Report on Prime Number Generator and Checker

1. Title Page

Prime Number Generator and Checker

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2. Introduction

This project implements a Python script designed to check if a number is prime and to generate a list of prime numbers up to a specified limit. A prime number is a natural number greater than 1 that cannot be formed by multiplying two smaller natural numbers. This script allows the user to input a number to check its primality, and it also allows the user to generate a list of all prime numbers up to a given limit.

Purpose:

- To determine whether a given number is prime.

- To generate a list of prime numbers within a defined range.

3. Methodology

The methodology for creating the Prime Number Generator and Checker involves:

1. **Prime Number Check (is_prime function):**
    - A function that checks if a number n is prime by iterating through all integers from 2 to the square root of n (as prime factors are limited to this range).
    - If the number is divisible by any of these integers, it is not prime; otherwise, it is prime.
2. **Prime Number Generator (generate_primes function):**
    - A function that generates all prime numbers from 2 up to the specified limit by calling the is_prime function for every number in that range.
3. **User Interaction:**
    - The program asks the user to input a number for checking primality.
    - The program also asks for a limit to generate and display all prime numbers up to that

Steps:

1. Define a function is_prime that checks whether a given number is prime.
2. Define a function generate_primes that iterates through numbers up to the specified limit, calling the is_prime function for each.
3. Prompt the user to input a number to check if it's prime and a limit for generating prime numbers.
4. Display the results to the user.

Code Typed

```
# Function to check if a number is prime
```

```
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

# Function to generate a list of prime numbers up to a given limit
def generate_primes(limit):
    primes = []
    for num in range(2, limit + 1):
        if is_prime(num):
            primes.append(num)
    return primes

# Example usage
number = int(input("Enter a number to check if it's prime: "))
if is_prime(number):
    print(f"{number} is a prime number.")
```

```
else:
    print(f"{number} is not a prime number.")


limit = int(input("Enter a limit to generate prime numbers: "))
prime_list = generate_primes(limit)
print(f"Prime numbers up to {limit}: {prime_list}")
```

Screenshots Output Photo Pasted

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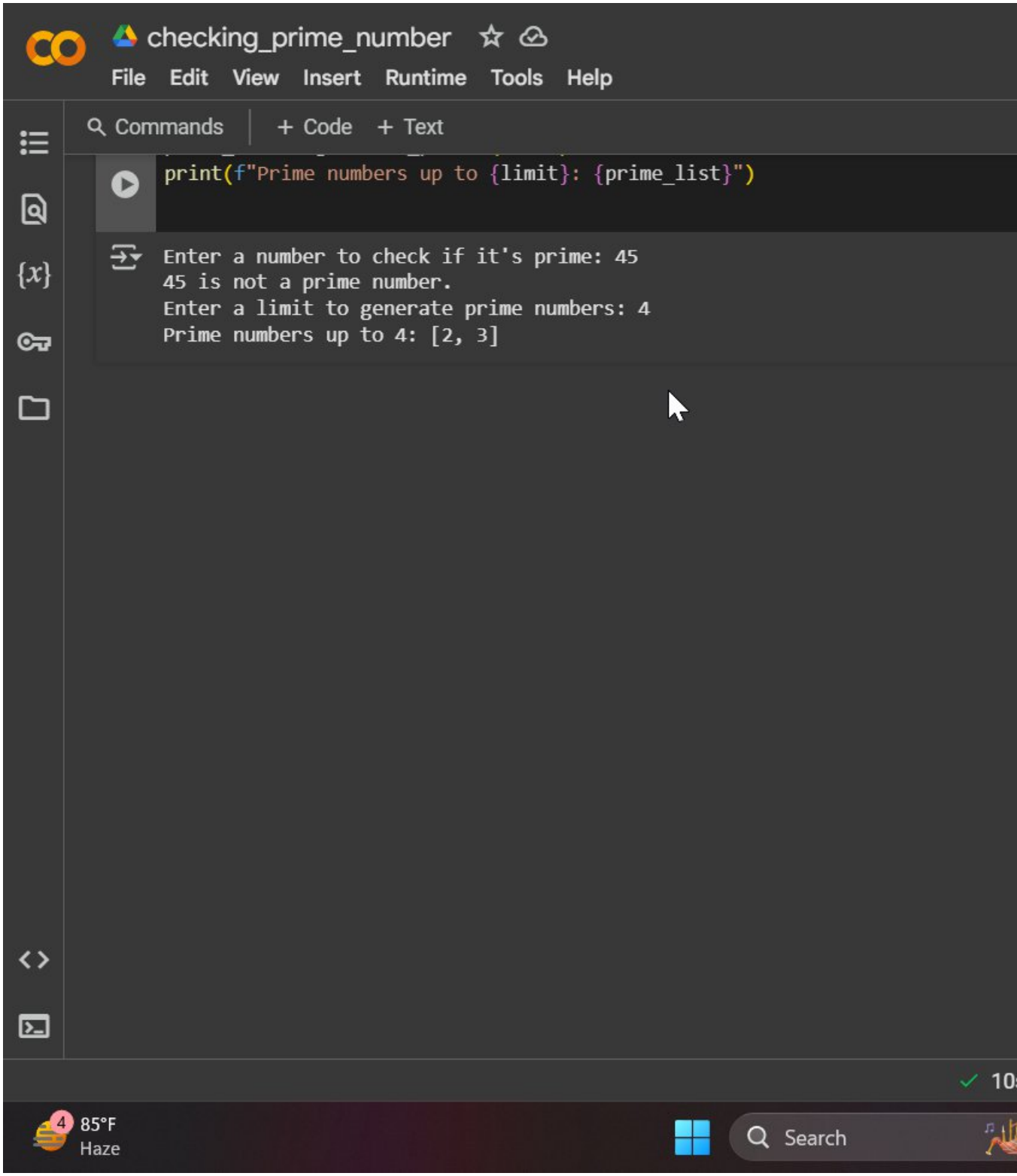
checking_prime_number
File Edit View Insert Runtime Tools Help
Commands + Code + Text
print(f"Prime numbers up to {limit}: {prime_list}")
Enter a number to check if it's prime: 45
45 is not a prime number.
Enter a limit to generate prime numbers: 4
Prime numbers up to 4: [2, 3]
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