1. Introduction

This project focuses on checking whether a given number is a prime number or not. A prime number is a natural number greater than 1 that has only two factors: 1 and itself. The program repeatedly asks the user to input a number and checks if it is prime using an efficient mathematical approach. The program also allows users to check multiple numbers until they choose to exit.

2. Methodology

The approach used to determine whether a number is prime follows these steps:

1. **Input Handling:** The program takes a number as input from the user.

2. **Prime Check Algorithm:**

   - If the number is less than or equal to 1, it is not prime.

   - The program checks divisibility from 2 to the square root of the number (for efficiency).

   - If any divisor is found, the number is not prime; otherwise, it is prime.

3. **Loop for Multiple Checks:** The program runs in a loop, allowing users to check multiple numbers until they choose to exit.

3. Code

```python
def is_prime(num):
    if num <= 1:
        return False
    for i in range(2, int(num ** 0.5) + 1):
        if num % i == 0:
            return False
    return True


while True:
    # Ask the user for a number
    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.")

    # Ask if the user wants to continue
    continue_check = input("Do you want to check another number? (yes/no): ").lower()
    if continue_check != 'yes':
        print("Exiting the program. Goodbye!")
        break
```

4. Output/Result

[Attach the screenshot of the output here]

Example Output:

Enter a number to check if it's prime: 11
11 is a prime number!
Do you want to check another number? (yes/no): yes
Enter a number to check if it's prime: 15
15 is not a prime number.
Do you want to check another number? (yes/no): no
Exiting the program. Goodbye!

5. References/Credits

- Python Documentation: https://docs.python.org/3/

- Prime Number Definition:
https://en.wikipedia.org/wiki/Prime_number