

# KIET Group Of Institution

Introduction To AI(MSE-1)

## Problem Statement- Prime Number Generator and Checker.

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## INTRODUCTION

### Problem- Prime Number Generator and Checker.

In this we will be discussing about defining a program which checks if the entered number is prime or not. Additionally, we will also be checking the prime numbers in a specific range.

It basically provides an interactive environment where the user can enter his choice of number to check whether the number is prime or not. This program contains the logic of checking the divisibility between a specific range of number, i.e. from 2 to  $n-1$ . This logic is the best suited logic for this problem and this is a very useful tool for students as well as developers.

# METHODOLOGY

The program determines whether a number is prime by checking its divisibility from 2 to  $n-1$ . If no divisors are found, it is classified as prime. The `prime_generator()` function iterates through numbers up to a given limit, verifying each with `is_prime()` and storing all identified primes. This method ensures accurate prime detection, making it useful for mathematical computations, educational purposes, and number theory applications. The program efficiently processes user input, providing an interactive way to explore prime numbers and understand their properties through direct computation and verification.

# Code-

```
1
2 #Checking for prime number
3 def is_prime(n):
4     if n < 2:
5         return False
6     for i in range(2, n):
7         #checking if the number is divisible by any number between 2 and n
8         if n % i == 0:
9             return False
10    return True
11
12 #Generating Prime Numbers to the entered Limit
13 def prime_generator(limit):
14     #defining a list
15     primes = []
16     for num in range(2, limit + 1):
17         if is_prime(num):
18             #Calling isPrime function to check if the number in the range is prime or not
19             primes.append(num)
20     return primes
21
22 #definition of main execution of program
23 if __name__ == "__main__":
24     number = int(input("Enter a number to check if it's prime: "))
25     if is_prime(number):
26         print(f"{number} is a prime number.")
27     else:
28         print(f"{number} is not a prime number.")
29
30     limit = int(input("Enter a limit to generate prime numbers up to: "))
31     print("Prime numbers up to", limit, ":", prime_generator(limit))
32
```

# Output-

## For Non-Prime-

Enter a number to check if it's prime: 6

6 is not a prime number.

Enter a limit to generate prime numbers up to: 45

Prime numbers up to 45 : [2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43]

```
Enter a number to check if it's prime: 6
6 is not a prime number.
Enter a limit to generate prime numbers up to: 45
Prime numbers up to 45 : [2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43]
```

## For Prime-

Enter a number to check if it's prime: 7

7 is a prime number.

Enter a limit to generate prime numbers up to: 89

Prime numbers up to 89 : [2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89]

```
Enter a number to check if it's prime: 7
7 is a prime number.
Enter a limit to generate prime numbers up to: 89
Prime numbers up to 89 : [2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89]
```