8. Write a program to generate all the prime numbers using recursion

Code:

```
def is_prime_recursive(n, i=2):
    if n <= 2:
        return n == 2
    if n % i == 0:
        return False
    if i * i > n:
        return True
    return is_prime_recursive(n, i + 1)

def generate_primes_recursive(current, limit, primes=[]):
    if current > limit:
        return primes
    if is_prime_recursive(current):
        primes.append(current)
    return generate_primes_recursive(current + 1, limit, primes)

limit = int(input("Enter the limit: "))

prime_numbers = generate_primes_recursive(2, limit)

print(f"Prime numbers up to {limit}: {prime_numbers}")
```

Output:

```
Enter the limit: 10
Prime numbers up to 10: [2, 3, 5, 7]
```

Time Complexity:

- $T(n) = O(\sqrt{n})$