```
    return f

x = 5
result = fact(x)
print(result)

# please use debug the code in pycharm for more indetail explainanation & breakthrough point at f = 1
```

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120
```

5th JULY 2025

Recursion

In [102…

```
def wish():
    print('hello')
    print('hi')

wish()
```

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hello
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In [103…

```
def wish():
    print('hello')
    print('hi')
    wish()

wish()
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---------------------------------------------------------------------------
RecursionError                            Traceback (most recent call last)
Cell In[103], line 6
      3     print('hi')
      4     wish()
----> 6 wish()

Cell In[103], line 4, in wish()
      2 print('hello')
      3 print('hi')
----> 4 wish()

Cell In[103], line 4, in wish()
      2 print('hello')
      3 print('hi')
----> 4 wish()

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

Cell In[103], line 4, in wish()
      2 print('hello')
      3 print('hi')
----> 4 wish()

Cell In[103], 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(self, 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:ignore[unreachable]
```

```
RecursionError: maximum recursion depth exceeded
```

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

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

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

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

wish()
```

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

i = 0
def wish():
    global i
    i += 1
    print('hello', i)
    wish()
wish()

# how to know how many with it printed
# so for best practice i would suggest for
```

In [ ]:
```
i = 0

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

```
wish()

# how to know how many wish it printed
#so for best practice i would suggest for
```

FACTORIAL USING RECURSSION

- recurssion is function calls itself

In [ ]:
```
def fact(n):
    if n==0:
        return 1
    return n * fact(n-1)

result = fact(5)

result
```

- Function without name is called - ANONYMOUS FUNCTION OR LAMBDA

Anonymous Function | Lambda

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

square(5)
# what if i dont want to call square() multiple times
```

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

result = square(5)
print(result)

# what if i dont want to call square() multiple times
```

In [104…
```python
# Lambda expression or lambda function
f = lambda a : a * a # hear a is an argument & operation in the argument is a * a
result = f(5)
result

# hear anonymous function is called lambda
# remember lambda alway you need to assain as function cuz function are object in python
```

Out[104… 25

In [105…
```python
f = lambda a, b : a + b
f1 = lambda a, b: a-b

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

print(result)
print(result1)
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In [106…
```python
import keyword
keyword.kwlist
```

Out[106…
```
['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 can we use lambda in other function like - filter, map & reduce

In [107…
```
# lets take one list & i want to find the list of even numbers
nums = [3,2,6,8,4,6,2,9]
```

```
evens = list(filter(is_even, nums)) #is_even is not an inbuild function
```

In [108…
```
try:
    del list
except NameError:
    pass

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 [111…
```
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 [112…
```
# lets write above function using help of lambda & lambda helps to reduce the line for better
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 [113…
```
# lets write above function using help of lambda & lambda helps to reduce the line for better
nums = [3,2,6,8,4,6,2,9]
odd = list(filter(lambda n : n%2 != 0, nums))
print(odd)
```

```
[3, 9]
```

In [114…
```
# lets write above function using help of lambda & lambda helps to reduce the line
nums = [3,2,6,8,4,6,2,9]

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]
[3, 9]
```

- What ever even number i have from the assigned list
- I want to double the even number i.e 2 become 4|| 4 become 6||6 become 8
- that we will do using map function
- this largly we are using in google map reduce programme
- we can build using user define & lambda

In [117…
```
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 [119…
```
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]
[0, 4, 6, 2, 4, 0]
```

In [120…

```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))
double_1 = list(map(lambda n : n-2, evens))

print(evens)
print(double)
print(double_)
print(double_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]
```

- i want to perform reduce now
- i want reduce all the values
- reduce you can add only 2 values
- [4, 12, 16, 8, 12, 4] if you sum everything then you will get 56

In [121…

```python
from functools import reduce

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

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

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

sums = reduce(add_all, double)
sums
print(sums)
```

```
56
```

In [123…

```
from functools import reduce

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

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 [ ]: