

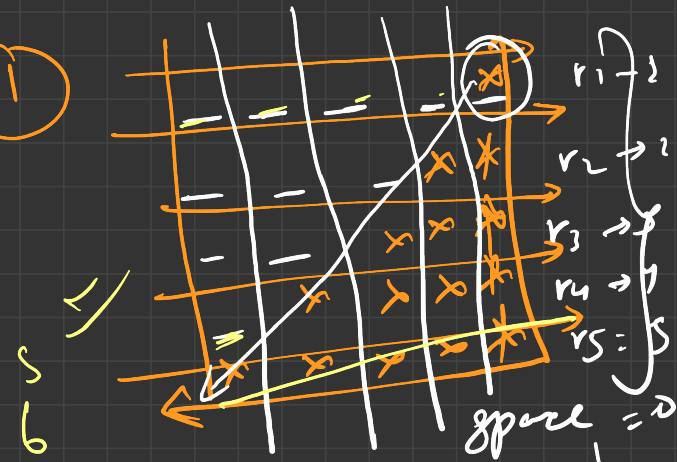
DSA : 8

Hard level

Pattern
Question Sunfire
Sensei



①



space ?

cout << " _ "

n = 5

row	space	star
1	$(n - row)$	1
2	5 - 1	2
3	5 - 2	3
4	5 - 3	4
5	5 - 4	5

- ① row = 1
- ② row ≤ n
- print space, n - row times
- print * , row time
- row + 1

$n=5$

$$100 = 1$$
$$col = 12345$$
$$col-X^2$$

```
for (row = 1; row <= n; row++) {
```

```
for (col = 1; col ≤ n - row; col++) {
```

cout << "ب" ; }
9(1)

```
for ( col = 1; col <= row; col++) {
```

```
cout << "x"; }x
```

```
cout << endl;
```

- - - - 1 r=1
 - - 1 2 r=2
 - 1 2 3 r=3
1 2 3 4 r=4
1 2 3 4 5 r=5

Space \rightarrow n-row
 num \rightarrow 1 to row

row = 1
 row \leq n

print space n-row time
 print 1 to row
 row++

for (row = 1; ^{1 \leq n} row \leq n; ² row++) {

$n=3$
 $row = 3-1$
 $col = 1 \leq 3-4(1)$

```
for (col=1; col ≤ n-row; col++) {  
    cout << " ";
```

$col = 2$

```
}  
for (col=1; 3-2  $\leq 2$ ; row  $col \leq 2$ ; col++) {  
    cout << col;  
    }  
    cout << endl;
```

Diagram illustrating the output of the code:

```
- - 1  
- 1 2
```

1
2 2
3 3 3
4 4 4 4

Space = $n - \text{row}$

print - row n

① row = 1

② row $\leq n$

③ print space, $n - \text{row}$ times

④ print row, row time

⑤ row ++

~~n=4~~
~~row=1~~
~~col=1~~

✓ 259
for (row=1; row ≤ n; row++) {
for (col=1; col ≤ n-row; col++) {

cout << " ";
for (col=1; col ≤ row; col++) {
cout << row;
}
cout << endl;

3
1 2 3
2 2
1

Local

```
{
  {
    {
  }
}
```

```
{
  int n
  {
    {
      {
        {
      }
    }
  }
}
```

Global

```
{
  {
    {
  }
}
```

parent

→ child
→ child

1	$r_1 \rightarrow 1$
2 1	$r_2 \rightarrow 2, 1$
3 2 1	$r_3 \rightarrow 3, 2, 1$
4 3 2 1	$r_4 \rightarrow 4, 3, 2, 1$
\vdots	$r_n \rightarrow n \text{ to } 1$

space $\rightarrow n - \text{row}$

print \rightarrow row to 1

- ① row = 1
- ② row $\leq n$

③ print space, $n - \text{row}$ times

④ print row to 1

⑤ row ++

$$n = 4$$

$$\text{row} = \cancel{1} 2 \checkmark$$

$$\text{col} = \cancel{1} 2 \leq 2 \times$$

$$\begin{array}{r} 4-2 \\ = 2 \end{array}$$

$$\text{col} = \cancel{2} \geq 1 \checkmark$$

\swarrow
0 \times

$$\begin{array}{r} - - - 1 \\ - - 2 \end{array} \begin{array}{l}) \\) \end{array}$$

-- A $\rightarrow r_1$
AD $\rightarrow r_2$

A B C

A B C D

space = $n - row$

print A to $A + (row - 1)$

A to B

$A + (1 - 1)$

① row = 1

② row $\leq n$

③ print space, n-row time 'A'

④ print A to $A + (row - 1)$

$A + (2 - 1)$

$A + 1$

$65 + 1 = 66 \rightarrow B$

⑤

row + 1

$$n = 4$$

$$r = \cancel{2}$$

$$c = \underline{1}$$

$$ch = \underline{'A'}$$

$$c = \text{'A' row} - 1$$

$$\text{'A' + 2 - 1}$$

$$65 + 1$$

$$66$$

$$(68 + 1)$$

$$\checkmark B$$

$$C$$

$$\cancel{C}$$

$$A, X$$

$$c = \text{'D'}$$

$$c = D$$

$$\checkmark 2 \leq 4$$

$$\cancel{2} + \cancel{2} = 3$$

$$4 - 2 = 2$$

