# **🧪 Lab 5: ChatGPT in Code Generation and Debugging**

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### **🎯 Objective:**

To explore how **ChatGPT** can assist in **generating code** and **debugging programs** in languages like **Python, C++, or Java**.

### **📋 Activities Performed:**

1. Prompted ChatGPT to generate working code in Python and C++.
2. Used ChatGPT to identify and fix bugs in a faulty code snippet.
3. Compared generated output with expected results.

## **🧪 Examples, Outputs, and Comparisons**

### **✅ 1. Python Code Generation**

**Prompt:** "Write a Python program to check if a number is prime."

**ChatGPT Output:**

def is\_prime(n):

if n <= 1:

return False

for i in range(2, int(n\*\*0.5) + 1):

if n % i == 0:

return False

return True

num = int(input("Enter a number: "))

if is\_prime(num):

print("Prime")

else:

print("Not Prime")

✅ Expected Output Match: Yes

📝 Notes: Efficient and correct logic, uses square root optimization.

### **✅ 2. C++ Code Generation**

**Prompt:** "Write a C++ program to find the factorial of a number using recursion."

**ChatGPT Output:**

#include <iostream>

using namespace std;

int factorial(int n) {

if(n <= 1)

return 1;

else

return n \* factorial(n - 1);

}

int main() {

int num;

cout << "Enter a number: ";

cin >> num;

cout << "Factorial: " << factorial(num);

return 0;

}

**✅ Expected Output Match:** Yes

**📝 Notes:** Recursive logic correctly implemented, works as expected.

### **✅ 3. Debugging Task**

**Faulty Code (Python):**

def add(a, b):

return a + b

print(add(5))

**Prompt:** "Find and fix the error in this code."

**ChatGPT Output:**

# Fixed: add() requires two arguments

def add(a, b):

return a + b

print(add(5, 3))

**✅ Output Match:** Yes

**📝 Notes:** ChatGPT correctly identified the **missing argument** issue and fixed it

## **📊 Summary Table**

| **Task** | **Language** | **ChatGPT Output** | **Matches Expected Output** | **Accuracy** |
| --- | --- | --- | --- | --- |
| Prime Check Program | Python | ✅ Working | ✅ Yes | ✅ High |
| Factorial Using Recursion | C++ | ✅ Working | ✅ Yes | ✅ High |
| Debugging Task | Python | ✅ Fixed | ✅ Yes | ✅ High |

## **✅ Conclusion:**

ChatGPT is highly effective for **code generation** and **debugging**. It produces accurate, readable code and can easily identify logical or syntax errors. It can be a valuable assistant for both beginner and advanced programmers.