```
def add(x,y):
    while x > 0:
        y += 1
        x -= 1
    return y
```

Speicher

x = 3
y = 4

Beginn while → nach 1. Durchlauf → 2. → 3

x = 3	x = 2	x = 1	x = 0
y = 4	y = 5	y = 6	y = 7

Programm

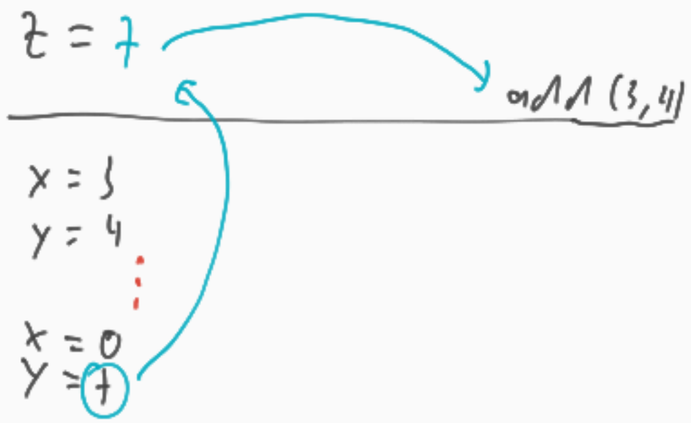
```
def add(x,y):
    while x > 0:
        y += 1
        x -= 1

    return y

z = add(3,4)
t = add(z,2)
```

1.

Speicher



Programm

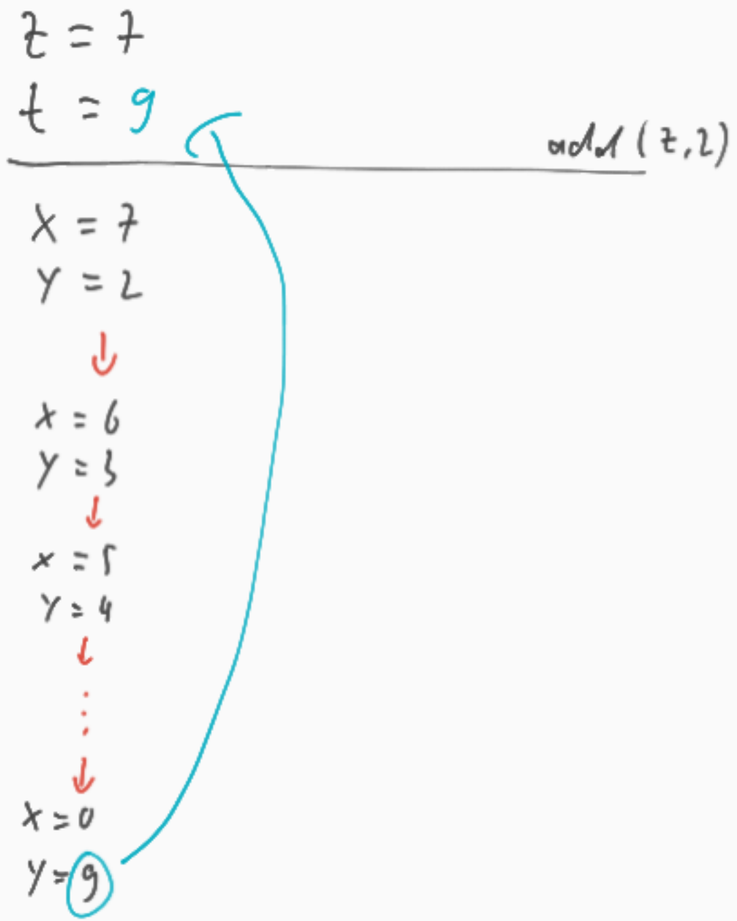
```
def add(x,y):
    while x > 0:
        y += 1
        x -= 1

    return y

z = add(3,4)
t = add(z,2)
```

1.
2.

Speicher



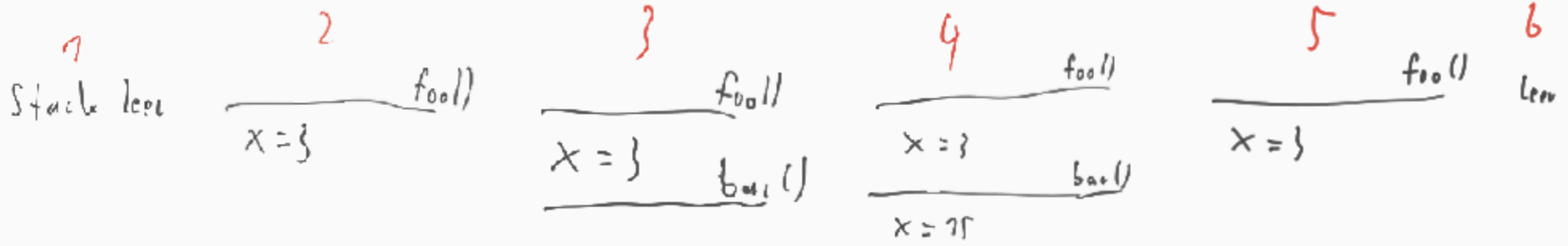
Programm

```
def foo():
    x = 3
    print(x)
    bar()
    print(x)

def bar():
    x = 15
    print(x)

foo()
```

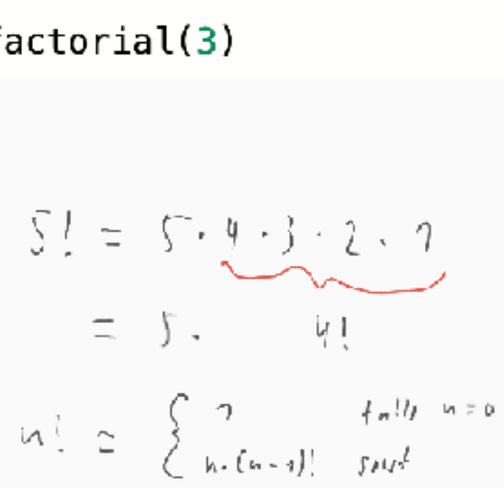
Speicher

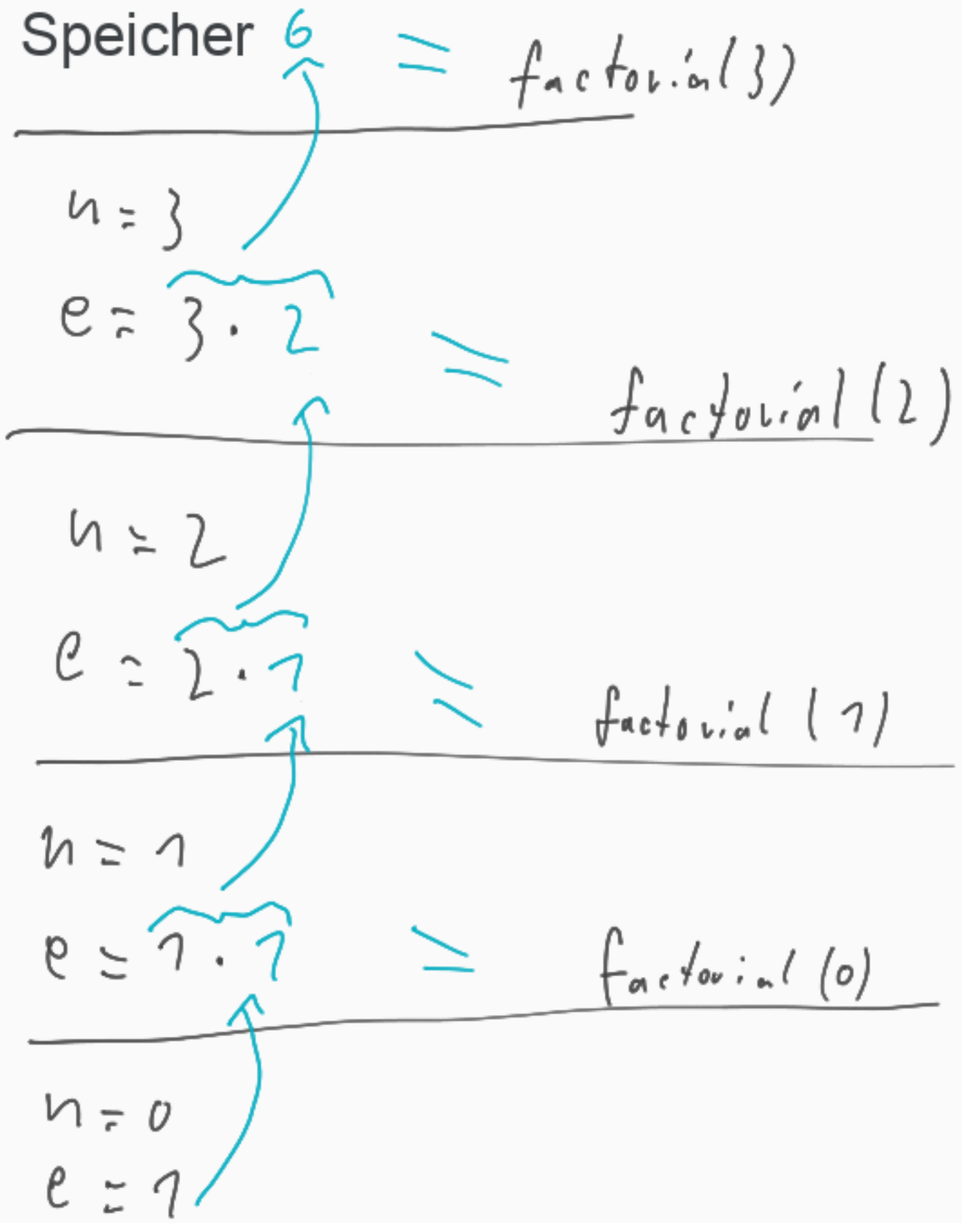


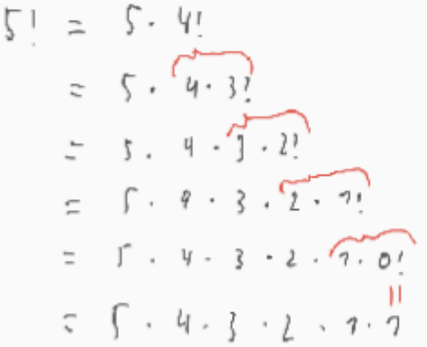
Programm

```
def factorial(n):
    if n == 0:
        return 1
    e = n * factorial(n-1)
    return e

factorial(3)
```







Alternative Version des Programms

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