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import math
def isPrime(n):
  if n <=1:
    return False
  for i in range(2, int(math.sqrt(n)) + 1):
    if n % i == 0:
      return False
  return True


# The isPrime(n) function checks whether a given number n is a prime number or not
# Prime numbers are greater than 1. If n is less than or equal to 1, it immediately returns False
# The loop iterates from 2 to the square root of n + 1 , as if n has a factor
# larger than its square root, there must also be a smaller factor within this range.
# For every number i in this range, it checks if n is divisible by i. If so, the function
# returns False, meaning n is not a prime number.
# If no divisors are found during the loop, the function concludes that n is a prime number
# and returns True.


def checkIfPrime(n, prime_numbers):
  sqrt_number = int(math.sqrt(n)) + 1
  for prime_number in prime_numbers:
    if(prime_number > sqrt_number):
      break # If prime_number greater than square root of number, break the loop
    if(n % prime_number == 0):
      return False
  return True


def getNthPrimeNumber(n):
  prime_numbers = []
  num = 2
  while len(prime_numbers) != n:
    if len(prime_numbers) == 0:
      if isPrime(num):
        prime_numbers.append(num)
    else:
      if checkIfPrime(num, prime_numbers):
        prime_numbers.append(num)
    num+=1
  return prime_numbers[-1]


# Code added to find 9991st to 10000th prime numbers
prime_numbers = []  # list to store prime number
num = 2  # Starting number to check primes
nth_prime = 1  # Counter for tracking the nth prime

while nth_prime <= 10000:
    if checkIfPrime(num, prime_numbers):
        if nth_prime >= 9991:
            prime_numbers.append(num)  # Add primes within the desired range to the list i.e. prime numbers between 9991 to 10000
        nth_prime += 1
    num += 1

# Displaying prime numbers
print("9991st to 10000th prime numbers are:", prime_numbers)

# Output the numbers to a data file called prime.txt
with open("prime.txt", "w") as file:
    file.write("\n".join(map(str, prime_numbers)))
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9991st to 10000th prime numbers are: [9992, 9993, 9994, 9995, 9996, 9997, 9998, 9999, 10000, 10001]
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