Let's do some more Patterns [Join Here]

Special class

Love Babbar • May 12, 2024

Sat → 09:00PM Doubt class

Sun → 02:00PM → Mega Class

↳ N no. of Question

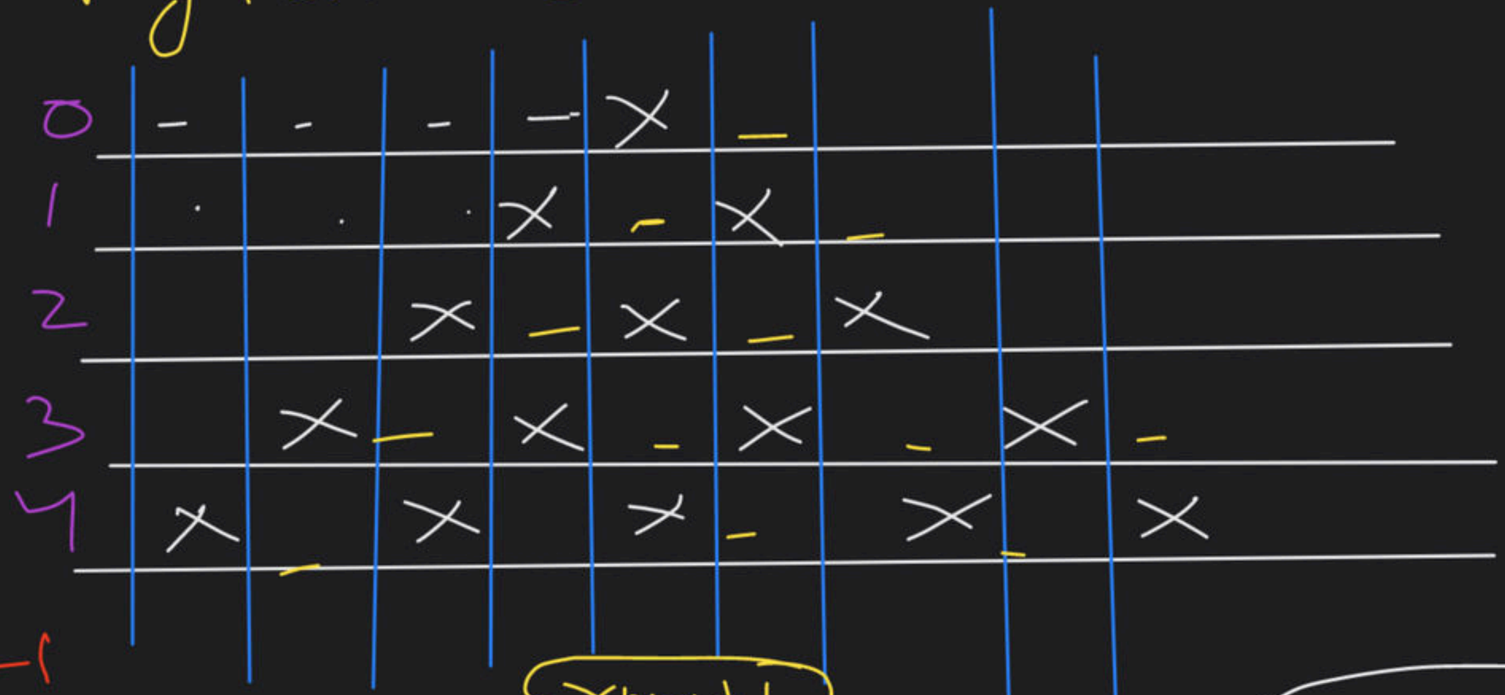
Practice purpose

Question → Try yourself → videodekho

H.W → videos

① Full Pyramid

N = 5



① Rows
↳ row ∈ [0, N)

N = 5
r = 0
N - r - 1
= 4

Rules

r0 → 4 sp, 1 ★
r1 → 3 sp, 2 ★
r2 → 2 sp, 3 ★
r3 → 1 sp, 4 ★

row + 1

N - r - 1

r4 → 0 sp, 5 ★
↳ N - r - 1
5 - 4 - 1

N - r - 1
5 - 3 - 1

for each row

↳ ① N - row - 1 spaces

② row + 1 ★

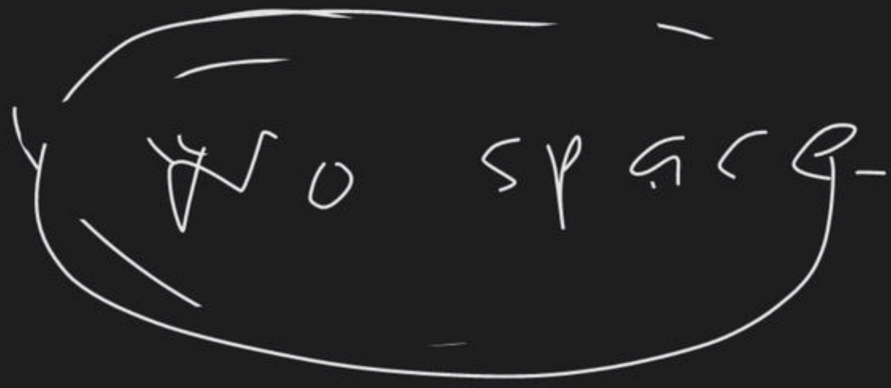
"★_"

```
void fullPyramid(int n) {
    for (int row = 0; row < n; row++) {
        // 1. spaces
        for (int col = 0; col < n - row - 1; col++)
            cout << " ";

        // 2. stars
        for (int col = 0; col < row + 1; col++)
            cout << "* ";
        cout << endl;
    }
}
```

$N = 5$ row $\in [0, 5) \rightarrow \in [0, 4]$

row = 4 ⇒ space →



Stars → , Col = 0 "*"

1

2

3 4

```
    X
   X X
  X X X
 X X X X
X X X X X
```

② Inverted Pyramid

Outer Loop

$i \in [0, N)$

$N = 5$

```
i — 0   X _ X _ X _ X _ X
  — 1   _ X _ X _ X _ X _
  — 2   _ _ X _ X _ X _
  — 3   _ _ _ X _ X _
  — 4   _ _ _ _ X _
```

inner Loop

I → $j \in [0, i)$

II → $j \in [0, N-i)$

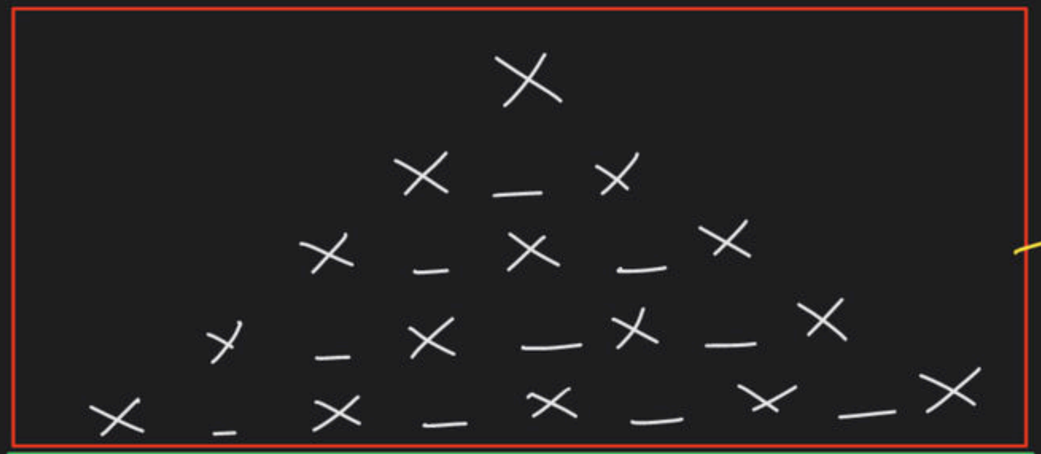
I → II

Inner Loop:

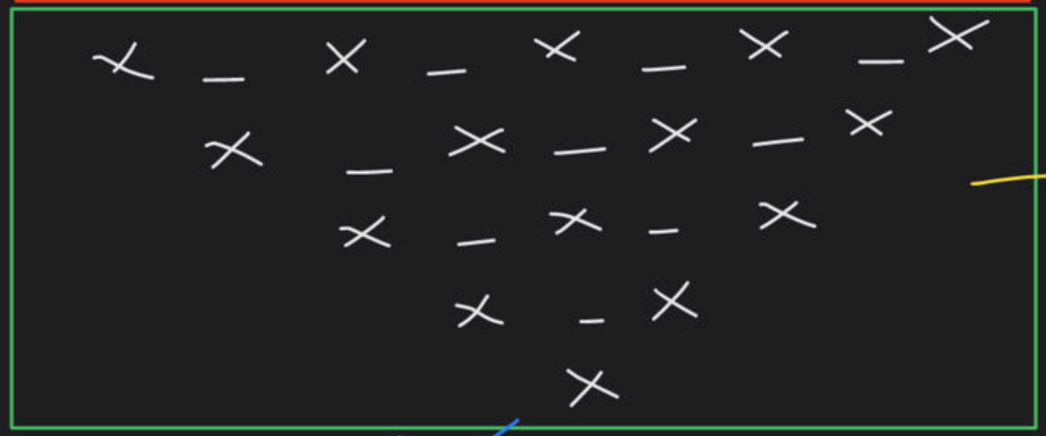
	I	II
$i=0$ →	0 sp ,	5 ☆
$i=1$ →	1 sp ,	4 ☆
$i=2$ →	2 sp ,	3 ☆
3 →	3 sp ,	2 ☆
4 →	4 sp ,	1 ☆

③ Diamond

N = 5



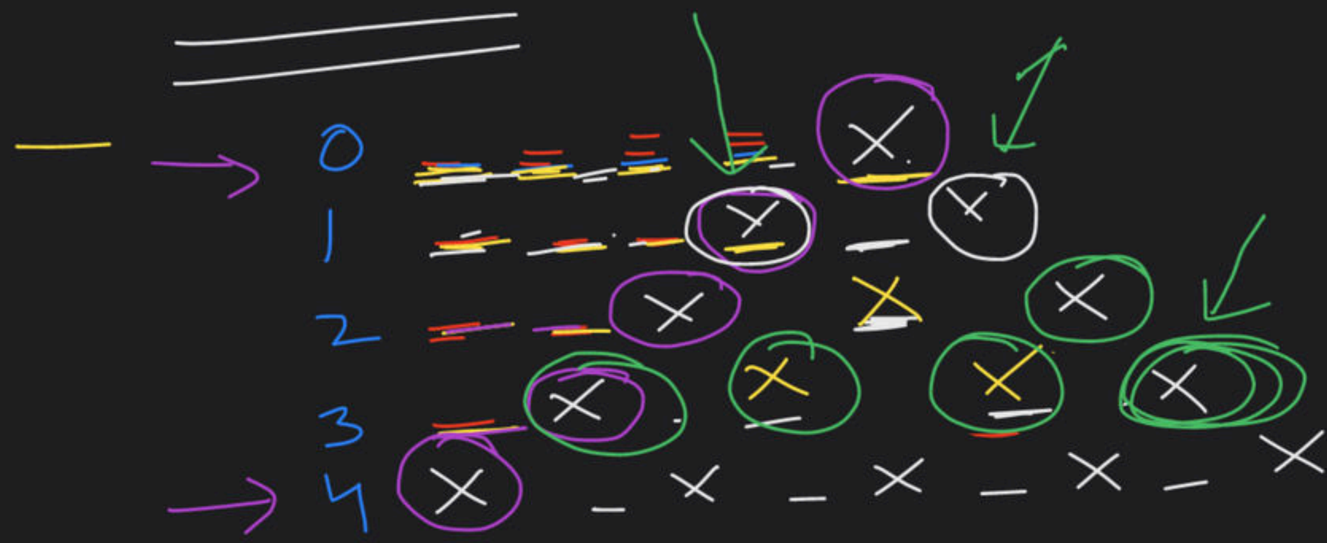
→ I → full Pyr



→ II → I F Py

4

Hollow Pyramid



I need Some Condⁿ over stars

$\Rightarrow$ i==0 || i==N-1 || j==0 || j==i

↓

*

kuch space karo

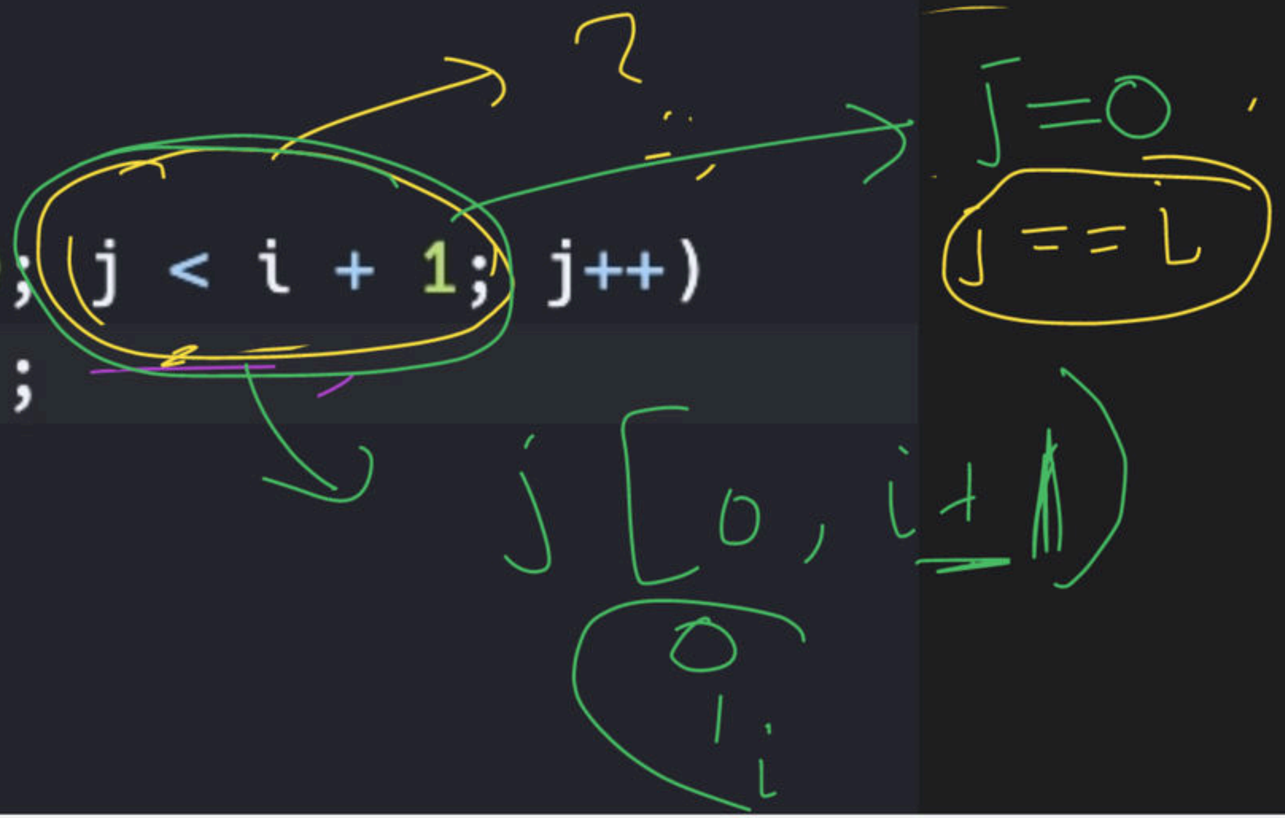
↳ I star print

↳ spaces.

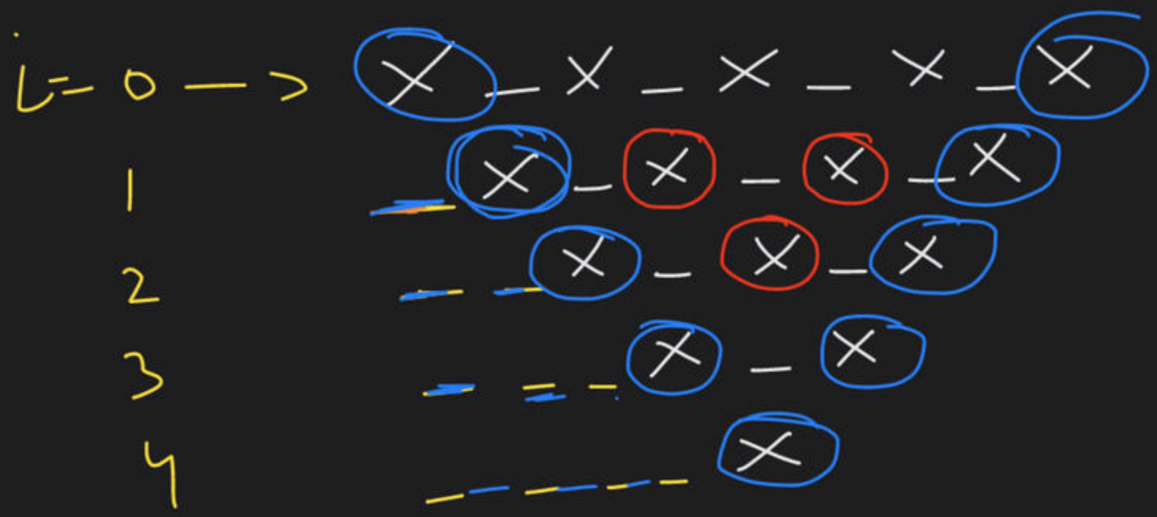
↳ last star ☆

```cpp
void hollowPyramid(int n) {
  // leveraging full pyramid code
  for (int i = 0; i < n; i++) {
    // 1. spaces
    for (int j = 0; j < n - i - 1; j++)
      cout << " ";

    // 2. stars
    for (int j = 0; j < i + 1; j++)
      cout << "* ";
    cout << endl;
  }
}
```



⑤ Inverted Hollow Pyramid



N = 5

① full inverted Pyramid

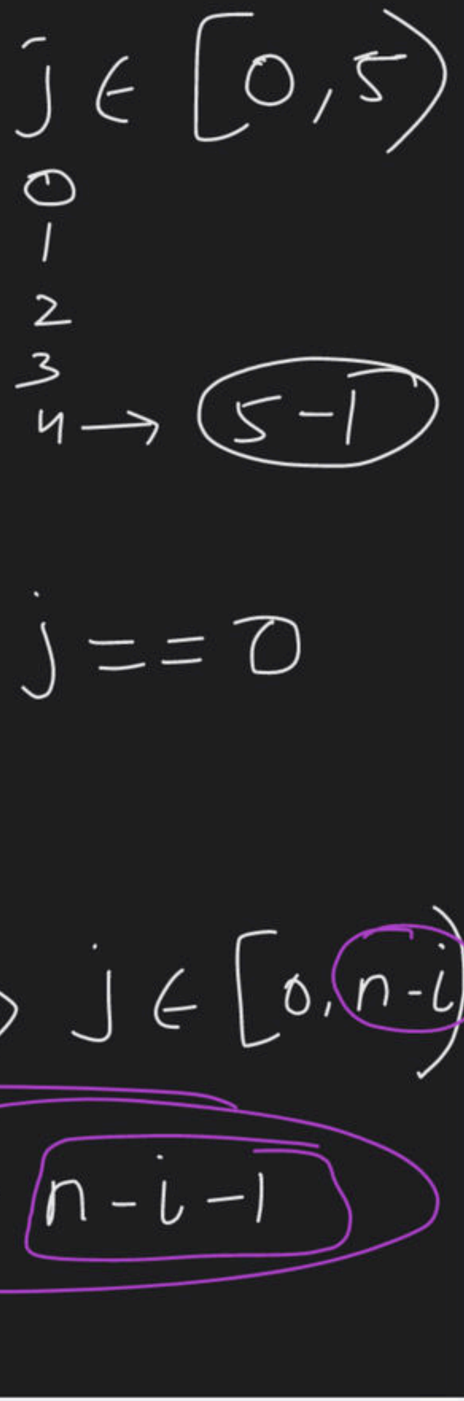
```
if (i==0 || i==N-1 || j==0 || j==n-i-1)
```

else space

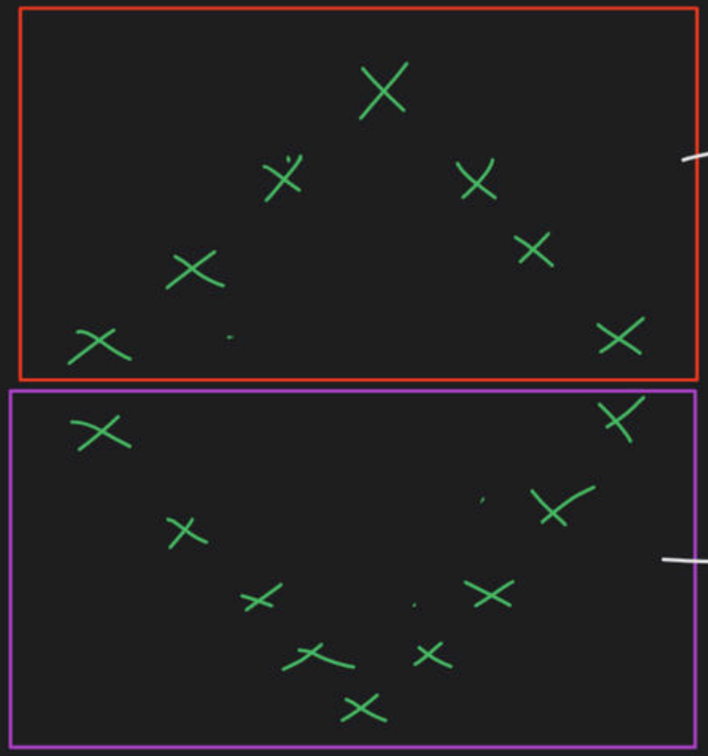
```cpp
void invertedFullPyramid(int n) {
  // outer loop
  for (int i = 0; i < n; i++) {
    // I spaces
    for (int j = 0; j < i; j++)
      cout << " ";

    // II stars
    for (int j = 0; j < n - i; j++)
      cout << "* ";

    cout << endl;
  }
}
```



6 Hollow Diamond



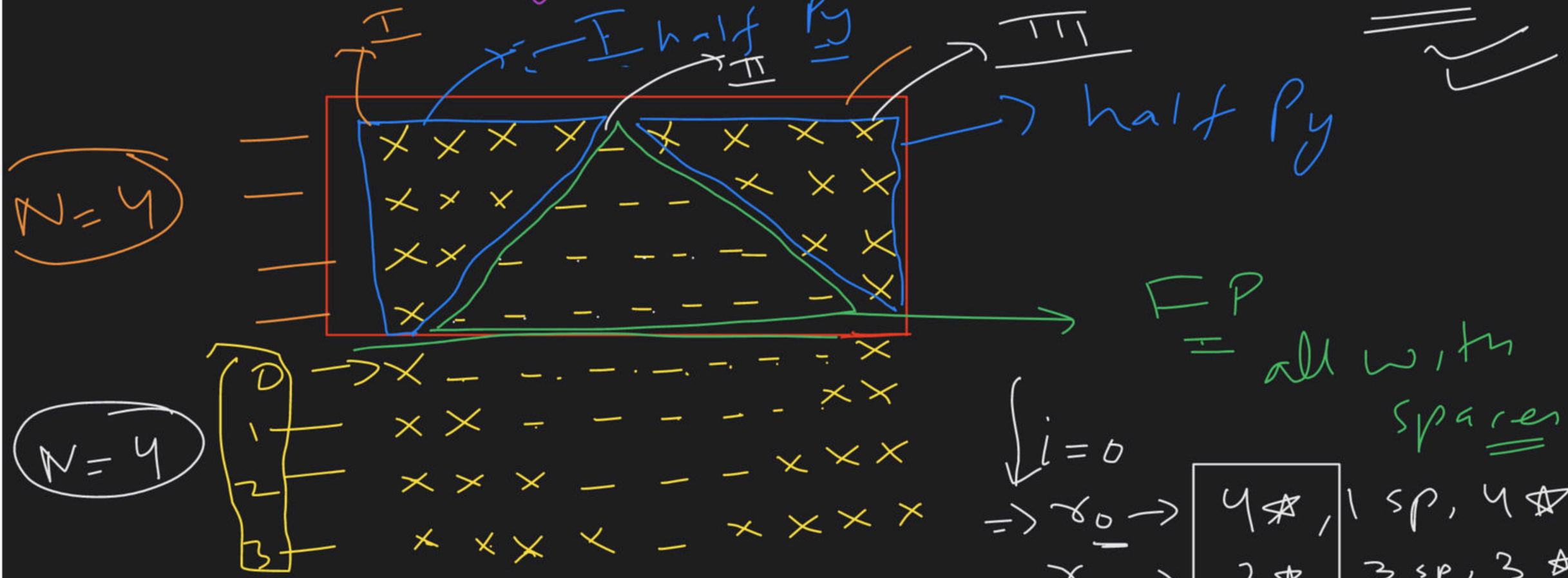
Hollow Py

IHPy

5 min

7 Min Pyramid

Outer



FP = all with spaces

$i = 0$

$\Rightarrow r_0 \rightarrow$ 4 ★, 1 sp, 4 ★

$r_1 \rightarrow$ 3 ★, 3 sp, 3 ★

$r_2 \rightarrow$ 2 ★, 5 sp, 2 ★

$r_3 \rightarrow$ 1 ★, 7 sp, 1 ★

I → stars → $j \in [0, n-i)$

III → ★ → $j \in [0, n-i)$

II.

$i = 0 \rightarrow 1$ sp

$1 \rightarrow 3$

$2 \rightarrow 5$

$3 \rightarrow 7$

$2i+1$ ~

1

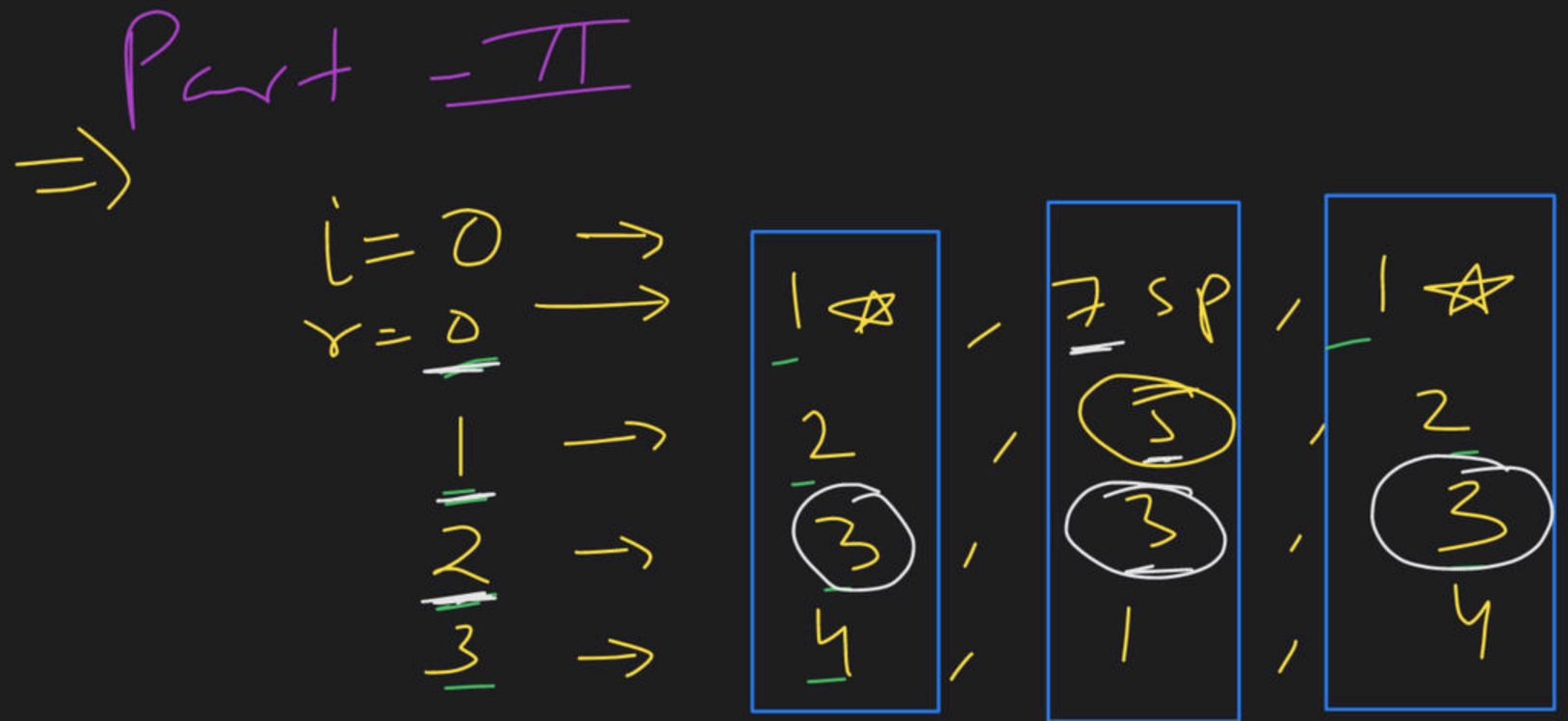
3

5

7

$j \in [0, 2i+1)$

Part - II



I : $j \in [0, i+1)$

III : $j \in [0, i+1)$

$i=2, j \in [0,3)$

→ 0 → 1 → 2

II → $j \in [0, 2n-2i-1)$

$2[n-i]-1$

$i = 3, \; j \in [0,3)$

$i = 1 \rightarrow j \in [0, 3)$

(8) Fancy 12 Pattern

Outer loop
↳ $i \in [0, n)$

N = 5

i
0 → 1

i 1 → 2 * 2
i 2 → 3 × 3 × 3
i 3 → 4 × 4 × 4 × 4
i 4 → 5 × 5 × 5 × 5 × 5

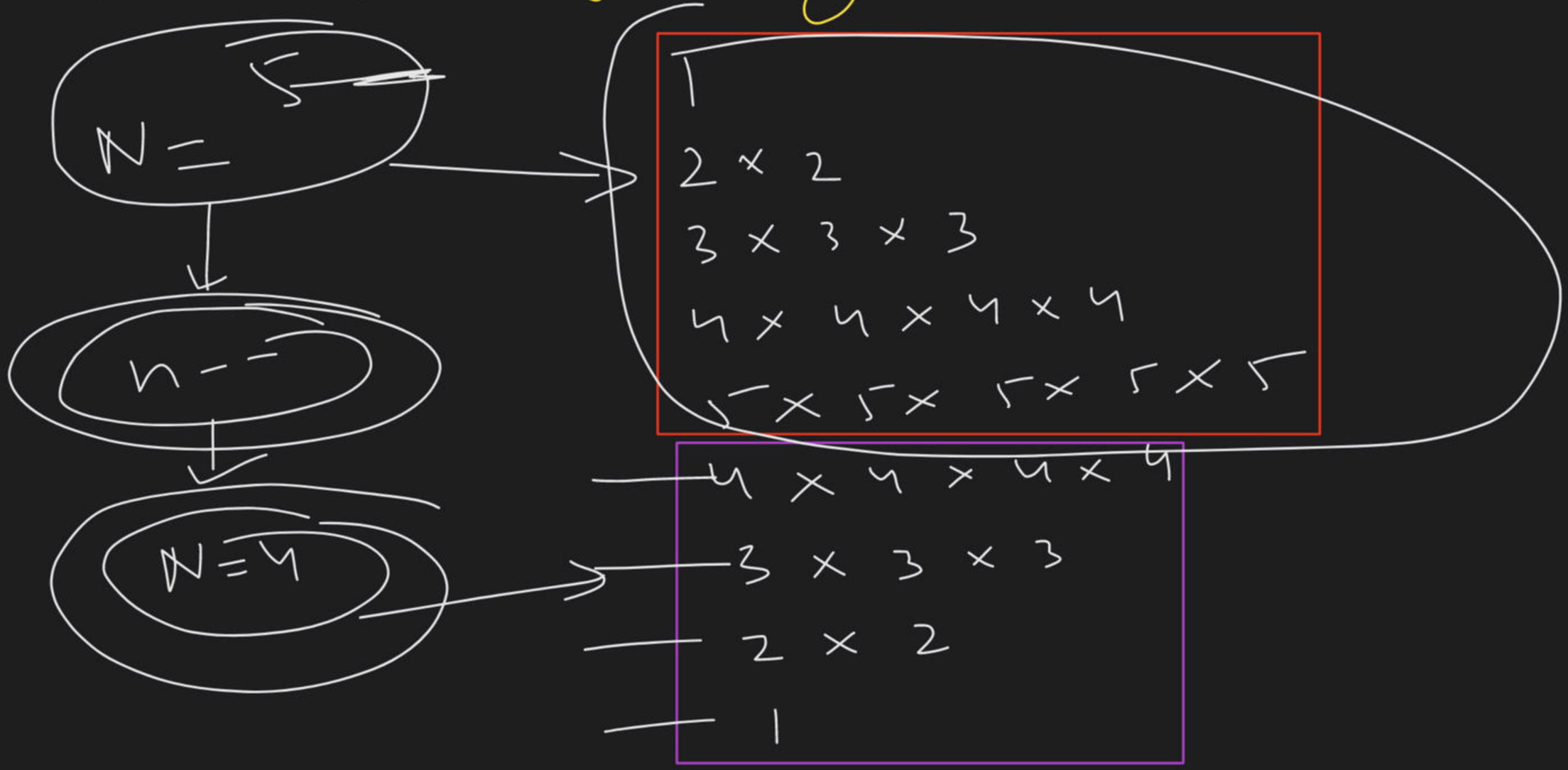
$j \in [0, 2i+1)$

0 1 2 3 4 5 6 7 8

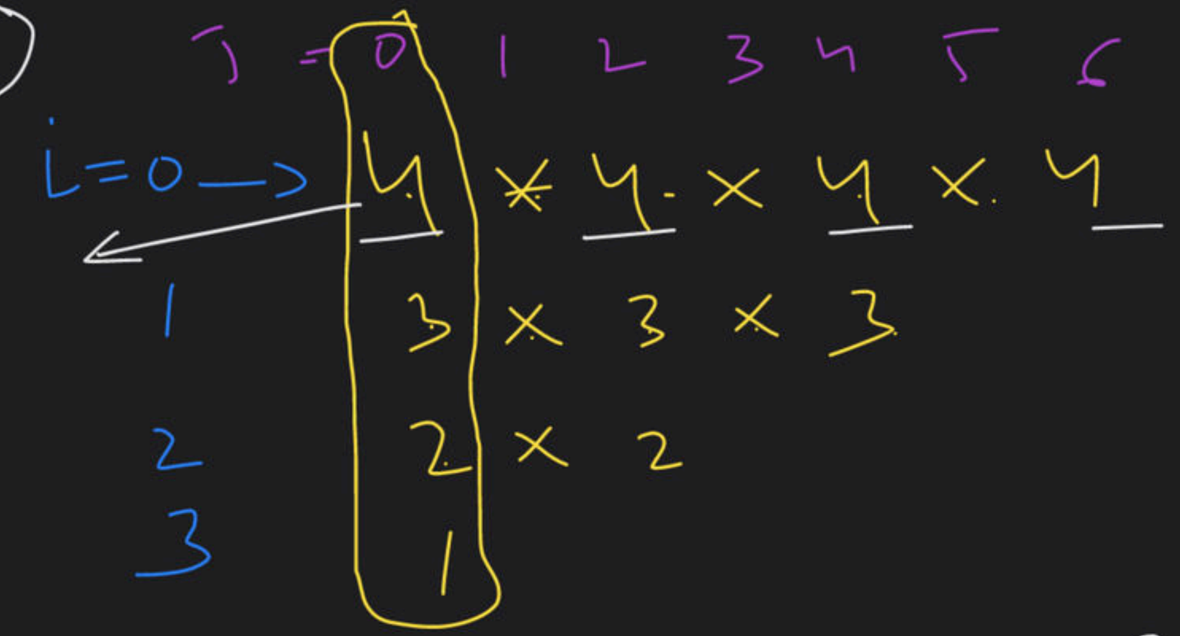
⇒ inverlap → even → no. → (i+1)

odd → ☆

9 full fancy 1 2



N=4



4-0

(4)

Outer

↓

$i \in [0, N)$

innerLoop →

$2[4-i]-1$

↓

1

i = 0, 1, 2, 3,

↗ J →

7 Times.

5 Times.

3 Times.

1 Time

$2[n-i]-1$

7

5

3

1

$J \in 0, 2(n-i)$

↓

→ j even → n-i odd → ☆

10

A B C B A

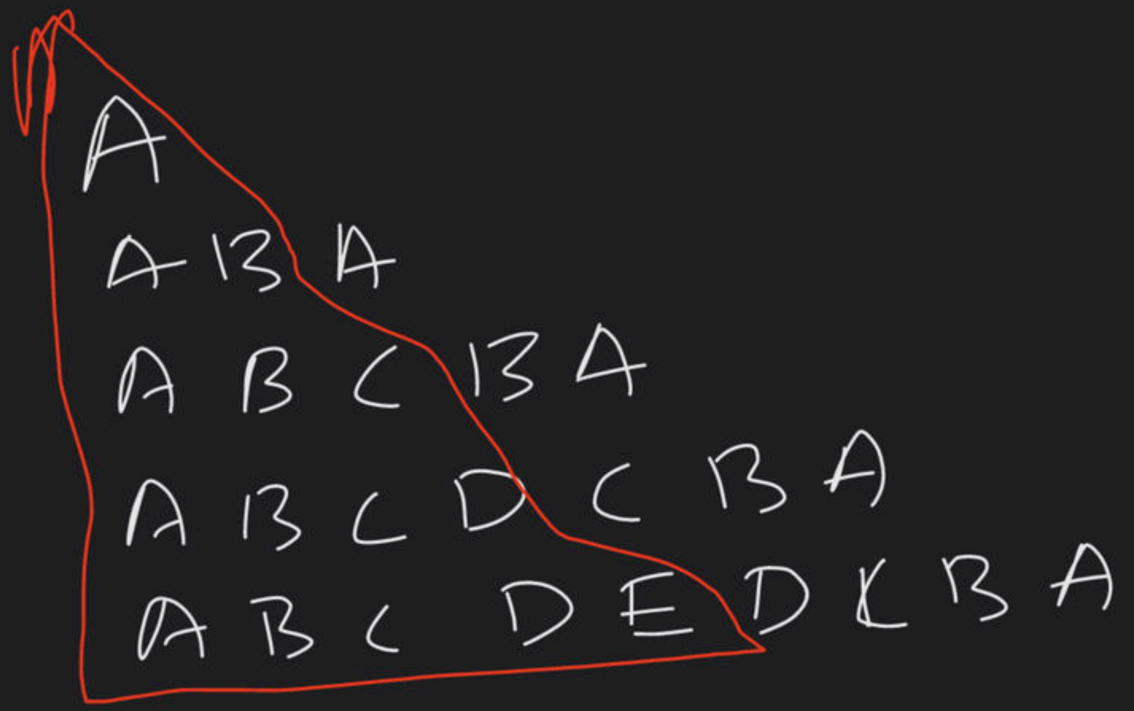
0 — 1

1 — 1 2

2 — 1 2 3

3 — 1 2 3 4

4 — 1 2 3 4 5



Outer → $i \in [0, 5)$

inner loop → $j \in [0, i+1)$

```cpp
void ABCBA(int n) {
  for (int i = 0; i < n; i++) {
    char ch = 'A' - 1; // ASCII 64 initialize
    for (int j = 0; j < i + 1; j++) {
      ch = ch + 1;
      cout << ch;
    }
    cout << endl;
  }
}
```