

4. Write Programs that demonstrate the mathematical analysis of non-recursive and recursive algorithms.

PROGRAM:

```
import time
```

```
def sum_non_recursive(n):
```

```
    start_time = time.time()
```

```
    total = 0
```

```
    for i in range(1, n+1):
```

```
        total += i
```

```
    end_time = time.time()
```

```
    execution_time = end_time - start_time
```

```
    return total, execution_time
```

```
n = 1000000
```

```
sum_non_rec, time_non_rec = sum_non_recursive(n)
```

```
print("Sum of the first", n, "natural numbers (non-recursive):", sum_non_rec)
```

```
print("Execution time:", time_non_rec, "seconds")
```

```
Sum of the first 1000000 natural numbers (non
-recursion): 500000500000
Execution time: 0.03219318389892578 seconds
```

OUTPUT:

TIME COMPLEXITY: $O(n)$