6/24/2025 OOP Python

Recursion!

$n! = 1 \times 2 \times 3 \times 4 \times \dots \times n$

"n factorial"

```
res=1
for i in range(1, n+1):
    res = res * i
```

res 1 1 2 6 24 120
i 1 2 3 4 5 6
n 5

$n! = [1 \times 2 \times 3 \times \dots \times (n-1)] \times n$

$n! = (n-1)! \times n$

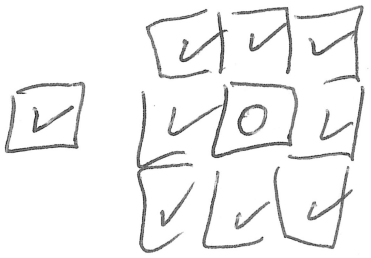
```
if n==0:
    return 1
return n * fact(n-1)
```

~~fact(0)~~ ret 1
~~fact(1)~~ 1×1, ret
~~fact(2)~~ 1×2
~~fact(3)~~ 3×2
ret 6
~~fact(4)~~ 6×4, ret 24
~~fact(5)~~
main 5×24,
120 ret 120

Power

$b^e = b^{1} \times b^{(e-1)}$

Recursion in Minesweeper



no adj bombs
all ✓ are automatically safe!

if we click on a 0 square,

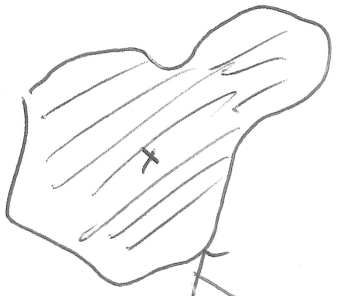
[recursively click on all adjacent squares automatically

UPTO 8 recursive calls

Can't click on the same square twice!

Infinite

MAKE SURE THIS CAN'T HAPPEN, OTHERWISE YOU'LL HAVE INFINITE RECURSION



fill for paint bucket
floodfill

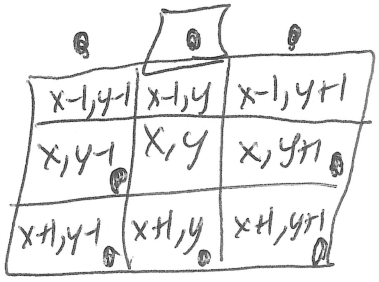
non-zero squares are like boundary in Paint

DX/DY Arrays (DR/DC Arrays)

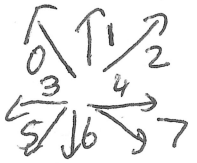
DX = [-1, -1, -1, 0, 0, 1, 1, 1]

DY = [-1, 0, 1, -1, 1, -1, 0, 1]

Dir 0 1 2 3 4 5 6 7




```
for i in range(len(DX)):
    nX = x + DX[i]
    nY = y + DY[i]
```



#2 options

```
if new square valid:
    clear(nX, nY)
```

OPT 1

```
clear(nX, nY)
```

always call

ADD MORE BASE CASES RETURNS ON BAD REC CALLS

my board storage

1	*	*	2
1	2	3	*
1	1	2	1
1	*	1	0

board

F	F	F	F
F	F	F	F
F	F	T	T
F	F	T	T

show

Cell | 1 | F

1F	*F	*F	2F
1F	2F	3F	*F
1F	1F	2T	1T
1F	*F	1T	0T

alternative method of storing data