05 – Functions in a nutshell
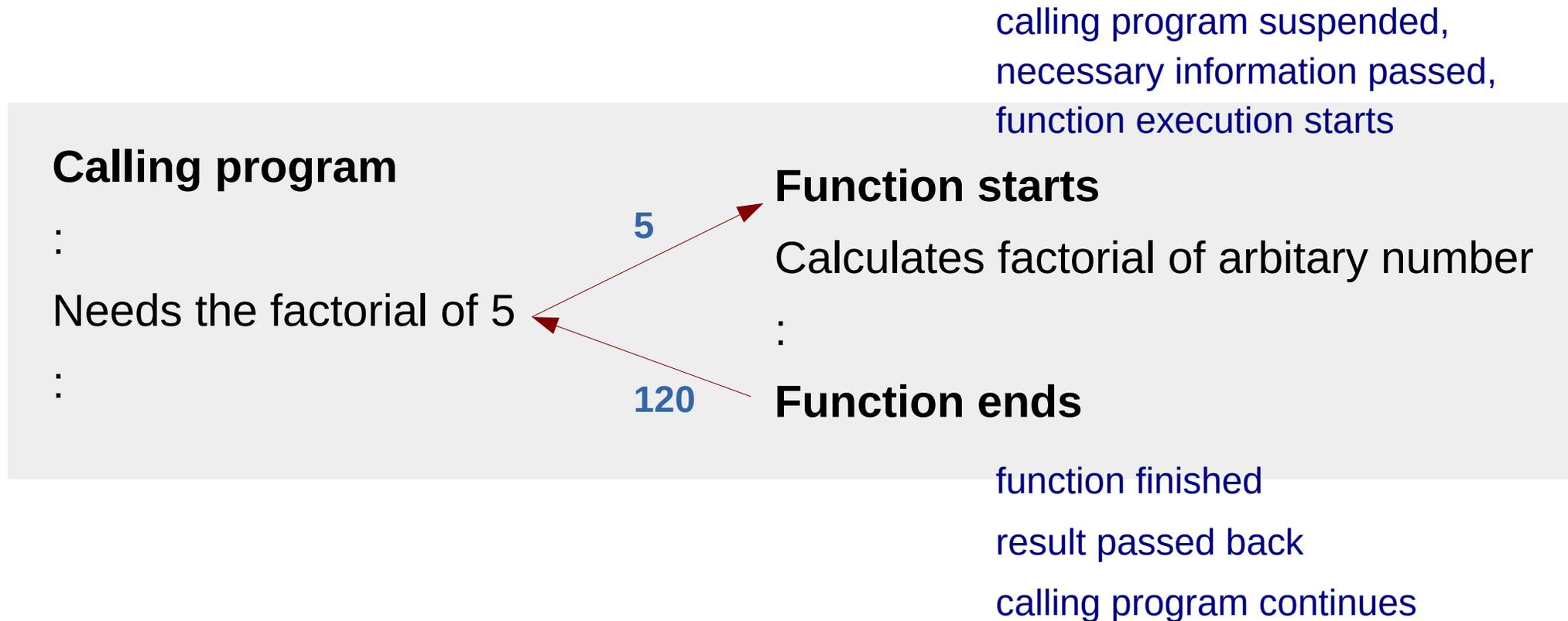
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Scientific Programming in Python (2025)

https://atticlectures.net/scipro/python-2025/

Function (procedure) = reusable code container, which communicates with other parts of the code only through a well defined interfaces

calling program suspended,
necessary information passed,
function execution starts

Calling program

.
.

Needs the factorial of 5

.
.

5

120

Function starts

Calculates factorial of arbitary number

.

Function ends

function finished

result passed back

calling program continues

Definition and calling

Name

Argument(s)

Doc-string

Function
code

Value
returned

```python
def factorial(nn):
    """Calculates the factorial of a number.

    Args:

        nn: Number to calculate the factorial of.

    Returns:

        Factorial of the argument.
    """
    result = 1
    for ii in range(2, nn + 1):
        result *= ii
    return result
```

Calling code

```python
aa = factorial(5)
aa
120
```

Function arguments and return value

```python
def functionname(arg1, arg2, ...):
    """Documentation string"""
    Subprogram statements
    ...
    return result
```

- Multiple arguments are possible

```python
def multiply_numbers(aa, bb):
    return aa * bb
```

```python
product = multiply_numbers(10, 12)
product
120
```

- Return value is optional

```python
def print_greeting(name):
    print(f"Hello {name}!")
```

```python
print_greeting("World")
Hello World!
```