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<b>SCHOOL OF COMPUTER SCIENCE AND ARTIFICIAL INTELLIGENCE</b>		<b>DEPARTMENT OF COMPUTER SCIENCE ENGINEERING</b>	
<b>Program Name:</b> B. Tech		<b>Assignment Type:</b> Lab	<b>Academic Year:</b> 2025-2026
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<b>Course Code</b>	24CS002PC215	<b>Course Title</b>	AI Assisted Coding
<b>Year/Sem</b>	II/III	<b>Regulation</b>	R24
<b>Date and Day of Assignment</b>	Week3 – Monday	<b>Time(s)</b>	
<b>Duration</b>	2 Hours	<b>Applicable to Batches</b>	
<b>Assignment Number:6.1</b> (Present assignment number)/ <b>24</b> (Total number of assignments)			
<b>Q.No.</b>	<b>Question</b>		<b>Expected Time to complete</b>
1	Lab 6: AI-Based Code Completion – Classes, Loops, and Conditionals <b>Lab Objectives:</b> <ul style="list-style-type: none"> <li>To explore AI-powered auto-completion features for core Python constructs.</li> </ul>		Week3 - Monday

	<ul style="list-style-type: none"> <li>• To analyze how AI suggests logic for class definitions, loops, and conditionals.</li> <li>• To evaluate the completeness and correctness of code generated by AI assistants.</li> </ul> <p><b>Lab Outcomes (LOs):</b> After completing this lab, students will be able to:</p> <ul style="list-style-type: none"> <li>• Use AI tools to generate and complete class definitions and methods.</li> <li>• Understand and assess AI-suggested loops for iterative tasks.</li> <li>• Generate conditional statements through prompt-driven suggestions.</li> <li>• Critically evaluate AI-assisted code for correctness and clarity.</li> </ul> <p>Task Description #1 (Classes – Employee Management)</p> <ul style="list-style-type: none"> <li>• Task: Use AI to create an Employee class with attributes (name, id, salary) and a method to calculate yearly salary.</li> <li>• Instructions: <ul style="list-style-type: none"> <li>◦ Prompt AI to generate the Employee class.</li> <li>◦ Analyze the generated code for correctness and structure.</li> <li>◦ Ask AI to add a method to give a bonus and recalculate salary.</li> </ul> </li> </ul> <p>PROMPT: Generate a Python class named Employee with attributes name, id, and salary. Add a method to calculate the yearly salary.</p> <p>CODE:</p>	
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```

❏ employee.py

class Employee:
    def __init__(self, name, id, salary):
        self.name = name
        self.id = id
        self.salary = salary

    def calculate_yearly_salary(self):
        return self.salary * 12

    def display_info(self):
        print(f"Employee Name: {self.name}")
        print(f"Employee ID: {self.id}")
        print(f"Monthly Salary: ${self.salary}")
        print(f"Yearly Salary: ${self.calculate_yearly_salary()}")

# Example usage and output
if __name__ == "__main__":
    # Create employee objects
    emp1 = Employee("John Doe", "E001", 5000)
    emp2 = Employee("Jane Smith", "E002", 6000)

    print("Employee 1:")
    emp1.display_info()
    print()

    print("Employee 2:")
    emp2.display_info()
    print()

    # Direct method calls
    print(f"John's yearly salary: ${emp1.calculate_yearly_salary()}")

```

```

print()

# Direct method calls
print(f"John's yearly salary: ${emp1.calculate_yearly_salary()}")
print(f"Jane's yearly salary: ${emp2.calculate_yearly_salary()}")

```

Expected Output #1:

- A class with constructor, display\_details(), and calculate\_bonus() methods.

≡ text

```
Employee 1:
Employee Name: John Doe
Employee ID: E001
Monthly Salary: $5000
Yearly Salary: $60000

Employee 2:
Employee Name: Jane Smith
Employee ID: E002
Monthly Salary: $6000
Yearly Salary: $72000

John's yearly salary: $60000
Jane's yearly salary: $72000
```

#### Task Description #2 (Loops – Automorphic Numbers in a Range)

- Task: Prompt AI to generate a function that displays all Automorphic numbers between 1 and 1000 using a for loop.
- Instructions:
  - Get AI-generated code to list Automorphic numbers using a for loop.
  - Analyze the correctness and efficiency of the generated logic.
  - Ask AI to regenerate using a while loop and compare both implementations.

#### PROMPT:

Generate a Python function that displays all Automorphic numbers between 1 and 1000 using a for loop.

#### CODE:

```

def is_automorphic(n):
    """Check if a number is automorphic"""
    square = n * n
    # Convert both numbers to strings to check if square ends with the number
    return str(square).endswith(str(n))

def find_automorphic_for_loop():
    """Find automorphic numbers using for loop"""
    automorphic_numbers = []
    for i in range(1, 1001):
        if is_automorphic(i):
            automorphic_numbers.append(i)
    return automorphic_numbers

def find_automorphic_while_loop():
    """Find automorphic numbers using while loop"""
    automorphic_numbers = []
    i = 1
    while i <= 1000:
        if is_automorphic(i):
            automorphic_numbers.append(i)
        i += 1
    return automorphic_numbers

# Test both implementations
if __name__ == "__main__":
    print("Finding Automorphic Numbers between 1 and 1000")
    print("=" * 50)

```

```

# Using for loop
print("\nUsing FOR loop:")
for_result = find_automorphic_for_loop()
print(f"Automorphic numbers found: {for_result}")
print(f"Count: {len(for_result)}")

# Using while loop
print("\nUsing WHILE loop:")
while_result = find_automorphic_while_loop()
print(f"Automorphic numbers found: {while_result}")
print(f"Count: {len(while_result)}")

# Verify both methods give same results
print(f"\nBoth methods give same results: {for_result == while_result}")

# Display individual automorphic numbers with their squares
print("\nDetailed verification:")
print("Number | Square | Is Automorphic?")
print("-" * 35)
for num in for_result:
    square = num * num
    print(f"{num:6} | {square:6} | Yes")

```

Expected Output #2:

- Correct implementation that lists Automorphic numbers using both loop types, with explanation.

```

Finding Automorphic Numbers between 1 and 1000
=====

Using FOR loop:
Automorphic numbers found: [1, 5, 6, 25, 76, 376, 625]
Count: 7

Using WHILE loop:
Automorphic numbers found: [1, 5, 6, 25, 76, 376, 625]
Count: 7

Both methods give same results: True

Detailed verification:
Number | Square | Is Automorphic?
-----
1 | 1 | Yes
5 | 25 | Yes
6 | 36 | Yes
25 | 625 | Yes
76 | 5776 | Yes
376 | 141376 | Yes
625 | 390625 | Yes

```

### Task Description #3 (Conditional Statements – Online Shopping Feedback Classification)

- Task: Ask AI to write nested if-elif-else conditions to classify online shopping feedback as Positive, Neutral, or Negative based on a numerical rating (1–5).
- Instructions:
  - Generate initial code using nested if-elif-else.
  - Analyze correctness and readability.
  - Ask AI to rewrite using dictionary-based or match-case structure.

#### PROMPT:

Write Python code using nested if-elif-else statements to classify online shopping feedback as Positive, Neutral, or Negative based on a numerical rating from 1 to 5.

#### CODE:

```

def classify_feedback(rating):
    """Classify feedback based on numerical rating using nested if-elif-else"""
    if rating >= 1 and rating <= 5:
        if rating == 5:
            return "Positive - Excellent service and experience!"
        elif rating == 4:
            return "Positive - Good service with minor issues"
        elif rating == 3:
            return "Neutral - Average experience, room for improvement"
        elif rating == 2:
            return "Negative - Below average, significant issues"
        elif rating == 1:
            return "Negative - Poor experience, major problems"
    else:
        return "Invalid rating - Please provide a rating between 1 and 5"

def analyze_feedback_detailed(rating):
    """More detailed feedback analysis with nested conditions"""
    if rating >= 1 and rating <= 5:
        if rating >= 4:
            if rating == 5:
                return "Positive - Outstanding! Highly recommend"
            else: # rating == 4
                return "Positive - Satisfactory experience"
        elif rating == 3:
            return "Neutral - Acceptable but could be better"
        else: # rating <= 2
            if rating == 2:
                return "Negative - Disappointing experience"
            else: # rating == 1

```

```

                return "Negative - Very poor, avoid this service"
    else:
        return "Invalid rating - Must be between 1 and 5"

# Test the functions
if __name__ == "__main__":
    print("Online Shopping Feedback Classifier")
    print("=" * 40)

    # Test all valid ratings
    test_ratings = [1, 2, 3, 4, 5, 0, 6]

    print("\nBasic Classification:")
    print("-" * 20)
    for rating in test_ratings:
        result = classify_feedback(rating)
        print(f"Rating {rating}: {result}")

    print("\nDetailed Classification:")
    print("-" * 20)
    for rating in test_ratings:
        result = analyze_feedback_detailed(rating)
        print(f"Rating {rating}: {result}")

    # Interactive testing
    print("\n" + "=" * 40)
    print("Interactive Testing:")
    print("Enter 'quit' to exit")

    while True:
        user_input = input("\nEnter a rating (1-5): ")
        if user_input.lower() == 'quit':
            break

```

```

if user_input.lower() == 'quit':
    break

try:
    rating = int(user_input)
    basic_result = classify_feedback(rating)
    detailed_result = analyze_feedback_detailed(rating)

    print(f"\nBasic Classification: {basic_result}")
    print(f"Detailed Classification: {detailed_result}")

except ValueError:
    print("Please enter a valid number between 1 and 5")

```

Expected Output #3:

- Feedback classification function with explanation and an alternative approach.

```

Online Shopping Feedback Classifier
=====

Basic Classification:
-----
Rating 1: Negative - Poor experience, major problems
Rating 2: Negative - Below average, significant issues
Rating 3: Neutral - Average experience, room for improvement
Rating 4: Positive - Good service with minor issues
Rating 5: Positive - Excellent service and experience!
Rating 0: Invalid rating - Please provide a rating between 1 and 5
Rating 6: Invalid rating - Please provide a rating between 1 and 5

Detailed Classification:
-----
Rating 1: Negative - Very poor, avoid this service
Rating 2: Negative - Disappointing experience
Rating 3: Neutral - Acceptable but could be better
Rating 4: Positive - Satisfactory experience
Rating 5: Positive - Outstanding! Highly recommend
Rating 0: Invalid rating - Must be between 1 and 5
Rating 6: Invalid rating - Must be between 1 and 5

=====

Interactive Testing:
Enter 'quit' to exit

Enter a rating (1-5): 4

```



Basic Classification: Positive - Good service with minor issues  
Detailed Classification: Positive - Satisfactory experience

Enter a rating (1-5): 2

Basic Classification: Negative - Below average, significant issues  
Detailed Classification: Negative - Disappointing experience

Enter a rating (1-5): quit

#### Task Description #4 (Loops – Prime Numbers in a Range)

- Task: Generate a function using AI that displays all prime numbers within a user-specified range (e.g., 1 to 500).
- Instructions:
  - Get AI-generated code to list all primes using a for loop.
  - Analyze the correctness and efficiency of the prime-checking logic.
  - Ask AI to regenerate an optimized version (e.g., using the square root method).

#### PROMPT:

Write a Python function that displays all prime numbers within a user-specified range (for example, 1 to 500) using a for loop.

#### CODE:

```
def is_prime(n):  
    """Check if a number is prime"""  
    if n < 2:  
        return False  
    if n == 2:  
        return True  
    if n % 2 == 0:  
        return False  
  
    # Check only up to square root for efficiency  
    for i in range(3, int(n ** 0.5) + 1, 2):  
        if n % i == 0:  
            return False  
    return True  
  
def find_primes(start, end):  
    """Find all prime numbers in the given range"""  
    primes = []  
    for num in range(start, end + 1):  
        if is_prime(num):  
            primes.append(num)  
    return primes
```

```
# Test the function
if __name__ == "__main__":
    # Find primes from 1 to 100
    start = 1
    end = 100

    print(f"Prime numbers from {start} to {end}:")
    print("-" * 30)

    prime_list = find_primes(start, end)

    for prime in prime_list:
        print(prime, end=" ")

    print(f"\n\nTotal prime numbers found: {len(prime_list)}")
```

Expected Output #4:

- Python program that lists all prime numbers within a given range, with an optimized version and explanation.

```
Prime numbers from 1 to 100:
-----
2 3 5 7 11 13 17 19 23 29 31 37 41 43 47 53 59 61 67 71 73 79 83 89 97

Total prime numbers found: 25
```

Task Description #5 (Classes – Library System)

- Task: Use AI to build a Library class with methods to add\_book(), issue\_book(), and display\_books().
- Instructions:
  - Generate Library class code using AI.
  - Analyze if methods handle edge cases (e.g., issuing unavailable books).
  - Ask AI to add comments and documentation.

PROMPT:

Generate a Python class named Library with methods add\_book(), issue\_book(), and display\_books()

CODE:

```

class Book:
    def __init__(self, book_id, title, author):
        self.book_id = book_id
        self.title = title
        self.author = author
        self.available = True

class Library:
    def __init__(self):
        self.books = {}
        self.next_id = 1

    def add_book(self, title, author):
        """Add a new book to the library"""
        book_id = self.next_id
        self.books[book_id] = Book(book_id, title, author)
        self.next_id += 1
        print(f"Added: {title} by {author}")

    def issue_book(self, book_id, user_name):
        """Issue a book to a user"""
        if book_id not in self.books:
            print("Book not found!")
            return False

        book = self.books[book_id]
        if not book.available:
            print(f"'{book.title}' is not available")
            return False

        book.available = False
        print(f"Issued '{book.title}' to {user_name}")
        return True

    def return_book(self, book_id):

```

```

    def return_book(self, book_id):
        """Return a book to the library"""
        if book_id not in self.books:
            print("Book not found!")
            return False

        book = self.books[book_id]
        if book.available:
            print(f"'{book.title}' is already in library")
            return False

        book.available = True
        print(f"Returned '{book.title}'")
        return True

    def display_books(self):
        """Show all books and their status"""
        if not self.books:
            print("No books in library")
            return

        print("\nLibrary Books:")
        print("-" * 40)
        for book in self.books.values():
            status = "Available" if book.available else "Issued"
            print(f"ID: {book.book_id} | {book.title} | {book.author} | {status}")

Test the Library
__name__ == "__main__":
    # Create Library
    library = Library()

```

```

# Add books
print("Adding books:")
library.add_book("Python Basics", "John Smith")
library.add_book("Data Science", "Jane Doe")
library.add_book("Web Development", "Bob Johnson")

# Display all books
library.display_books()

# Issue books
print("\nIssuing books:")
library.issue_book(1, "Rithika")
library.issue_book(2, "Alex")

# Try to issue unavailable book
library.issue_book(1, "Tom")

# Display current status
library.display_books()

# Return a book
print("\nReturning book:")
library.return_book(1)

# Final display
library.display_books()

```

Expected Output #5:

- Library class with all methods, inline comments, and explanation.

```

Adding books:
Added: Python Basics by John Smith
Added: Data Science by Jane Doe
Added: Web Development by Bob Johnson

Library Books:
-----
ID: 1 | Python Basics | John Smith | Available
ID: 2 | Data Science | Jane Doe | Available
ID: 3 | Web Development | Bob Johnson | Available

Issuing books:
Issued 'Python Basics' to Rithika
Issued 'Data Science' to Alex
'Python Basics' is not available

Library Books:
-----
ID: 1 | Python Basics | John Smith | Issued
ID: 2 | Data Science | Jane Doe | Issued
ID: 3 | Web Development | Bob Johnson | Available

Returning book:
Returned 'Python Basics'

Library Books:
-----
ID: 1 | Python Basics | John Smith | Available
ID: 2 | Data Science | Jane Doe | Issued
ID: 3 | Web Development | Bob Johnson | Available

```

Note: Report should be submitted a word document for all tasks in a single document with prompts, comments & code explanation, and output and if required, screenshots

#### Evaluation Criteria:

Criteria	Max Marks
Class	1.0
Loops	1.0
Conditional Statements	0.5
<b>Total</b>	<b>2.5 Marks</b>