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## 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.**

## Code:

```
class Employee:
    def __init__(self,empid,empname,designation,salary,experience):
        self.empid=empid
        self.empname=empname
        self.designation=designation
        self.salary=salary
        self.experience=experience
    def display_details(self):
            print(f"Employee ID: {self.empid}")
            print(f"Employee Name: {self.empname}")
            print(f"Designation: {self.designation}")
            print(f"Salary: {self.salary}")
            print(f"Experience: {self.experience} years")
    def caclculate_allowance(self):
```

```
        if self.experience >10:
            allowance = 0.20 * self.salary
        elif 5<=self.experience <=10:
                allowance = 0.10 * self.salary
        else:
            allowance = 0.05 * self.salary
        print(f"Allowance: {allowance}")
        print(f"Total Salary including Allowance: {self.salary + allowance}")
emp1 = Employee(101, "Alice Smith", "Manager", 80000,12)
emp1.display_details()
emp1.caclculate_allowance()
```

**output: Employee ID: 101**

**Employee Name: Alice Smith**

**Designation: Manager**

**Salary: 80000**

**Experience: 12 years**

**Allowance: 16000.0**

**Total Salary including Allowance: 96000.0**

**<u>Task 2:</u> 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.**

**Code:**

```
class ElectricityBill:
    def __init__(self,customer_id,name,units_consumed):
```

```
        self.customer_id = customer_id
        self.name = name
        self.units_consumed = 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 =self.units_consumed  * 7
        else:
            bill_amount = self.units_consumed * 10
        return bill_amount
    def display_bill(self):
        bill_amount = self.calculate_bill()
        print(f"Customer ID: {self.customer_id}")
        print(f"Customer Name: {self.name}")
        print(f"Units Consumed: {self.units_consumed}")
        print(f"Total Bill Amount: {bill_amount} INR")
# Example usage
obj1=ElectricityBill("C001","Alice",150)
obj1.display_bill()
obj2=ElectricityBill("C002","Bob",350)
obj2.display_bill()
```

**output:**

**Customer ID: C001**

**Customer Name: Alice**

**Units Consumed: 150**

**Total Bill Amount: 1050 INR**

**Customer ID: C002**

**Customer Name: Bob**

**Units Consumed: 350**

**Total Bill Amount: 3500 INR**

# 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.**

**Code:**

```
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
        return discount
```

**# Example usage**

**product1 = Product(101, "Smartphone", 500, "Electronics")**

**product1.display_details()**

**discount1 = product1.calculate_discount()**

**print(f"Discount on {product1.product_name}: {discount1}")**

**print("\n")**

**product2 = Product(202, "Jeans", 80, "Clothing")**

**product2.display_details()**

**output:**

**Product ID: 101**

**Product Name: Smartphone**

**Price: 500**

**Category: Electronics**

**Discount on Smartphone: 50.0**

**Product ID: 202**

**Product Name: Jeans**

**Price: 80**

**Category: Clothing**

## ***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.**

**Code:**

```
class LibraryBook:
    def __init__(self,book_id,title,author,borrower,days_late):
        self.book_id = book_id
        self.title = title
        self.author = author
        self.borrower = borrower
        self.days_late = days_late
    def display_details(self):
        print(f"Book ID: {self.book_id}")
        print(f"Title: {self.title}")
        print(f"Author: {self.author}")
        print(f"Borrower: {self.borrower}")
        print(f"Days Late: {self.days_late}")
    def calculate_late_fee(self):
        if self.days_late<= 5:
            fee=self.days_late * 5
        elif 6 <= self.days_late <= 10:
            fee=self.days_late * 7
        else:
            fee=self.days_late * 10
        return fee
# Example usage
book = LibraryBook(book_id=101, title="The Great Gatsby", author="F. Scott Fitzgerald",
borrower="Alice", days_late=8)
book.display_details()
late_fee = book.calculate_late_fee()
print(f"Late Fee: ${late_fee}")
```

output: Book ID: 101

Title: The Great Gatsby

Author: F. Scott Fitzgerald

Borrower: Alice

Days Late: 8

Late Fee: $56

Task 5: 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.

Code:

```
def student_report(student_marks):
    report=[]
    for name,marks in student_marks.items():
        avg_marks=sum(student_marks.values())/len(student_marks)
        if avg_marks>=40:
            status="Pass"
        else:
            status="Fail"
        report.append({"name":name,"Average Marks":avg_marks,"Status":status})
    return report
student_marks={"nikhil":85,"ram":78,"Sam":65,"phani":45}
report=student_report(student_marks)
for student in report:
    print(student)
```

**output:**

**c:/Users/nikhi/OneDrive/Attachments/Desktop/AI_assist_coding/pract5.1.py**

**{'name': 'nikhil', 'Average Marks': 68.25, 'Status': 'Pass'}**

**{'name': 'ram', 'Average Marks': 68.25, 'Status': 'Pass'}**

**{'name': 'Sam', 'Average Marks': 68.25, 'Status': 'Pass'}**

**{'name': 'phani', 'Average Marks': 68.25, 'Status': 'Pass'}**

## 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.**

**Code:**

```
class TaxiRide:
    def __init__(self, ride_id, driver_name, distance_km, waiting_time_min):
        self.ride_id = ride_id
        self.driver_name = driver_name
        self.distance_km = distance_km
        self.waiting_time_min = waiting_time_min

    def display_details(self):
        print(f"Ride ID: {self.ride_id}")
        print(f"Driver Name: {self.driver_name}")
        print(f"Distance (km): {self.distance_km}")
        print(f"Waiting Time (min): {self.waiting_time_min}")

    def calculate_fare(self):
        if self.distance_km <= 10:
```

```
        fare = self.distance_km * 15
    elif 11 <= self.distance_km <= 30:
        fare = (10 * 15) + (self.distance_km - 10) * 12
    else:
        fare = (10 * 15) + (20 * 12) + (self.distance_km - 30) * 10

    fare += self.waiting_time_min * 2
    return fare

ride = TaxiRide(501, "nikhilyams", 25, 10)
ride.display_details()
fare = ride.calculate_fare()
print(f"Total Fare: {fare}")
```

**Output:**

**Ride ID: 501**

**Driver Name: nikhilyams**

**Distance (km): 25**

**Waiting Time (min): 10**

**Total Fare: 350**

## 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**

**Code:**

```
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, 53, 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)
```

**Output:**

```
Number of Students Passed: 30
Number of Students Failed: 10
{'average': 57.775, 'highest': 95, 'lowest': 15}
```

**Task 8: 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.**

**Code: #Generate Python code for two prime-checking methods and explain how the optimized version improves performance.well commented”**

```
# Method 1: Basic Prime Checking
def is_prime_basic(n):
    """Check if a number is prime using basic method."""
    if n <= 1:
        return False
    for i in range(2, n):
        if n % i == 0:
            return False
    return True
# Method 2: Optimized Prime Checking
def is_prime_optimized(n):
    """Check if a number is prime using optimized method."""
    if n <= 1:
        return False
    if n <= 3:
        return True
    if n % 2 == 0 or n % 3 == 0:
        return False
    i = 5
```

```
    while i * i <= n:
        if n % i == 0 or n % (i + 2) == 0:
            return False
        i += 6
    return True
# Example usage
number = 29
print(f"Is {number} prime? {is_prime_basic(number)}")
print(f"Is {number} prime? {is_prime_optimized(number)}")
# Explanation of Optimization:
# The optimized method reduces the number of checks needed to determine if a number is prime.
# Instead of checking all numbers up to n, it only checks up to the square root of n.
# It also skips even numbers and multiples of 3 after initial checks, significantly improving performance for larger numbers.
#Generate Python code that extracts specific information from a nested dictionary representing student data.
```

**Output: Is 29 prime? True**

**Is 29 prime? True**

## Task 9:

**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.**

**Code: #generate a recursive function to calculate fibonacci numbers with clear comments and explain base case and recursive calls**

```
def fibonacci(n):
    """
    This function returns the nth Fibonacci number using recursion.

    Base Case:
    If n is 0, return 0.
    If n is 1, return 1.

    Recursive Case:
    For n greater than 1, return the sum of the two preceding Fibonacci numbers:
    fibonacci(n-1) + fibonacci(n-2)
    """
    if n == 0:
        return 0  # Base case: the 0th Fibonacci number is 0
    elif n == 1:
        return 1  # Base case: the 1st Fibonacci number is 1
    else:
        # Recursive case: sum of the two preceding Fibonacci numbers
        return fibonacci(n - 1) + fibonacci(n - 2)
# Example usage
num = 10
print(f"The {num}th Fibonacci number is: {fibonacci(num)}")
```

**Output: The 10th Fibonacci number is: 55**

## Task 10:

**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.**

**Code: #Generate code with proper error handling and clear explanations for each exception.**

```
# Generate a python code that reads a file and process data with well commented
def read_and_process_file(file_path):
    try:
        # Attempt to open the file
        with open(file_path, 'r') as file:
            data = file.readlines()

        # Process the data (for example, converting to uppercase)
        processed_data = [line.strip().upper() for line in data]

        return processed_data

    except FileNotFoundError:
        # Handle the case where the file does not exist
        return "Error: The file was not found. Please check the file path."

    except IOError:
        # Handle other I/O errors
        return "Error: An I/O error occurred while trying to read the file."
```

```
    except Exception as e:
        # Handle any other exceptions that may occur
        return f"An unexpected error occurred: {str(e)}"
# Example usage
file_path = 'example.txt'
result = read_and_process_file(file_path)
if isinstance(result, list):
    for line in result:
        print(line)
else:
    print(result)  # Print the error message if an error occurred
```

**Output: Error: The file was not found. Please check the file path.**