 5.1 & 6

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Batch: 23

Task 1:

Employee Data: Create Python code that defines a class named `Employee` with the following attributes: `empid`, `empname`, `designation`, `basic_salary`, and `exp`. Implement a method `display_details()` to print all employee details. Implement another method `calculate_allowance()` to determine additional allowance based on experience:

- If `exp > 10 years` → allowance = 20% of `basic_salary`
- If `5 ≤ exp ≤ 10 years` → allowance = 10% of `basic_salary`
- If `exp < 5 years` → allowance = 5% of `basic_salary`

Finally, create at least one instance of the `Employee` class, call the `display_details()` method, and print the calculated allowance.

Assignment-1.5 and 6.py > ...

```python
class Employee:
    def __init__(self, empid, empname, designation, basic_salary, exp):
        self.empid = empid
        self.empname = empname
        self.designation = designation
        self.basic_salary = basic_salary
        self.exp = exp
    def display_details(self):
        print(f"Employee ID:{self.empid}")
        print(f"Employee Name: {self.empname}")
        print(f"Designation: {self.designation}")
        print(f"Basic Salary:{self.basic_salary}")
        print(f"Experience:{self.exp} years")

    def calculate_allowance(self):
        if self.exp > 10:
            allowance = 0.20 * self.basic_salary
        elif 5 <= self.exp <= 10:
            allowance = 0.10 * self.basic_salary
        else:
            allowance = 0.05 * self.basic_salary
        print(f"Allowance:{allowance}")
        print(f"Total Salary: {self.basic_salary+allowance}")
empobj1=Employee(101,"Alice","Manger",80000,12)
empobj1.display_details()
empobj1.calculate_allowance
print()
empobj2=Employee(102,"vicky","HR",160000,20)
empobj2.display_details()
empobj2.calculate_allowance
```

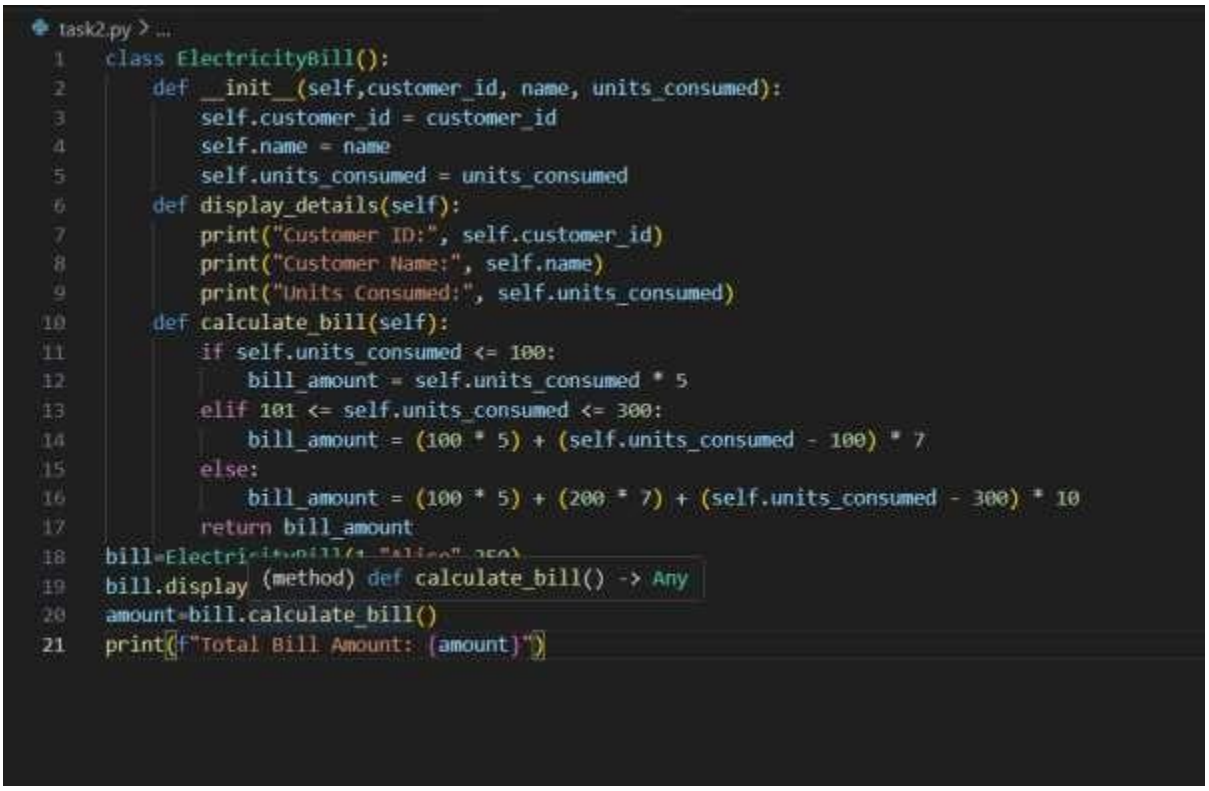
```
AttributeError: 'Employee' object has no attribute 'display_details'. Did you mean: 'display_detail'?
PS C:\Users\2303a\OneDrive\Desktop\AI> & C:\Users\2303a\miniconda3\python.exe c:/Users/2303a/OneDrive/Desktop/AI/ASS_5_04.py
Employee ID: 101
Employee Name: Alice
Designation: Manager
Basic Salary: 80000
Experience (years): 12
Allowance :16000.0
Total Salary: 96000.0
Employee ID: 102
Employee Name: Bob
Designation: Developer
Basic Salary: 60000
Experience (years): 7
Allowance :6000.0
Total Salary: 66000.0
```

Task 2:

Electricity Bill Calculation- Create Python code that defines a class named `ElectricityBill` with attributes: `customer_id`, `name`, and `units_consumed`. Implement a method `display_details()` to print customer details, and a method `calculate_bill()` where:

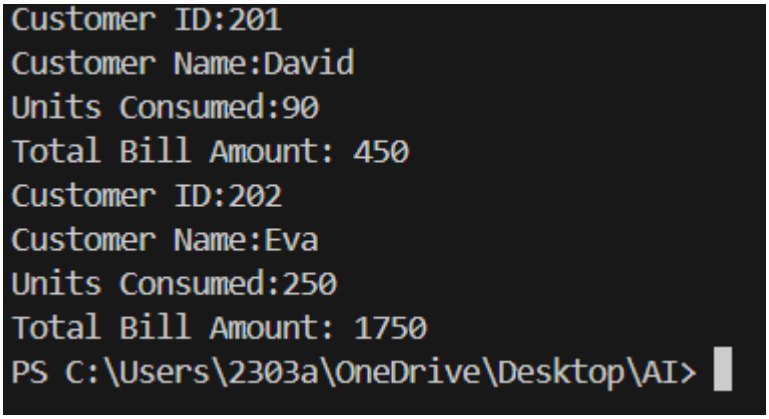
- Units ≤ 100 → ₹5 per unit
- 101 to 300 units → ₹7 per unit
- More than 300 units → ₹10 per unit

Create a bill object, display details, and print the total bill amount.



```python
class ElectricityBill():
    def __init__(self,customer_id, name, units_consumed):
        self.customer_id = customer_id
        self.name = name
        self.units_consumed = units_consumed
    def display_details(self):
        print("Customer ID:", self.customer_id)
        print("Customer Name:", self.name)
        print("Units Consumed:", self.units_consumed)
    def calculate_bill(self):
        if self.units_consumed <= 100:
            bill_amount = self.units_consumed * 5
        elif 101 <= self.units_consumed <= 300:
            bill_amount = (100 * 5) + (self.units_consumed - 100) * 7
        else:
            bill_amount = (100 * 5) + (200 * 7) + (self.units_consumed - 300) * 10
        return bill_amount
bill=Electri
bill.display
amount=bill.calculate_bill()
print(f"Total Bill Amount: {amount}")
```

(method) def calculate_bill() -> Any



```
Customer ID:201
Customer Name:David
Units Consumed:90
Total Bill Amount: 450
Customer ID:202
Customer Name:Eva
Units Consumed:250
Total Bill Amount: 1750
PS C:\Users\2303a\OneDrive\Desktop\AI>
```

Task 3:

Product Discount Calculation- Create Python code that defines a class named `Product` with attributes: `product_id`, `product_name`, `price`, and `category`. Implement a method `display_details()` to print product details. Implement another method `calculate_discount()` where:

- Electronics → 10% discount
- Clothing → 15% discount
- Grocery → 5% discount

Create at least one product object, display details, and print the final price after discount.

task3.py

```
class Product:
    def __init__(self, product_id, product_name, price, category):
        self.product_id=product_id
        self.product_name=product_name
        self.price=price
        self.category=category
    def display_details(self):
        print(f"Product ID:{self.product_id}")
        print(f"Product Name:{self.product_name}")
        print(f"Price:{self.price}")
        print(f"Category:{self.category}")
    def calculate_discount(self):
        if self.category.lower() == "electronics":
            discount = 0.10 * self.price
        elif self.category.lower() == "clothing":
            discount = 0.15 * self.price
        else:
            discount = 0.05 * self.price
        print(f"Discount Amount: {discount}")
        print(f"Price after Discount: {self.price - discount}")
prod1=Product(301,"Laptop",60000,"Electronics")
prod1.display_details()
prod1.calculate_discount()
```

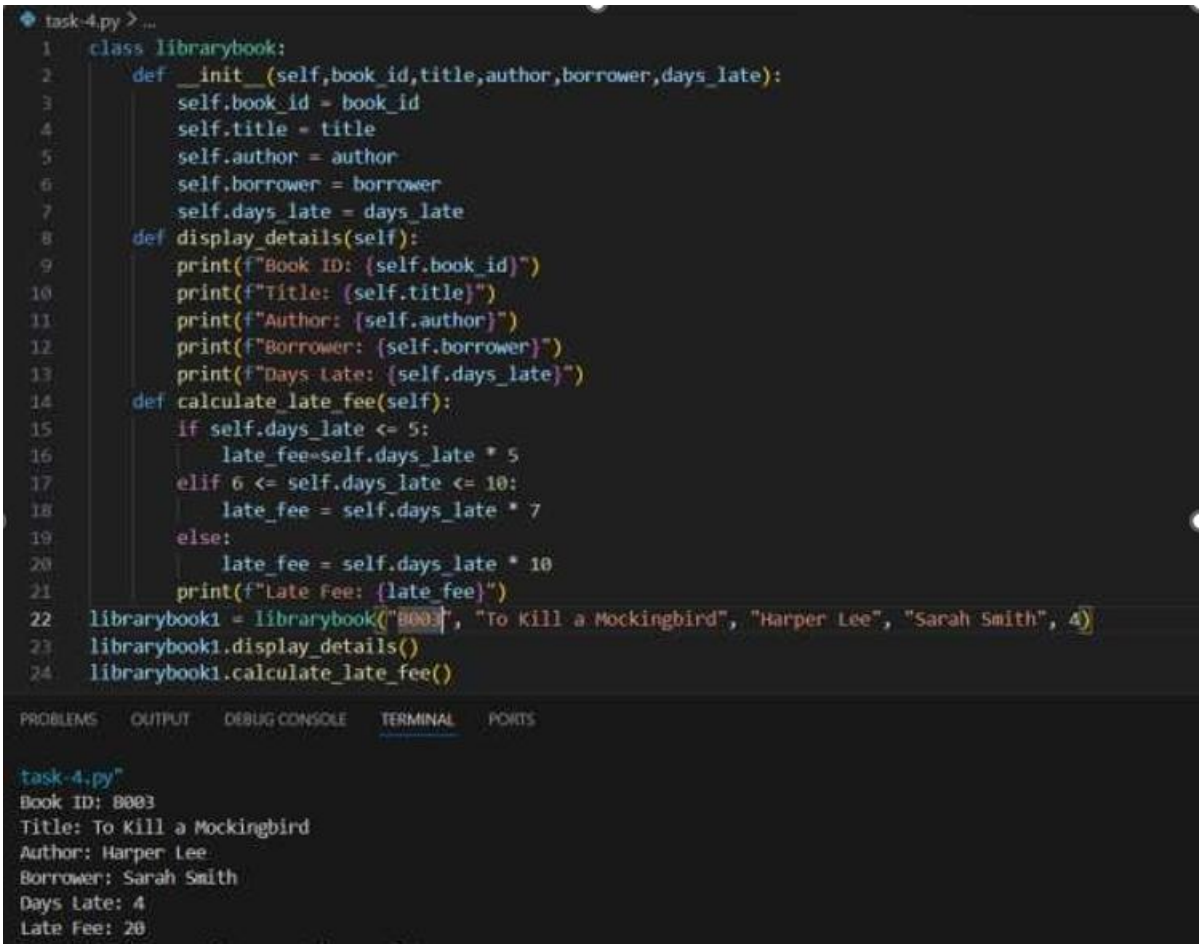
```
PS C:\Users\2303a\OneDrive\Desktop\AI> & C
Product ID:301
Product Name:Smartphone
Price:50000
Category:Electronics
Discount Amount: 5000.0
Price after Discount: 45000.0
PS C:\Users\2303a\OneDrive\Desktop\AI>
```

Task 4:

Book Late Fee Calculation- Create Python code that defines a class named `LibraryBook` with attributes: `book_id`, `title`, `author`, `borrower`, and `days_late`. Implement a method `display_details()` to print book details, and a method `calculate_late_fee()` where:

- Days late ≤ 5 → ₹5 per day
- 6 to 10 days late → ₹7 per day
- More than 10 days late → ₹10 per day

Create a book object, display details, and print the late fee.



```
task-4.py > ...
1   class librarybook:
2       def __init__(self,book_id,title,author,borrower,days_late):
3           self.book_id = book_id
4           self.title = title
5           self.author = author
6           self.borrower = borrower
7           self.days_late = days_late
8       def display_details(self):
9           print(f"Book ID: {self.book_id}")
10          print(f"Title: {self.title}")
11          print(f"Author: {self.author}")
12          print(f"Borrower: {self.borrower}")
13          print(f"Days Late: {self.days_late}")
14      def calculate_late_fee(self):
15          if self.days_late <= 5:
16              late_fee=self.days_late * 5
17          elif 6 <= self.days_late <= 10:
18              late_fee = self.days_late * 7
19          else:
20              late_fee = self.days_late * 10
21          print(f"Late Fee: {late_fee}")
22  librarybook1 = librarybook("B003", "To Kill a Mockingbird", "Harper Lee", "Sarah Smith", 4)
23  librarybook1.display_details()
24  librarybook1.calculate_late_fee()

PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

task-4.py"
Book ID: B003
Title: To Kill a Mockingbird
Author: Harper Lee
Borrower: Sarah Smith
Days Late: 4
Late Fee: 20
```

Task 5:

Student Performance Report - Define a function `student_report(student_data)` that accepts a dictionary containing student names and their marks. The function should:

- Calculate the average score for each student
- Determine pass/fail status (pass ≥ 40)
- Return a summary report as a list of dictionaries

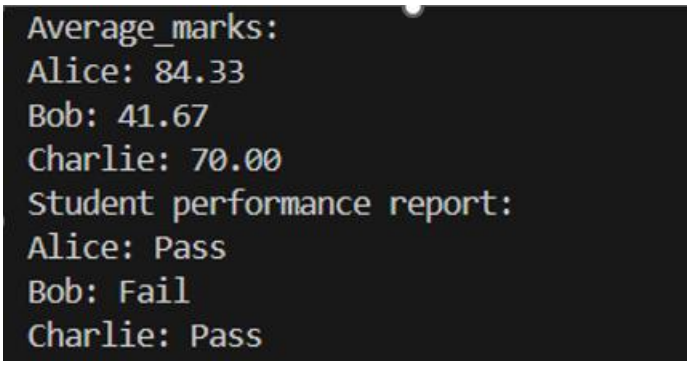
Use Copilot suggestions as you build the function and format the

output.

Assignment-5&6 > task-5.py > ...

```python
def student_performance_report(students):
    report = {}
    for name, marks in students.items():
        if marks>=40:
            report[name] = "Pass"
        else:
            report[name] = "Fail"
def calculate_average_marks(students):
    averages = {}
    for name, marks_list in students.items():
        averages[name] = sum(marks_list) / len(marks_list)
    return averages
students={
    "Alice": [85, 90, 78],
    "Bob": [35, 40, 50],
    "Charlie": [60, 70, 80]
}
average_marks = calculate_average_marks(students)
print("Average_marks:")
for name, avg in average_marks.items():
    print(f"{name}: {avg:.2f}")
performance_report ={
    name: "Pass" if all(mark >= 40 for mark in marks) else "Fail"
    for name, marks in students.items()

}
print("Student performance report:")
for name, status in performance_report.items():
    print(f"{name}: {status}")
```

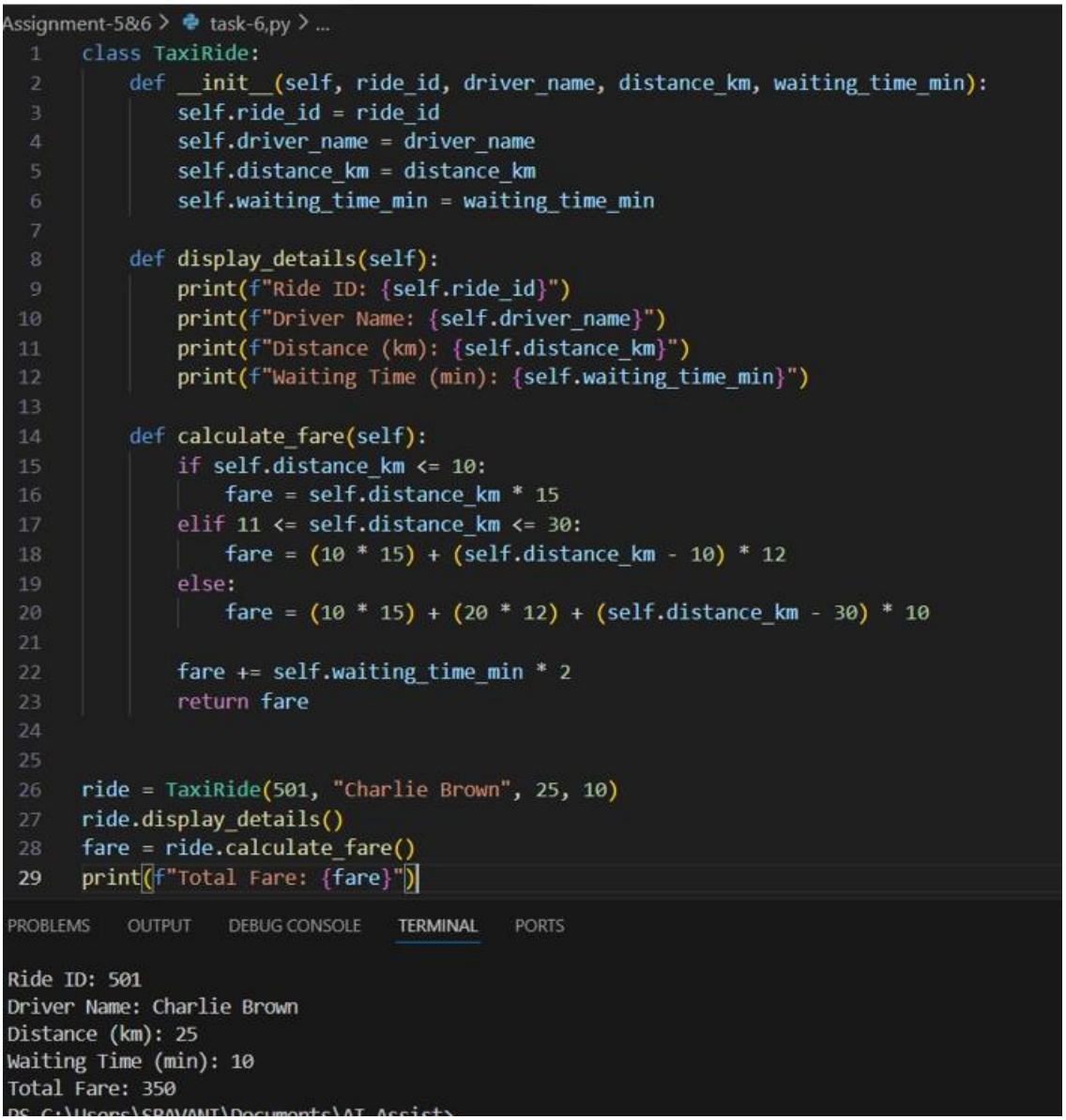


Task 6:

Taxi Fare Calculation-Create Python code that defines a class named `TaxiRide` with attributes: `ride_id`, `driver_name`, `distance_km`, and `waiting_time_min`. Implement a method `display_details()` to print ride details, and a method `calculate_fare()` where:

- ₹15 per km for the first 10 km
- ₹12 per km for the next 20 km
- ₹10 per km above 30 km
- Waiting charge: ₹2 per minute

Create a ride object, display details, and print the total fare.



Task 7:

Statistics Subject Performance - Create a Python function `statistics_subject(scores_list)` that accepts a list of 60 student scores and computes key performance statistics. The function should return the following:

- Highest score in the class
- Lowest score in the class
- Class average score
- Number of students passed (score ≥ 40)

- Number of students failed (score < 40)

Allow Copilot to assist with aggregations and logic

```python
def statistics_subject(score_list):
    total = sum(score_list)
    average = total / len(score_list)
    highest = max(score_list)
    lowest = min(score_list)
    passed = 0
    failed = 0
    for i in score_list:
        if i >= 40:
            passed += 1
        else:
            failed += 1
    print(f"Number of Students Passed: {passed}")
    print(f"Number of Students Failed: {failed}")
    return {
        "average": average,
        "highest": highest,
        "lowest": lowest
    }
scores = [
    28, 49, 33, 72, 15, 60, 95, 40, 51, 81, 22, 47, 68, 79, 34, 91, 44, 58,
    73, 38, 66, 84, 29, 50, 77, 92, 41, 36, 65, 80, 54, 87, 30, 69, 45, 71,
    39, 83, 59, 74
]
stats = statistics_subject(scores)
print(stats)
```

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

Time taken (Naive): 8.58306884765625e-06 seconds
PS C:\Users\2303a\OneDrive\Desktop\AI> (C:\Users\2303a\miniconda3\Scripts\activate) ; (conda activate base)
PS C:\Users\2303a\OneDrive\Desktop\AI> & C:\Users\2303a\miniconda3\python.exe "c:/Users/2303a/OneDrive/Desktop/AI/ASS_5.1&6.1.py"
Number of Students Passed: 30
Number of Students Failed: 10
{'average': 57.725, 'highest': 95, 'lowest': 15}
PS C:\Users\2303a\OneDrive\Desktop\AI>
```

Task Description #8 (Transparency in Algorithm Optimization)

Task: Use AI to generate two solutions for checking prime numbers:

• Naive approach(basic)

• Optimized approach

Prompt:

“Generate Python code for two prime-checking methods and explain

how the optimized version improves performance.”

Expected Output:

• Code for both methods.

• Transparent explanation of time complexity.

• Comparison highlighting efficiency improvements.

```python
# generate a program that reads a file and process the data
# Generate code with proper error handling and clear explanations for each exception.

def read_file(file_path):
    try:
        # Attempt to open the file
        with open(file_path, 'r') as file:
            data = file.read()
            print("File content successfully read.")
            return data
    except FileNotFoundError:
        # Handle the case where the file does not exist
        print(f"Error: The file at {file_path} was not found.")
    except PermissionError:
        # Handle the case where there are permission issues
        print(f"Error: You do not have permission to read the file at {file_path}.")
    except Exception as e:
        # Handle any other exceptions that may occur
        print(f"An unexpected error occurred: {e}")
file_path = 'example.txt'   # Specify the path to your file here
file_content = read_file(file_path)
if file_content:
    print("File Content:")
    print(file_content)
```

```
File content successfully read.
File Content:
Hello Everyone
Welcome to AI Assisted Coding class
Third year second semester
SR University
Lets work with files as part of lab assignment
```

Task Description #9 (Transparency in Recursive Algorithms)

Objective: Use AI to generate a recursive function to calculate

Fibonacci numbers.

Instructions:

1. Ask AI to add clear comments explaining recursion.

2. Ask AI to explain base cases and recursive calls.

Expected Output:

• Well-commented recursive code.

• Clear explanation of how recursion works.

• Verification that explanation matches actual execution.

```python
# write a code to generate a recursive function to calculate fibonacci numbers.
# - add clear comments explaining recursion.
# - also explain base cases and recursive calls.
# - verification that explanation matches actual execution.
def fibonacci(n):
    """
    Calculate the nth Fibonacci number using recursion.

    The Fibonacci sequence is defined as:
    F(0) = 0 (base case)
    F(1) = 1 (base case)
    F(n) = F(n-1) + F(n-2) for n > 1 (recursive case)

    Parameters:
    n (int): The position in the Fibonacci sequence to calculate.

    Returns:
    int: The nth Fibonacci number.
    """
    # Base cases
    if n == 0:
        return 0
    elif n == 1:
        return 1
    else:
        # Recursive case: sum of the two preceding numbers
        return fibonacci(n - 1) + fibonacci(n - 2)
# Example usage and verification
n = 6
print(f"The {n}th Fibonacci number is: {fibonacci(n)}")
# Explanation:
# When we call fibonacci(6), the function checks if n is 0 or 1. Since it's neither, it proceeds to the recursive case:
# fibonacci(6) = fibonacci(5) + fibonacci(4)
# This pattern continues, breaking down each call until it reaches the base cases:
# fibonacci(1) = 1 and fibonacci(0) = 0
```

```
The 6th Fibonacci number is: 8
```

Task Description #10 (Transparency in Error Handling)

Task: Use AI to generate a Python program that reads a file and processes data.

Prompt:

“Generate code with proper error handling and clear explanations for each exception.”

Expected Output:

• Code with meaningful exception handling.

• Clear comments explaining each error scenario.

• Validation that explanations align with runtime behavior.

```python

import time
def is_prime_naive(n):
    if n <= 1:
        return False
    for i in range(2, n):
        if n % i == 0:
            return False
    return True
start_time = time.time()
number = 29
result_naive = is_prime_naive(number)
end_time = time.time()
print(f"Naive Approach: Is {number} prime? {result_naive}")
print(f"Time taken (Naive): {end_time - start_time} seconds")

```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS

```
PS C:\Users\2303a\OneDrive\Desktop\AI> & C:\Users\2303a\miniconda3\python.exe "c:/Users/2303a/OneDrive/Desktop/AI/ASS_5.1&6.1.py"
Naive Approach: Is 29 prime? True
Time taken (Naive): 8.58306884765625e-06 seconds
PS C:\Users\2303a\OneDrive\Desktop\AI> (C:\Users\2303a\miniconda3\Scripts\activate) ; (conda activate base)
PS C:\Users\2303a\OneDrive\Desktop\AI>
```