Recursion

In [1]:
```
def wish():
    print('hello')
    print('hi')
wish()
```

```
hello
hi
```

In [2]:
```
def wish():
    print('hello')
    print('hi')
    wish()
wish()
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```
---------------------------------------------------------------------------
RecursionError                            Traceback (most recent call last)
Cell In[2], line 5
      3     print('hi')
      4     wish()
----> 5 wish()

Cell In[2], line 4, in wish()
      2 print('hello')
      3 print('hi')
----> 4 wish()

Cell In[2], line 4, in wish()
      2 print('hello')
      3 print('hi')
----> 4 wish()

    [... skipping similar frames: wish at line 4 (2972 times)]

Cell In[2], line 4, in wish()
      2 print('hello')
      3 print('hi')
----> 4 wish()

Cell In[2], line 2, in wish()
      1 def wish():
----> 2     print('hello')
      3     print('hi')
      4     wish()

File ~\anaconda3\Lib\site-packages\ipykernel\iostream.py:664, in OutStream.write(sel
f, string)
    655 def write(self, string: str) -> Optional[int]:  # type:ignore[override]
    656     """Write to current stream after encoding if necessary
    657
    658     Returns
   (...)
    662
    663     """
--> 664     parent = self.parent_header
    666     if not isinstance(string, str):
    667         msg = f"write() argument must be str, not {type(string)}"  # type:ig
nore[unreachable]

RecursionError: maximum recursion depth exceeded
```

In [3]:
```
import sys
sys.getrecursionlimit()
```

Out[3]: 3000

In [4]:
```
import sys
sys.setrecursionlimit(200)
print(sys.getrecursionlimit())
```

```
200
```

In [5]:
```
import sys
sys.getrecursionlimit()
```

Out[5]: 200

In [6]:
```
def wish():
    print('hello')
    print('hi')
wish()
```

```
hello
hi
```

In [7]:
```
import sys
sys.setrecursionlimit(150)
print(sys.getrecursionlimit())

i = 0

def wish():
    global i
    i == 1
    print('hello', i)
    wish()
wish()
```

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---------------------------------------------------------------------------
RecursionError                            Traceback (most recent call last)
Cell In[7], line 12
     10     print('hello', i)
     11     wish()
---> 12 wish()

Cell In[7], line 11, in wish()
      9 i == 1
     10 print('hello', i)
---> 11 wish()

Cell In[7], line 11, in wish()
      9 i == 1
     10 print('hello', i)
---> 11 wish()

    [... skipping similar frames: wish at line 11 (122 times)]

Cell In[7], line 11, in wish()
      9 i == 1
     10 print('hello', i)
---> 11 wish()

Cell In[7], line 10, in wish()
      8 global i
      9 i == 1
---> 10 print('hello', i)
     11 wish()

File ~\anaconda3\Lib\site-packages\ipykernel\iostream.py:664, in OutStream.write(sel
f, string)
    655 def write(self, string: str) -> Optional[int]:  # type:ignore[override]
    656     """Write to current stream after encoding if necessary
    657
    658     Returns
   (...)
    662
    663     """
--> 664     parent = self.parent_header
    666     if not isinstance(string, str):
    667         msg = f"write() argument must be str, not {type(string)}"  # type:ig
nore[unreachable]

RecursionError: maximum recursion depth exceeded
```

Factorial Using Recursion

In [8]:

```python
def fact(n):
    if n==0:
        return 1
    return n * fact(n-1)

result = fact(5)
```

```
result
```

Out[8]: 120

Anonymous Function | Lambda Function

Function without name is calld - Annoymous function | Lambda function

In [9]:
```
def square(a):
    return a * a

square(8)
```

Out[9]: 64

In [10]:
```
def square(a):
    return a * a

result = square(5)
print(result)
```

```
25
```

In [11]:
```
f = lambda a : a * a
result= f(5)
result
```

Out[11]: 25

In [12]:
```
f = lambda a, b : a + b
f1 = lambda a, b : a - b

result = f(1,4)
result1 = f1(4,1)

print(result)
print(result1)
```

```
5
3
```

In [13]:
```
import keyword
keyword.kwlist
```

Out[13]:
```
['False',
 'None',
 'True',
 'and',
 'as',
 'assert',
 'async',
 'await',
 'break',
 'class',
 'continue',
 'def',
 'del',
 'elif',
 'else',
 'except',
 'finally',
 'for',
 'from',
 'global',
 'if',
 'import',
 'in',
 'is',
 'lambda',
 'nonlocal',
 'not',
 'or',
 'pass',
 'raise',
 'return',
 'try',
 'while',
 'with',
 'yield']
```

How to use lambda function in other function like filter, map, reduce

In [14]:
```
nums = [3,2,6,8,4,6,2,9]
evens = list(filter(is_even, nums))
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
Cell In[14], line 2
      1 nums = [3,2,6,8,4,6,2,9]
----> 2 evens = list(filter(is_even, nums))

NameError: name 'is_even' is not defined
```

In [15]:
```
def is_even(n):
    return n % 2 == 0

nums = [3,2,6,8,4,6,2,9]
```

```
evens = list(filter(is_even, nums))
print(evens)
```

```
[2, 6, 8, 4, 6, 2]
```

In [16]:
```
def is_odd(n):
    return n % 2 != 0

nums = [3,2,6,8,4,6,2,9]

odd = list(filter(is_odd, nums))
print(odd)
```

```
[3, 9]
```

In [17]:
```
nums = [3,2,6,8,4,6,2,9]

evens = list(filter(lambda n : n % 2 == 0, nums))

print(evens)
```

```
[2, 6, 8, 4, 6, 2]
```

In [18]:
```
nums = [3,2,6,8,4,6,2,9]

odd = list (filter(lambda n : n % 2 != 0, nums))

print(odd)
```

```
[3, 9]
```

In [19]:
```
nums = [3,2,6,8,4,6,2,9,34,77,120]

evens = list(filter(lambda n : n%2 == 0, nums))
odd = list(filter(lambda n : n%2 != 0,nums))

print(evens)
print(odd)
```

```
[2, 6, 8, 4, 6, 2, 34, 120]
[3, 9, 77]
```

Map function is use to transform the using some function ex: square each elements

In [20]:
```
def update(n):
    return n+2

nums = [3,2,6,8,4,6,2,9]

evens = list(filter(is_even, nums))
double = list(map(update, evens))

print(evens)
print(double)
```

```
[2, 6, 8, 4, 6, 2]
[4, 8, 10, 6, 8, 4]
```

In [21]:
```python
nums = [3,2,6,8,4,6,2,9]

evens = list(filter(is_even, nums))
double = list(map(lambda n : n*2, evens))

print(evens)
print(double)
```

```
[2, 6, 8, 4, 6, 2]
[4, 12, 16, 8, 12, 4]
```

In [22]:
```python
nums = [3,2,6,8,4,6,2,9]

evens = list(filter(is_even, nums))

double = list(map(lambda n : n*2, evens))
double_ = list(map(lambda n : n+2, evens))
doubble_1 = list(map(lambda n : n-2, evens))

print(evens)
print(double)
print(double_)
print(doubble_1)
```

```
[2, 6, 8, 4, 6, 2]
[4, 12, 16, 8, 12, 4]
[4, 8, 10, 6, 8, 4]
[0, 4, 6, 2, 4, 0]
```

In [23]:
```python
nums = [3,2,6,8,4,6,2,9]

evens = list(filter(is_even, nums))

double = list(map(lambda n : n*2, evens))
double_ = list(map(lambda n : n-2, evens))

print(double)
print(double_)
```

```
[4, 12, 16, 8, 12, 4]
[0, 4, 6, 2, 4, 0]
```

In [24]:
```python
nums = [3,2,6,8,4,6,2,9]
evens = list(filter(is_even, nums))

double = list(map(lambda n: n*2, nums))
double_ = list(map(lambda n: n+2, nums))
double1 = list(map(lambda n: n-2, nums))

print(double)
print(double_)
print(double1)
```

```
[6, 4, 12, 16, 8, 12, 4, 18]
[5, 4, 8, 10, 6, 8, 4, 11]
[1, 0, 4, 6, 2, 4, 0, 7]
```

In [25]:
```python
from functools import reduce

def add_all(a,b):
    return a+b

nums = [3,2,6,8,4,6,2,9]

evens = list(filter(is_even, nums))
double = list(map(lambda n : n*2, evens))

sums = reduce(add_all, double)
sums

print(sums)
```

```
56
```

In [26]:
```python
a = [7,8]
print(type(a))
```

```
<class 'list'>
```

In [31]:
```python
from functools import reduce

nums = [3,2,6,8,4,6,2,9]

evens = list(filter(is_even, nums))
double = list(map(lambda n: n*2, evens))
sums = (reduce(lambda a,b : a + b, double))

print(evens)
print(double)
print(sums)
```

```
[2, 6, 8, 4, 6, 2]
[4, 12, 16, 8, 12, 4]
56
```

In [ ]:

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