

Lab 6: AI-Based Code Completion – Classes, Loops, and Conditionals

Week3-Wednesday

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Lab Objectives

- To explore AI-powered auto-completion features for Python classes, loops, and conditionals.
- To analyze AI-suggested logic for object-oriented programming and control structures.
- To evaluate correctness, readability, and completeness of AI-generated code.

Lab Outcomes (LOs)

After completing this lab, students will be able to:

- Use AI tools to generate Python classes and methods.
- Understand and assess AI-suggested loop constructs.
- Generate and evaluate conditional statements.
- Critically analyze AI-assisted code.

Task 1: Classes – Student Class

Prompt Used:

"Generate a Python Student class with name, roll number, branch, and a method to display details."

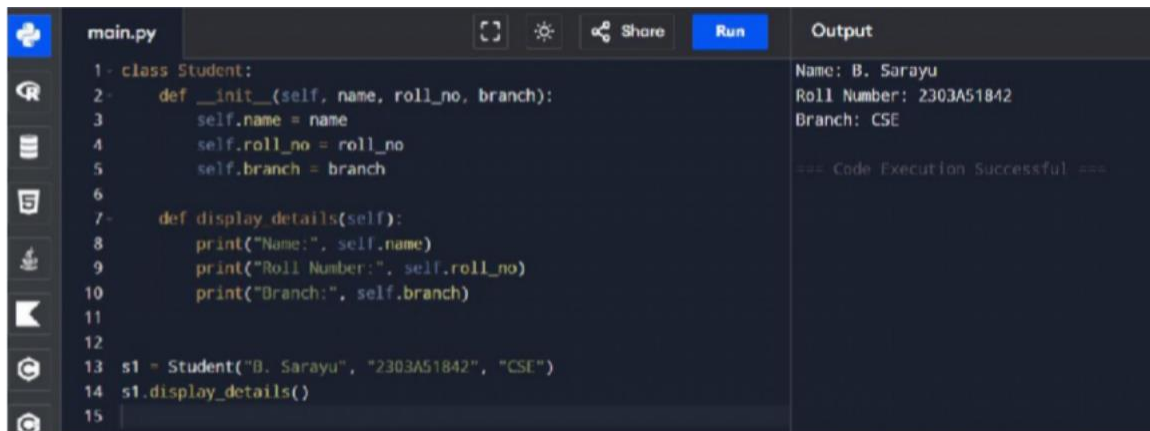
```
class Student
    def __init__(self, name, roll_no, branch):
        self.name = name
        self.roll_no = roll_no
        self.branch = branch

    def display_details(self):
        print("Name:", self.name)
        print("Roll Number:", self.roll_no)
        print("Branch:", self.branch)
```

```
s1 = Student("B.t", "2303A51489", "CSE")
s1.display_details()
```

Output:

Name: B.t



The screenshot shows a code editor with a file named 'main.py'. The code defines a class 'Student' with an '__init__' method that takes 'name', 'roll_no', and 'branch' as arguments and assigns them to instance variables. It also has a 'display_details' method that prints the values of these variables. In the main part of the code, an instance 's1' of the 'Student' class is created with the values 'B. Sarayu', '2303A51842', and 'CSE', and the 'display_details' method is called on it. The output panel on the right shows the printed details: 'Name: B. Sarayu', 'Roll Number: 2303A51842', and 'Branch: CSE', followed by a success message '=== Code Execution Successful ==='.

```
1- class Student:
2-     def __init__(self, name, roll_no, branch):
3-         self.name = name
4-         self.roll_no = roll_no
5-         self.branch = branch
6-
7-     def display_details(self):
8-         print("Name:", self.name)
9-         print("Roll Number:", self.roll_no)
10-        print("Branch:", self.branch)
11-
12-
13- s1 = Student("B. Sarayu", "2303A51842", "CSE")
14- s1.display_details()
15-
```

Output

Name: B. Sarayu
Roll Number: 2303A51842
Branch: CSE

=== Code Execution Successful ===

Analysis: The AI-generated class is well-structured, readable, and correctly uses a constructor and instance method.

Task 2: Loops – Multiples of a Number

Prompt Used "Generate Python code to print first 10 multiples of a number using loops."

Using for loop:

```
def multiples_for(n)
    for i in range(1, 11):
        print(n*i)
```

multiples_for(5

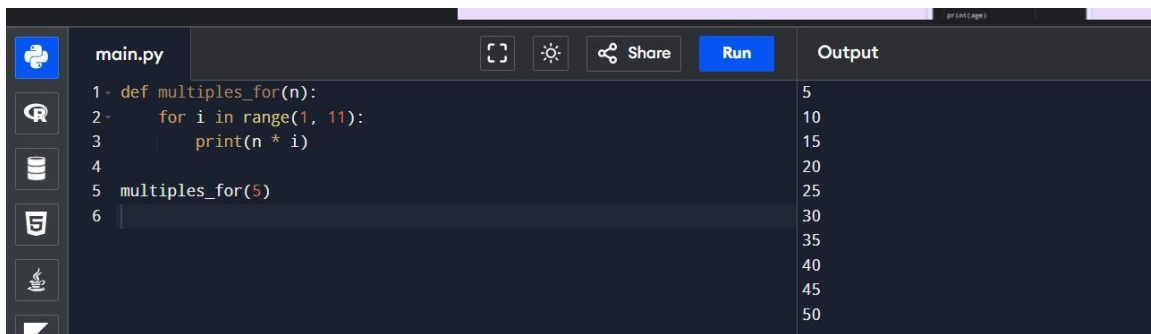
Using while loop:

```
def multiples_while(n)
    : i=1
    while i<=10:
        print(n*i)
        i+=1
```

multiples_while(5

Output:

5101520253035404550



```
main.py
1 def multiples_for(n):
2     for i in range(1, 11):
3         print(n * i)
4
5 multiples_for(5)
6
```

Output

5
10
15
20
25
30
35
40
45
50

Analysis:

The for loop is concise and readable, while the while loop provides explicit control over iteration.

Task 3: Conditional Statements – Age Classification

Prompt Used:

"Generate Python code to classify age using if-elif-else."

```
def classify_age(age):
```

```
    if age < 13:
```

```
        return "Child"
```

```
    elif age < 20:
```

```
        return "Teenager"
```

```
    elif age < 60:
```

```
        return "Adult"
```

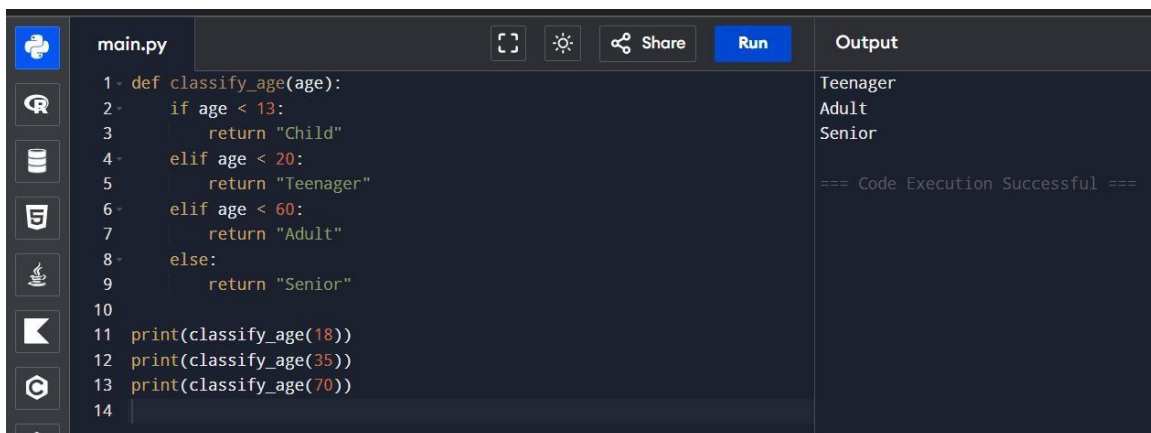
```
    else:
```

```
        return "Senior"
```

```
print(classify_age(18))
```

Output:

Teenager



```
main.py
1 def classify_age(age):
2     if age < 13:
3         return "Child"
4     elif age < 20:
5         return "Teenager"
6     elif age < 60:
7         return "Adult"
8     else:
9         return "Senior"
10
11 print(classify_age(18))
12 print(classify_age(35))
13 print(classify_age(70))
14
```

Output

Teenager
Adult
Senior

=== Code Execution Successful ===

Explanation:

The conditions are checked in sequence. The first matching condition determines the age group.

Task 4: For and While Loops – Sum of First n Numbers

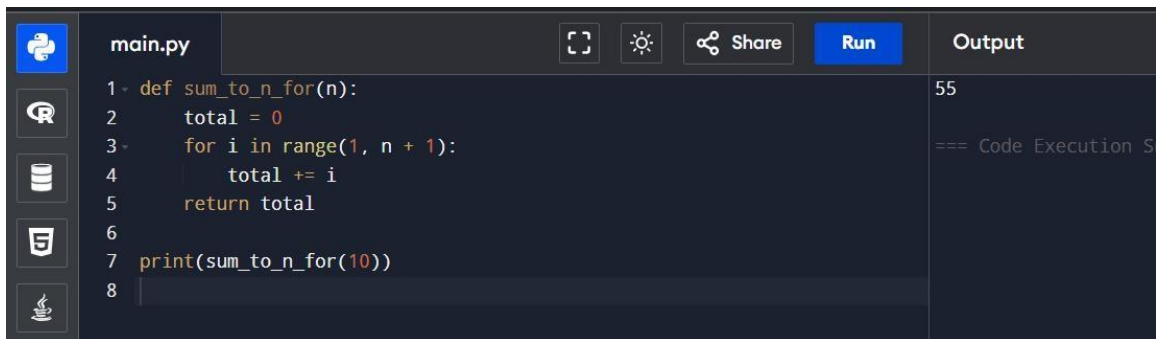
Prompt Used:

"Generate Python code to find sum of first n natural numbers using loops."

Using for loop:

```
def sum_to_n_for(n):  
    total = 0  
    for i in range(1, n + 1):  
        total += i  
    return total
```

```
print(sum_to_n_for(10))
```

A screenshot of a Python IDE interface. On the left, there is a sidebar with icons for Python, R, a database, a file explorer, and a terminal. The main area is titled 'main.py' and contains the following Python code:

```
1 def sum_to_n_for(n):  
2     total = 0  
3     for i in range(1, n + 1):  
4         total += i  
5     return total  
6  
7 print(sum_to_n_for(10))  
8
```

At the top right of the code editor, there are icons for a full screen view, a light/dark theme toggle, a 'Share' button, and a blue 'Run' button. To the right of the code editor is an 'Output' pane. It displays the number '55' and the text '=== Code Execution S'.

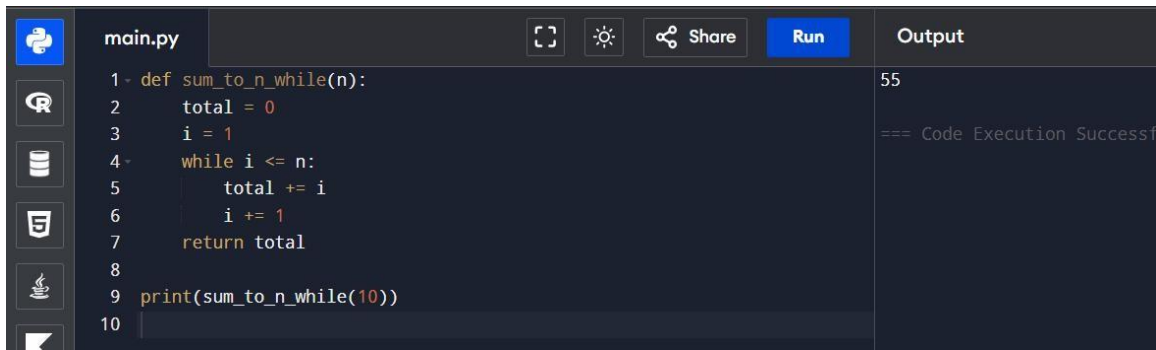
Using while loop:

```
def sum_to_n_while(n):  
    total = 0  
    i = 1  
    while i <= n:  
        total += i  
        i += 1  
    return total
```

```
print(sum_to_n_while(10))
```

Output:

55



The screenshot shows a Python IDE with a file named 'main.py'. The code defines a function 'sum_to_n_while(n)' that calculates the sum of integers from 1 to n using a while loop. The function is called with 'n=10', and the output is '55'. The IDE interface includes a left sidebar with icons for Python, a file explorer, a search bar, and a terminal. The top bar has buttons for 'Run', 'Share', and 'Output'.

```
1 def sum_to_n_while(n):
2     total = 0
3     i = 1
4     while i <= n:
5         total += i
6         i += 1
7     return total
8
9 print(sum_to_n_while(10))
10
```

Output: 55
=== Code Execution Successful ===

Analysis:

Both approaches are correct. Loop-based methods are simple, while mathematical formulas can be more efficient.

Task 5: Classes – Bank Account Class

Prompt Used:

"Generate a Python BankAccount class with deposit, withdraw, and check balance methods."

class BankAccount:

```
    def __init__(self, balance=0):
        self.balance = balance
```

```
    def deposit(self, amount):
        self.balance += amount
        print("Deposited:", amount)
```

```
    def withdraw(self, amount):
        if amount <= self.balance:
            self.balance -= amount
            print("Withdrawn:", amount)
        else:
            print("Insufficient balance")
```

```
    def check_balance(self):
        print("Current Balance:", self.balance)
```

```
account = BankAccount(1000)
account.deposit(500)
account.withdraw(300)
account.check_balance()
```


Output:

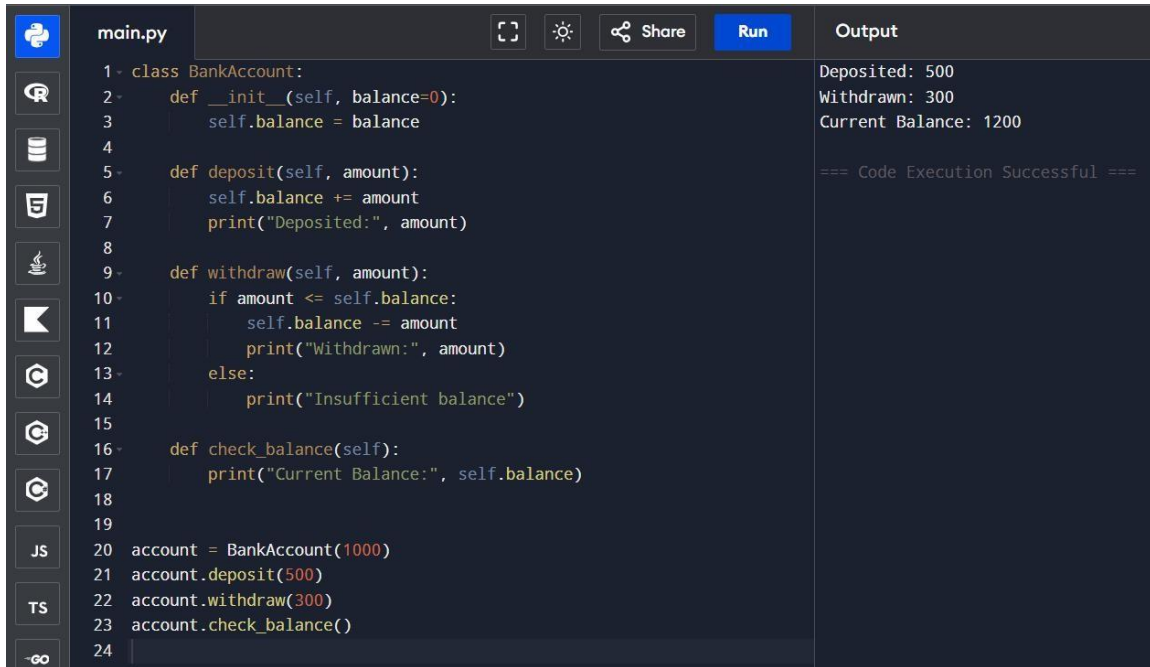
Deposited: 500

Withdrawn: 300

Current Balance: 1200

Explanation:

The class maintains account balance and updates it through deposit and withdraw methods.



The screenshot shows a code editor with a file named `main.py`. The code defines a `BankAccount` class with methods `__init__`, `deposit`, `withdraw`, and `check_balance`. The `__init__` method initializes the balance to 0. The `deposit` method adds an amount to the balance and prints it. The `withdraw` method checks if the amount is less than or equal to the current balance; if so, it subtracts the amount and prints it, otherwise, it prints "Insufficient balance". The `check_balance` method prints the current balance. In the main script, an account is created with an initial balance of 1000, 500 is deposited, 300 is withdrawn, and the balance is checked, resulting in a final balance of 1200.

```
1 class BankAccount:
2     def __init__(self, balance=0):
3         self.balance = balance
4
5     def deposit(self, amount):
6         self.balance += amount
7         print("Deposited:", amount)
8
9     def withdraw(self, amount):
10        if amount <= self.balance:
11            self.balance -= amount
12            print("Withdrawn:", amount)
13        else:
14            print("Insufficient balance")
15
16    def check_balance(self):
17        print("Current Balance:", self.balance)
18
19
20 account = BankAccount(1000)
21 account.deposit(500)
22 account.withdraw(300)
23 account.check_balance()
24
```

The output of the code execution is displayed on the right side of the editor:

```
Deposited: 500
Withdrawn: 300
Current Balance: 1200

=== Code Execution Successful ===
```

Overall Conclusion

This lab demonstrates how AI-assisted code completion helps in generating structured, readable, and correct Python programs. Human review is essential to ensure correctness and efficiency.