Sequences

Iteration

```
def sum_I(n):
        res = 0
        while n > 0:
                res = res + n % 10
                n = n // 10
        return res

print(sum_I(15))
```

```
def fact_I(n):
        res = 1
        while n > 0:
                res = res * n
                n = n - 1
        return res

print(fact_I(5))
```

Recursion

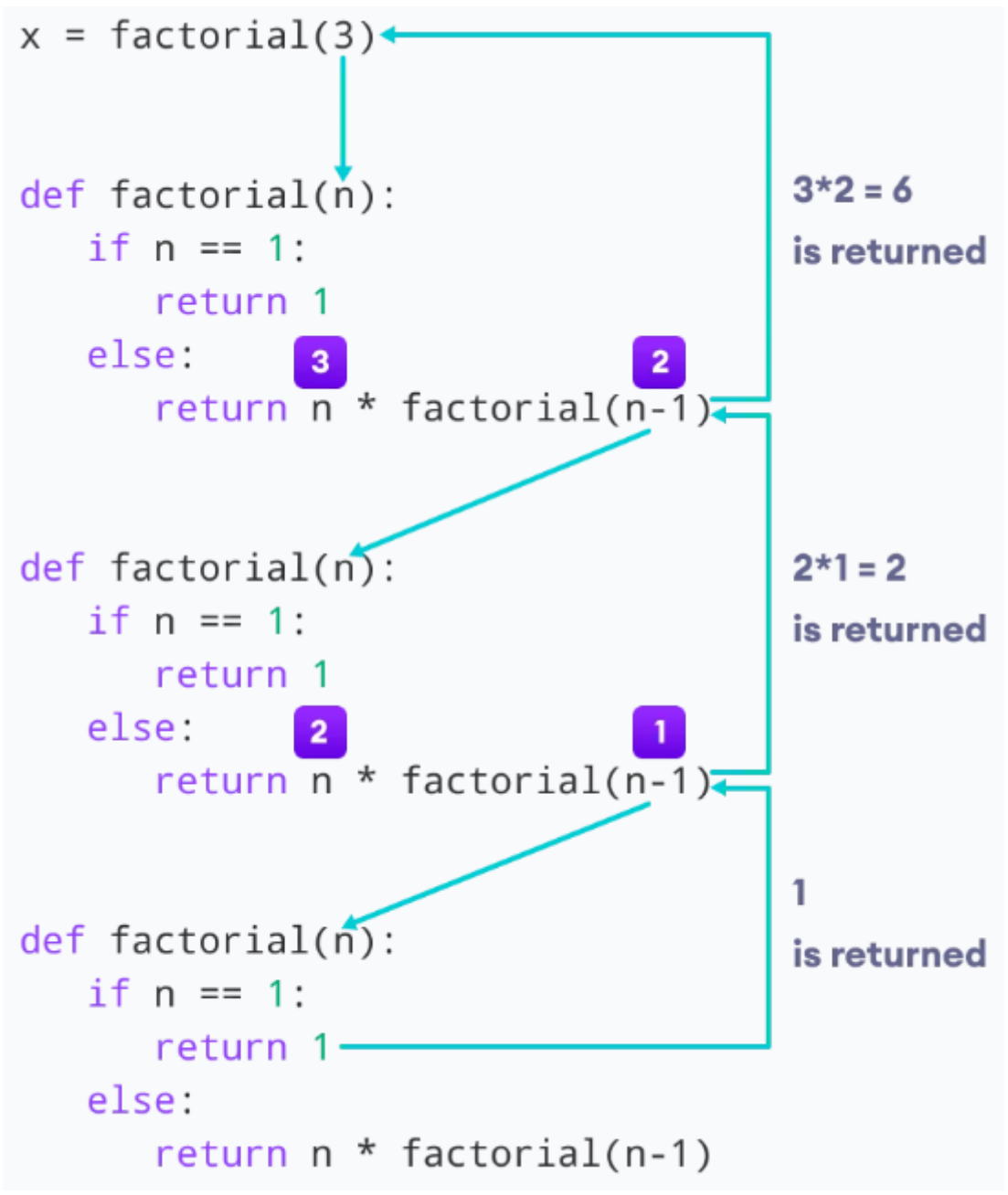
Recursion is the process of defining something in terms of itself, `calls itself`.

```
def sum_R(n):
        if n == 0:
                return 0
        else:
                return n % 10 + sum_R(n // 10)

print(sum_R(15))
```

```
def fact_R(n):
        if n == 0:
                return 1
        else:
                return n * fact_R(n - 1)

print(fact_R(5))
```



The calls:

```
factorial(3)          # 1st call with 3
3 * factorial(2)      # 2nd call with 2
3 * 2 * factorial(1)  # 3rd call with 1
```

```
3 * 2 * 1            # return from 3rd call as number=1
3 * 2                # return from 2nd call
6                    # return from 1st call
```

Range

range(start, stop step)

```
for i in range(5):
        print(i)
```

```
for i in range(3, 10):
        print(i)
```

```
for i in range(3, 10, 4):
        print(i)

print("########")

for i in range(5, 0, -1):
        print(i)
```