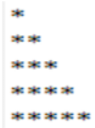
Pattern Tricks

General steps

1. Outer Loop : No.of lines = no.of rows = no.of times outer loop will run.
2. Inner Loop: No.of Columns for every row, types of elements (*,1,0,any other values(need to find the logic to get the value)
3. What do you need to print
4. When one row is printed, we need to add a newline.

Trick 1

Step-1:



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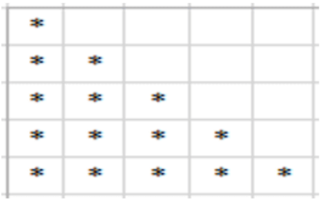
Step-2:



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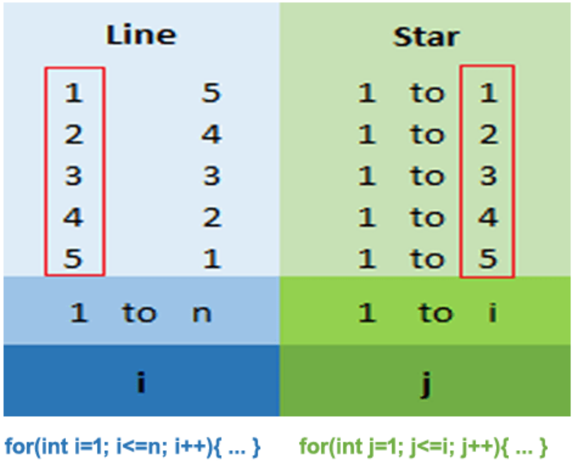
Step-3:



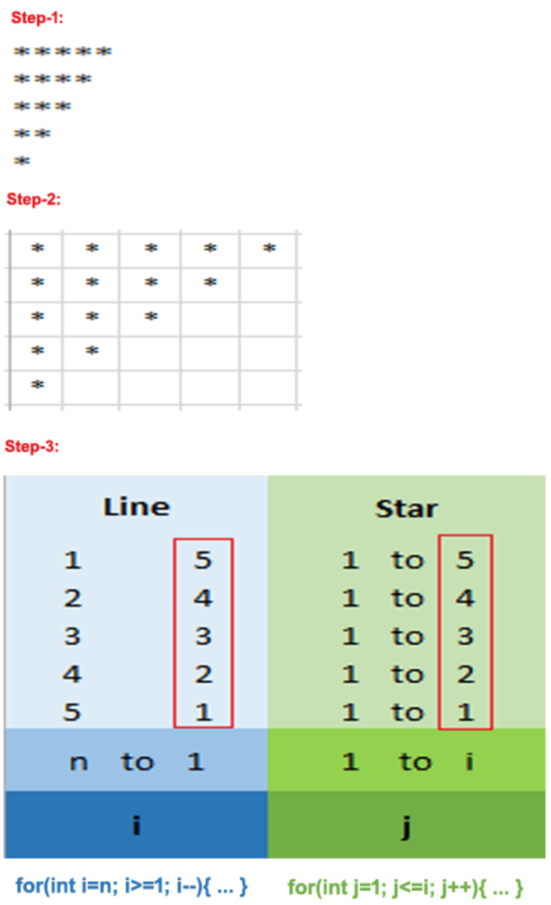
Line		Star		
1	5	1	to	1
2	4	1	to	2
3	3	1	to	3
4	2	1	to	4
5	1	1	to	5
1 to n		1 to i		
i		j		

```
for(int i=1; i<=n; i++){ ... }     for(int j=1; j<=i; j++){ ... }
```

- Line can be represented either in increasing order(1,2,3,4,5) or in decreasing order(5,4,3,2,1).
- In the given pattern, first-line is printing 1 star, second-line is printing 2 stars, third-line is printing 3 stars, and so on. Now you can see in the green area, we have mentioned it like 1 to 1, 1 to 2, 1 to 3, 1 to 4, and 1 to 5.
- Now match the common patterns from both(blue area and green area), here you can see we have matched it with red color box.
- Now as we have selected lines in increasing order(1,2,3,4,5), so we can write it like 1 to n and then it can be further assumed as the variable i.

- Similarly in the green area, we can write it like 1 to i and then it can be further assumed as the variable j.
- Now we can write a for loop for the variable i is like for(int i=1; i<=n; i++){ …} to change the line and another for loop for the variable j is like for(int j=1; j<=i; j++){ …} to print the star. Hence, here we required only two for loops to print the given pattern.

<u>Trick 2</u>



Step-1:

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*
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Step-2:

*	*	*	*	*
*	*	*	*	
*	*	*		
*	*			
*				

Step-3:

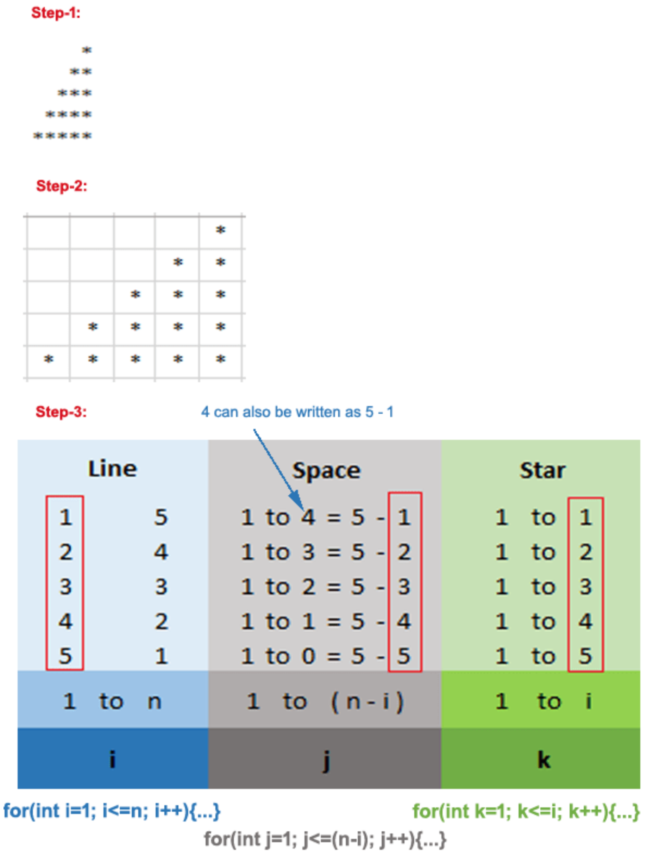
Line		Star
1	5	1 to 5
2	4	1 to 4
3	3	1 to 3
4	2	1 to 2
5	1	1 to 1
n to 1		1 to i
i		j

for(int i=n; i>=1; i--){ ... }

for(int j=1; j<=i; j++){ ... }

- Line can be represented either in increasing order(1,2,3,4,5) or in decreasing order(5,4,3,2,1).
- In the given pattern, first-line is printing 5 star, second-line is printing 4 stars, third-line is printing 3 stars, and so on. Now you can see in the green area, we have mentioned it like 1 to 5, 1 to 4, 1 to 3, 1 to 2, and 1 to 1.
- Now match the common patterns from both(blue area and green area), here you can see we have matched it with red color box.
- Now as we have selected lines in decreasing order(5,4,3,2,1), so we can write it like n to 1 and then it can be further assumed as the variable i.
- Similarly in the green area, we can write it like 1 to i and then it can be further assumed as the variable j.
- Now we can write a for loop for the variable i is like for(int i=n; i>=1; i–){ …} to change the line and another for loop for the variable j is like for(int j=1; j<=i; j++){ …} to print the star. Hence, here also we required only two for loops to print the given pattern.

<u>Trick 3</u>



Step-1:

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*****
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Step-2:

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			*	*
		*	*	*
	*	*	*	*
*	*	*	*	*

Step-3:

4 can also be written as 5 - 1

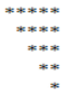
Line		Space	Star
1	5	1 to 4 = 5 - 1	1 to 1
2	4	1 to 3 = 5 - 2	1 to 2
3	3	1 to 2 = 5 - 3	1 to 3
4	2	1 to 1 = 5 - 4	1 to 4
5	1	1 to 0 = 5 - 5	1 to 5
1 to n		1 to (n-i)	1 to i
i		j	k

```
for(int i=1; i<=n; i++){...}
for(int j=1; j<=(n-i); j++){...}
for(int k=1; k<=i; k++){...}
```

- As we have seen already the Line can be represented either in increasing order(1,2,3,4,5) or in decreasing order(5,4,3,2,1).
- In the pattern, first-line is printing 4 spaces, second-line is printing 3 spaces, third-line is printing 2 spaces, and so on. Now look at gray area we have mentioned it like 1 to 4, 1 to 3, 1 to 2, 1 to 1, and 1 to 0. Now just understand here, 4 can be written as 5-1 means 4=5-1, that's why you can see in the first line we have written it like 1 to 4 = 5 – 1, similarly we can write for the remaining lines.
- In the pattern, first-line is printing 1 star, second-line printing 2 stars, third-line printing 3 stars, and so on. Now you can see in the green area, we have mentioned it like 1 to 1, 1 to 2, 1 to 3, 1 to 4, and 1 to 5.
- Now match the common patterns from all(blue area, grey area, and green area), here you can see we have matched it with red color box.
- Now as we have selected lines in increasing order(1,2,3,4,5), so we can write it like 1 to n and then it can be further assumed as the variable i.
- In grey area, we can write 1 to (n-i) and then it can be further assumed as the variable j.
- Similarly in the green area, we can write it like 1 to i and then it can be further assumed as the variable k.
- Now we can write a for loop for the variable i is like for(int i=1; i<=n; i++){ …} to change the line and a for loop for the variable j is like for(int j=1; j<=(n-i); j++){ …} to print the spaces, and another for loop for the variable k is like for(int k=1; k<=i; k++){ … } to print the stars. Hence, here we required three for loops to print the given pattern.

Trick 4

Step-1:



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  ***
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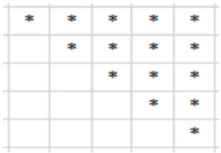
    *
```

Step-2:



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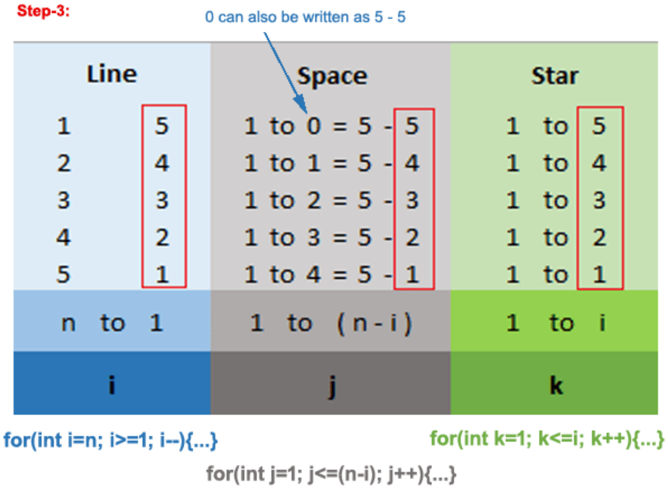
	*	*	*	*
		*	*	*
			*	*
				*

Step-3:



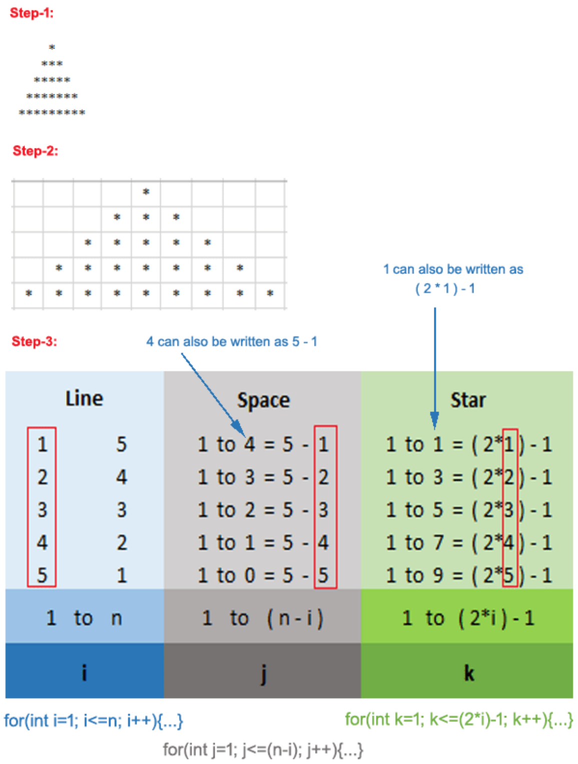
0 can also be written as 5 - 5

Line		Space		Star	
1	5	1 to 0 = 5 -	5	1 to	5
2	4	1 to 1 = 5 -	4	1 to	4
3	3	1 to 2 = 5 -	3	1 to	3
4	2	1 to 3 = 5 -	2	1 to	2
5	1	1 to 4 = 5 -	1	1 to	1
n to 1		1 to (n-i)		1 to i	
i		j		k	

```
for(int i=n; i>=1; i--){...}
for(int j=1; j<=(n-i); j++){...}
for(int k=1; k<=i; k++){...}
```

- As we have seen already the Line can be represented either in increasing order(1,2,3,4,5) or in decreasing order(5,4,3,2,1).
- In the pattern, first-line is printing 0 space, second-line is printing 1 space, third-line is printing 2 spaces, and so on. Now look at gray area we have mentioned it like 1 to 0, 1 to 1, 1 to 2, 1 to 3, and 1 to 4. Now just understand here, 0 can be written as 5-5 means 0=5-5, that's why you can see in the first line we have written it like 1 to 0 = 5 – 5, similarly we can write for the remaining lines.
- In the pattern, first-line is printing 5 star, second-line printing 4 stars, third-line printing 3 stars, and so on. Now you can see in the green area, we have mentioned it like 1 to 5, 1 to 4, 1 to 3, 1 to 2, and 1 to 1.
- Now match the common patterns from all(blue area, grey area, and green area), here you can see we have matched it with red color box.
- Now as we have selected lines in decreasing order(5,4,3,2,1), so we can write it like n to 1 and then it can be further assumed as the variable i.
- In grey area, we can write 1 to (n-i) and then it can be further assumed as the variable j.
- Similarly in the green area, we can write it like 1 to i and then it can be further assumed as the variable k.
- Now we can write a for loop for the variable i is like for(int i=n; i>=1; i–){ …} to change the line and a for loop for the variable j is like for(int j=1; j<=(n-i); j++){ …} to print the spaces, and another for loop for the variable k is like for(int k=1; k<=i; k++){ … } to print the stars. Hence, here also we required three for loops to print the given pattern.

Trick 5



Step-1:

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    *
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  *****
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*********
```

Step-2:

				*				
			*	*	*			
		*	*	*	*	*		
	*	*	*	*	*	*	*	
*	*	*	*	*	*	*	*	*

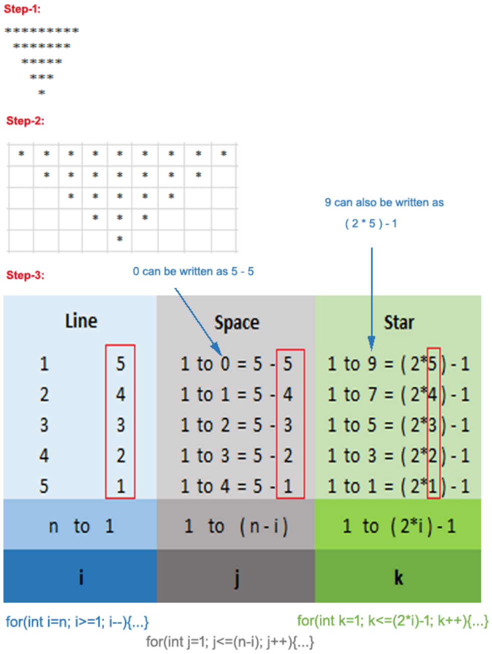
Step-3:

Line		Space	Star
1	5	1 to 4 = 5 - 1	1 to 1 = (2*1) - 1
2	4	1 to 3 = 5 - 2	1 to 3 = (2*2) - 1
3	3	1 to 2 = 5 - 3	1 to 5 = (2*3) - 1
4	2	1 to 1 = 5 - 4	1 to 7 = (2*4) - 1
5	1	1 to 0 = 5 - 5	1 to 9 = (2*5) - 1
1 to n		1 to (n - i)	1 to (2*i) - 1
i		j	k

```
for(int i=1; i<=n; i++){...}
for(int k=1; k<=(2*i)-1; k++){...}
for(int j=1; j<=(n-i); j++){...}
```

- As we have seen already the Line can be represented either in increasing order(1,2,3,4,5) or in decreasing order(5,4,3,2,1).
- In the pattern, first-line is printing 0 space, second-line is printing 1 space, third-line is printing 2 spaces, and so on. Now look at gray area we have mentioned it like 1 to 0, 1 to 1, 1 to 2, 1 to 3, and 1 to 4. Now just understand here, 0 can be written as 5-5 means 0=5-5, that's why you can see in the first line we have written it like 1 to 0 = 5 – 5, similarly we can write for the remaining lines.
- In the pattern, first-line is printing 5 star, second-line printing 4 stars, third-line printing 3 stars, and so on. Now you can see in the green area, we have mentioned it like 1 to 5, 1 to 4, 1 to 3, 1 to 2, and 1 to 1.
- Now match the common patterns from all(blue area, grey area, and green area), here you can see we have matched it with red color box.
- Now as we have selected lines in decreasing order(5,4,3,2,1), so we can write it like n to 1 and then it can be further assumed as the variable i.
- In grey area, we can write 1 to (n-i) and then it can be further assumed as the variable j.
- Similarly in the green area, we can write it like 1 to i and then it can be further assumed as the variable k.
- Now we can write a for loop for the variable i is like for(int i=n; i>=1; i–){ …} to change the line and a for loop for the variable j is like for(int j=1; j<=(n-i); j++){ …} to print the spaces, and another for loop for the variable k is like for(int k=1; k<=i; k++){ … } to print the stars. Hence, here also we required three for loops to print the given pattern.

Trick 6



Step-1:

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*********
 *******
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    *
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Step-2:

*	*	*	*	*	*	*	*	*
	*	*	*	*	*	*	*	
		*	*	*	*	*		
			*	*	*			
				*				

9 can also be written as (2 * 5) - 1

Step-3:

0 can be written as 5 - 5

Line		Space	Star
1	5	1 to 0 = 5 - 5	1 to 9 = (2*5) - 1
2	4	1 to 1 = 5 - 4	1 to 7 = (2*4) - 1
3	3	1 to 2 = 5 - 3	1 to 5 = (2*3) - 1
4	2	1 to 3 = 5 - 2	1 to 3 = (2*2) - 1
5	1	1 to 4 = 5 - 1	1 to 1 = (2*1) - 1
n to 1		1 to (n-i)	1 to (2*i)-1
i		j	k

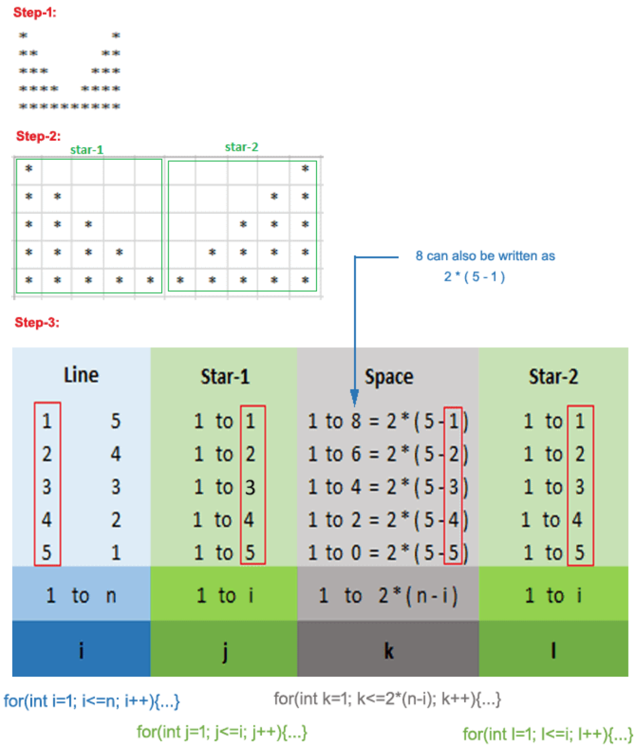
for(int i=n; i>=1; i--){...}

for(int k=1; k<=(2*i)-1; k++){...}

for(int j=1; j<=(n-i); j++){...}

- In the pattern, first-line is printing 0 space, second-line is printing 1 space, third-line is printing 2 spaces, and so on. Now look at gray area we have mentioned it like 1 to 0, 1 to 1, 1 to 2, 1 to 3, and 1 to 4. Now just understand here, 4 can be written as 5-1 means 4=5-1, that’s why you can see in the first line we have written it like 1 to 4 = 5 – 1, similarly we can write for the remaining lines.
- In the pattern, first-line is printing 9 stars, second-line printing 7 stars, third-line printing 5 stars, and so on. Now you can see in the green area, we have mentioned it like 1 to 9, 1 to 7, 1 to 5, 1 to 3, and 1 to 1. Now understand again here, 9 can also be written as (2*5)-1, that’s why you can see in the first line we have written it like 1 to 9 = (2*5) – 1, similarly we can write for the remaining lines.
- Now match the common patterns from all(blue area, grey area, and green area), here you can see we have matched it with red color box.
- Now as we have selected lines in decreasing order(5,4,3,2,1), so we can write it like n to 1 and then it can be further assumed as the variable i.
- In grey area, we can write 1 to (n-i) and then it can be further assumed as the variable j.
- Similarly in the green area, we can write it like 1 to (2*i)-1 and then it can be further assumed as the variable k.
- Now we can write a for loop for the variable i is like for(int i=n; i>=1; i–){ …} to change the line and a for loop for the variable j is like for(int j=1; j<=(n-i); j++){ …} to print the spaces, and another for loop for the variable k is like for(int k=1; k<=(2*i)-1; k++){ … } to print the stars. Hence, here also we required three for loops to print the given pattern.

Trick 7



Step-1:

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**********
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Step-2:

star-1 star-2

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*                 *
* *             * *
* * *         * * *
* * * *     * * * *
* * * * * * * * * *
```

8 can also be written as 2 * (5 - 1)

Step-3:

Line		Star-1	Space	Star-2
1	5	1 to 1	1 to 8 = 2 * (5 - 1)	1 to 1
2	4	1 to 2	1 to 6 = 2 * (5 - 2)	1 to 2
3	3	1 to 3	1 to 4 = 2 * (5 - 3)	1 to 3
4	2	1 to 4	1 to 2 = 2 * (5 - 4)	1 to 4
5	1	1 to 5	1 to 0 = 2 * (5 - 5)	1 to 5
1 to n		1 to i	1 to 2 * (n - i)	1 to i
i		j	k	l

for(int i=1; i<=n; i++){...}

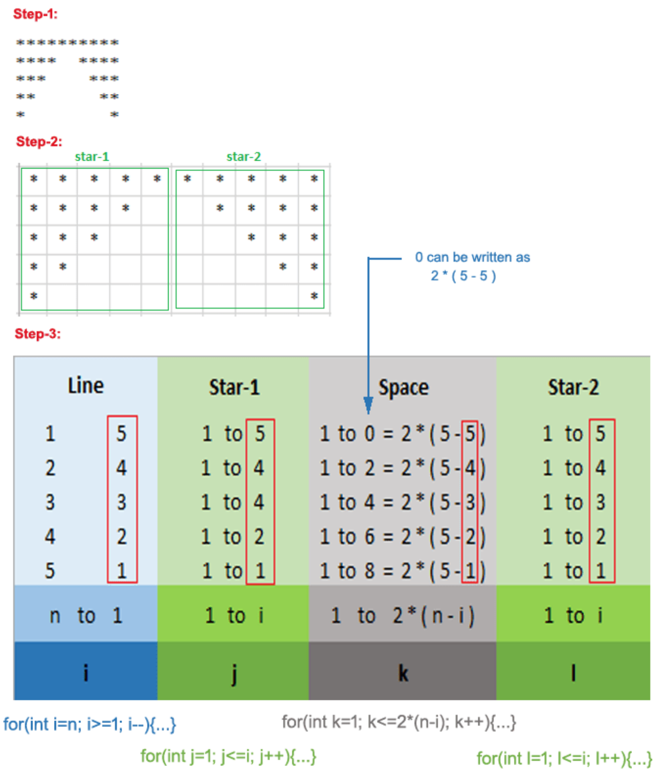
for(int k=1; k<=2*(n-i); k++){...}

for(int j=1; j<=i; j++){...}

for(int l=1; l<=i; l++){...}

- Here we have divided the pattern into two parts(only for star printing). Now as you can see in both Star-1 and Star-2 area, first-line is printing 1 star, second-line is printing 2 stars, third-line is printing 3 stars, and so on. Now look at both green area we have mentioned it like 1 to 1, 1 to 2, 1 to 3, 1 to 4, and 1 to 5.
- Now look at grey area, first-line is printing 8 spaces, second-line printing 6 spaces, third-line printing 4 spaces, and so on. So we have mentioned it like 1 to 8, 1 to 6, 1 to 4, 1 to 2, and 1 to 0. Now understand here, 8 can also be written as 2*(5-1), that's why in the first line we have written it like 1 to 8 = 2*(5-1), similarly we have written for the remaining lines.
- Now match the common patterns from all(blue area, grey area, and both green area), here you can see we have matched it with red color box.
- Now as we have selected lines in increasing order(1,2,3,4,5), so we can write it like 1 to n and then it can be further assumed as the variable i.
- Now in both green area, we can write 1 to i and then further we can assume as the variable j and l respectively.
- Now in grey area, we can write 1 to 2*(n-i) and then it can be further assumed as the variable k.
- Now here we required 4 for loops(for the variable i,j,k,l) to print the given pattern.
- The loop for the variable i is like for(int i=1; i<=n; i++){ … }.
- The loop for the variable j is like for(int j=1; j<=i; j++){ … }.
- The loop for the variable k is like for(int k=1; k<=2*(n-i); k++){ … }.
- The loop for the variable l is like for(int l=1; l<=i; l++){ … }.

Trick 8



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***      ***
**        **
*          *
```

Step-2:
star-1
star-2
0 can be written as
2 * (5 - 5)
Step-3:

Line		Star-1	Space	Star-2
1	5	1 to 5	1 to 0 = 2 * (5 - 5)	1 to 5
2	4	1 to 4	1 to 2 = 2 * (5 - 4)	1 to 4
3	3	1 to 4	1 to 4 = 2 * (5 - 3)	1 to 3
4	2	1 to 2	1 to 6 = 2 * (5 - 2)	1 to 2
5	1	1 to 1	1 to 8 = 2 * (5 - 1)	1 to 1
n to 1		1 to i	1 to 2 * (n - i)	1 to i
i		j	k	l

for(int i=n; i>=1; i--){...}
for(int k=1; k<=2*(n-i); k++){...}
for(int j=1; j<=i; j++){...}
for(int l=1; l<=i; l++){...}

- Here we have divided the pattern into two parts(only for star printing). Now as you can see in both Star-1 and Star-2 area, first-line is printing 5 stars, second-line is printing 4 stars, third-line is printing 3 stars, and so on. Now look at both green area we have mentioned it like 1 to 5, 1 to 4, 1 to 3, 1 to 2, and 1 to 1.
- Now look at grey area, first-line is printing 8 spaces, second-line printing 6 spaces, third-line printing 4 spaces, and so on. So we have mentioned it like 1 to 8, 1 to 6, 1 to 4, 1 to 2, and 1 to 0. Now understand here, 8 can also be written as 2*(5-1), that's why in the first line we have written it like 1 to 8 = 2*(5-1), similarly we have written for the remaining lines.
- Now match the common patterns from all(blue area, grey area, and both green area), here you can see we have matched it with red color box.
- Now as we have selected lines in decreasing order(5,4,3,2,1), so we can write it like n to 1 and then it can be further assumed as the variable i.
- Now in both green area, we can write 1 to i and then further we can assume as the variable j and l respectively.
- Now in grey area, we can write 1 to 2*(n-i) and then it can be further assumed as the variable k.
- Now here also we required 4 for loops(for the variable i,j,k,l) to print the given pattern.
- The loop for the variable i is like for(int i=n; i>=1; i–){ … }.
- The loop for the variable j is like for(int j=1; j<=i; j++){ … }.
- The loop for the variable k is like for(int k=1; k<=2*(n-i); k++){ … }.
- The loop for the variable l is like for(int l=1; l<=i; l++){ … }.

Examples

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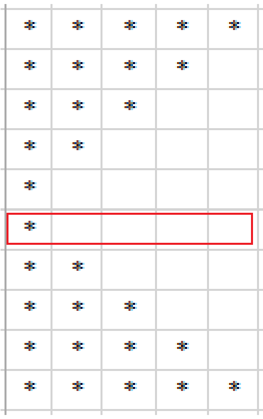
Given Pattern Logic = Trick-1 + Trick-2



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*	*			
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*	*	*	*	*

Given Pattern Logic = Trick-2 + Trick-1

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    *
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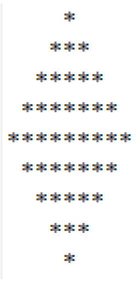
Given Pattern Logic = Trick-3 + Trick-4



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    *
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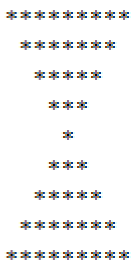
Given Pattern Logic = Trick-5 + Trick-6



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  *****
   ***
    *
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  *****
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*********
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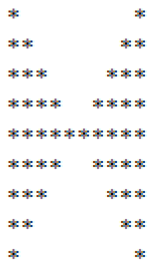
Given Pattern Logic = Trick-6 + Trick-5



```
*        *
**      **
***    ***
****  ****
**********
****  ****
***    ***
**      **
*        *
```

Given Pattern Logic = Trick-7 + Trick-8