General Pattern

i=1	*					1 star	i* star (Here i = 1)
i=2	*	*				2 stars	i* stars (Here i = 2)
i=3	*	*	*			3 stars	i* stars (Here i = 3)
i=4	*	*	*	*		4 stars	i* stars (Here i = 4)
i=5	*	*	*	*	*	5 stars	i* stars (Here i = 5)

Note: We always consider left side spaces and can ignore the right side spaces.

Note: "for i in range(1, n+1):" is common in all the codes. Here only the condition inside the second loop changes. (See Arrow in the codes)

In the pattern there are 5 rows that's why we take n = 5.

```
# using 1 for loop
n=5
for i in range(1,n+1):
    print(i*"* ")
```

```
# using 2 for loop
n=5
for i in range(1,n+1):
    for j in range(i):
        print("* ", end="")
    print()
```

```
# using 2 while loop
n=5
i=1
while i<=n:
    j=1
    while j<=i:
        print("* ", end="")
        j +=1
    i +=1
    print()
```

General Pattern

i=1	*	*	*	*	*		5 star	(n-(i-1)) * star (Here i = 1)
i=2	*	*	*	*			4 stars	(n-(i-1)) * stars (Here i = 2)
i=3	*	*	*				3 stars	(n-(i-1)) * stars (Here i = 3)
i=4	*	*					2 stars	(n-(i-1)) * stars (Here i = 4)
i=5	*						1 stars	(n-(i-1)) * stars (Here i = 5)

Note: We always consider left side spaces and can ignore the right side spaces.

Note: "for i in range(1, n+1):" is common in all the codes. Here only the condition inside the second loop changes. (See Arrow in the codes)

In the pattern there are 5 rows that's why we take n = 5. for i in

```
# using 1 for loop
n=5
for i in range(1,n+1):
    print((n-(i-1))*"* ")
```

```
# using 2 for loop
n=5
for i in range(1,n+1):
    for j in range((n-(i-1))):
        print("* ", end="")
    print()
```

```
# using 2 while loop
n=5
i=1
while i<=n:
    j=1
    while j<=(n-(i-1)):
        print("* ", end="")
        j +=1
    i +=1
    print()
```

General Pattern

i=1					*	4 spaces 1 star	(5-1) spaces 1 star	(n-i) space i star
i=2				*	*	3 spaces 2 stars	(5-2) spaces 2 stars	(n-i) space i stars
i=3			*	*	*	2 spaces 3 stars	(5-3) spaces 3 stars	(n-i) spaces i stars
i=4		*	*	*	*	1 spaces 4 stars	(5-4) spaces 4 stars	(n-i) spaces i stars
i=5	*	*	*	*	*	0 spaces 5 stars	(5-5) spaces 5 stars	(n-i) spaces i stars

In the pattern there are 5 rows that's why we take n =5.

```
# using 1 for loop
n=5
for i in range(1,n+1):
    print((n-i)*"  "+i*"* ")
```

```
# using 2 for loop
n=5
for i in range(1,n+1):
    for j in range((n-i)):
        print("  ", end="")
    for j in range(i):
        print("* ", end="")
    print()
```

Note: Here we take **two** "for loops" inside the main loop because here we also considered left spaces along with the stars. One inside "for loop" for **left spaces** and another "for loop" to print the **stars**.

Note: We always consider left side spaces and can ignore the right side spaces.

General Pattern

i=1	*	*	*	*	*
i=2		*	*	*	*
i=3			*	*	*
i=4				*	*
i=5					*

0 space 5 star

1 space 4 stars

2 spaces 3 stars

3 spaces 2 stars

4 spaces 1 stars

(1-1) space (5-(1-1)) star

(2-1) space (5-(2-1)) stars

(3-1) spaces (5-(3-1)) stars

(4-1) spaces (5-(4-1)) stars

(5-1) spaces (5-(5-1)) stars

(i-1) space (n-(i-1)) star

(i-1) space (n-(i-1)) stars

(i-1) spaces (n-(i-1)) stars

(i-1) spaces (n-(i-1)) stars

(i-1) spaces (n-(i-1)) stars

In the pattern there are 5 rows that's why we take n = 5.

```
# using 1 for loop
n=5
for i in range(1,n+1):
    print((i-1)*"  "+(n-(i-1))*"* ")
```

```
# using 2 for loop
n=5
for i in range(1,n+1):
    for j in range((i-1)):
        print("  ", end="")
    for j in range((n-(i-1))):
        print("* ", end="")
    print()
```

Note: Here we take **two** "for loops" inside the main loop because here we also considered left spaces along with the stars. One inside "for loop" for **left spaces** and another "for loop" to print the **stars**.

Note: We always consider left side spaces and can ignore the right side spaces.

0 spaces 5 stars	(i-1) spaces n stars
1 spaces 5 stars	(i-1) spaces n stars
2 spaces 5 stars	(i-1) spaces n stars
3 spaces 5 stars	(i-1) spaces n stars
4 spaces 5 stars	(i-1) spaces n stars

In the pattern there are 5 rows that's why we take n = 5.

```
# using 1 for loop
n=5
for i in range(1,n+1):
    print((i -1)*"  "+n*"* ")
```

```
# using 2 for loop
n=5
for i in range(1,n):
    for j in range(i-1):
        print(end="  ")
    for j in range(n):
        print("* ",end="")
    print()
```

Note: Here we take **two** "for loops" inside the main loop because here we also considered left spaces along with the stars. One inside "for loop" for **left spaces** and another "for loop" to print the **stars**.

Note: We always consider left side spaces and can ignore the right side spaces.

General Pattern

| i=1 | | | | | | * | * | * | * | * |

4 spaces 5 stars | (n-i) spaces n stars

| i=2 | | | | * | * | * | * | * |

3 spaces 5 stars | (n-i) spaces n stars

| i=3 | | | * | * | * | * | * |

2 spaces 5 stars ➡ (n-i) spaces n stars

| i=4 | | * | * | * | * | * |

1 spaces 5 stars | (n-i) spaces n stars

| i=5 | * | * | * | * | * |

0 spaces 5 stars | (n-i) spaces n stars

In the pattern there are 5 rows that's why we take n = 5.

```
# using 1 for loop
n=5
for i in range(1,n+1):
    print((n-i)*"  "+n*"* ")
```

```
# using 2 for loop
n=5
for i in range(1,n):
    for j in range(n-i):⬅
        print(end="  ")
    for j in range(n): ⬅
        print("* ",end="")
print()
```

Note: Here we take **two** "for loops" inside the main loop because here we also considered left spaces along with the stars. One inside "for loop" for **left spaces** and another "for loop" to print the **stars**.

Note: We always consider left side spaces and can ignore the right side spaces.

General Pattern

4 spaces 1 star 0 stars → (n-i) spaces i star (i-1) star

3 spaces 2 stars 1 stars → (n-i) spaces i stars (i-1) star

2 spaces 3 stars 2 stars ➡ (n-i) spaces i stars (i-1) star

1 spaces 4 stars 3 stars → (n-i) spaces i stars (i-1) star

0 spaces 5 stars 4 stars → (n-i) spaces i stars (i-1) star

In the pattern there are 5 rows that's why we take n = 5.

```
# using 1 for loop
n=5
for i in range(1,n+1):
    print((n-i)*"  "+i*"* "+(i-1)*"* ")
```

```
# using 2 for loop
n=5
for i in range(1,n+1):
    for j in range((n-i)):
        print("  ", end="")
    for j in range(i):
        print("* ", end="")
    for j in range((i-1)):
        print("* ", end="")
    print()
```

Note: Here we take **three** "for loops" inside the main loop because here we also considered left spaces along with the stars. One inside "for loop" for **left spaces** and another "for loop" to print the **stars**.

Note: We always consider left side spaces and can ignore the right side spaces.

Another way

General Pattern

i=1	*	*	*	*	*	*	*	*	*

0 space 9 stars — (i-1) spaces (2(n-i)+1) star

1 spaces 7 stars — (i-1) spaces (2(n-i)+1) stars

2 spaces 5 stars — (i-1) spaces (2(n-i)+1) stars

3 spaces 3 stars — (i-1) spaces (2(n-i)+1) stars

4 spaces 1 stars — (i-1) spaces (2(n-i)+1) stars

In the pattern there are 5 rows that's why we take n = 5.

```
# using 1 for loop
n=5
for i in range(1,n+1):
    print((i-1)*"  "+(2*(n-i)+1)*"* ")
```

```
# using 2 for loop
n=5
for i in range(1,n+1):
    for j in range((i-1)):
        print(end="  ")
    for j in range(2*(n-i)+1):
        print("* ", end="")
    print()
```

Note: We always consider left side spaces and can ignore the right side spaces.

General Pattern

i=1	*
i=2	* *
i=3	* * *
i=4	* * * *
i=5	* * * * *
i=6	* * * *
i=7	* * *
i=8	* *
i=9	*

1 star — i star
2 stars — i star
3 stars — i star
4 stars — i star   } n <= 5
5 stars — i star

4 stars — ((n+1)-i) star
3 stars — ((n+1)-i) star
2 stars — ((n+1)-i) star   } n > 5
1 stars — ((n+1)-i) star

In the pattern there are 5 rows that's why we take n = 5.

```
# using 2 for loop
n=9
for i in range(1,(n+1)):
    if i <=5:
        for j in range(i):
            print("*",end=" ")
        print()
    else:
        for j in range((n + 1) - i):
            print("*", end=" ")
        print()
```

```
# using 1 for loop
n=9
for i in range(1,n+1):
    if i <= 5:
        print(i*"* ")
    else:
        print(((n+1)-i) * "* ")
```

Note: We always consider left side spaces and can ignore the right side spaces.

Note: Here the general patterns changes after n = 5, so we have to use if and else condition along with the general pattern.

General Pattern

In the pattern there are 5 rows that's why we take n = 5.

i=1					*
i=2				*	*
i=3			*	*	*
i=4		*	*	*	*
i=5	*	*	*	*	*
i=6		*	*	*	*
i=7			*	*	*
i=8				*	*
i=9					*

4 spaces 1 star	(9-4-1) spaces 1 star	((n-4)-i) spaces i star
3 spaces 2 stars	(9-4-2) spaces 2 stars	((n-4)-i) spaces i stars
2 spaces 3 stars	(9-4-3) spaces 3 stars	((n-4)-i) spaces i stars
1 spaces 4 stars	(9-4-4) spaces 4 stars	((n-4)-i) spaces i stars
0 spaces 5 stars	(9-4-5) spaces 5 stars	((n-4)-i) spaces i stars

n <= 5

1 spaces 4 stars	(6-(9-4)) spaces (9+1-6)	(i-(n-4)) spaces ((n+1)-i) stars
2 spaces 3 stars	(7-(9-4)) spaces (9+1-7)	(i-(n-4)) spaces ((n+1)-i) stars
3 spaces 2 stars	(8-(9-4)) spaces (9+1-8)	(i-(n-4)) spaces ((n+1)-i) stars
4 spaces 1 stars	(9-(9-4)) spaces (9+1-9)	(i-(n-4)) spaces ((n+1)-i) stars

n > 5

Note: We always consider left side spaces and can ignore the right side spaces.

Note: Here the general patterns changes after n = 5, so we have to use if and else condition along with the general pattern.

```
# using 1 for loop
n=9
for i in range(1,n+1):
    if i <= 5:
        print(((n-4)-i)*"  "+i*"* ")
    else:
        print((i-(n-4))*"  "+((n+1)-i)*"* ")
```

```
# using 2 for loop
n=9
for i in range(1,(n+1)):
    if i <=5:
        for j in range(((n-4)-i)):
            print(end="  ")
        for j in range(i):
            print("* ",end="")
        print()
    else:
        for j in range(i-(n-4)):
            print(end="  ")
        for j in range((n+1)-i):
            print("* ", end="")
        print()
```

General Pattern

In the pattern there are 5 rows that's why we take n = 5.

i=1				*						4 spaces 1 star 0 stars	((9-4)-1) spaces 1 star (1-1) star	((n-4)-i) spaces i star (i-1) star
i=2			*	*	*					3 spaces 2 stars 1 stars	((9-4)-2) spaces 2 stars (2-1) star	((n-4)-i) spaces i stars (i-1) star
i=3		*	*	*	*	*				2 spaces 3 stars 2 stars	((9-4)-3) spaces 3 stars (3-1) star	((n-4)-i) spaces i stars (i-1) star
i=4	*	*	*	*	*	*	*			1 spaces 4 stars 3 stars	((9-4)-4) spaces 4 stars (4-1) star	((n-4)-i) spaces i stars (i-1) star
i=5	*	*	*	*	*	*	*	*	*	0 spaces 5 stars 4 stars	((9-4)-5) spaces 5 stars (5-1) star	((n-4)-i) spaces i stars (i-1) star

n <= 5

i=6	*	*	*	*	*	*	*			1 spaces 4 stars 3 stars	(6-(9-4)) spaces (9+1-6) stars (9-6) star	(i-(n-4)) spaces ((n+1)-i) stars (n-i) star
i=7		*	*	*	*	*				2 spaces 3 stars 2 stars	(7-(9-4)) spaces (9+1-7) stars (9-7) star	(i-(n-4)) spaces ((n+1)-i) stars (n-i) star
i=8			*	*	*					3 spaces 2 stars 1 stars	(8-(9-4)) spaces (9+1-8) stars (9-8) star	(i-(n-4)) spaces ((n+1)-i) stars (n-i) star
i=9				*						4 spaces 1 stars 0 stars	(9-(9-4)) spaces (9+1-9) stars (9-9) star	(i-(n-4)) spaces ((n+1)-i) stars (n-i) star

n > 5

Note: We always consider left side spaces and can ignore the right side spaces.

Note: Here the general patterns changes after n = 5, so we have to use if and else condition along with the general pattern.

```
# using 1 for loop
n=9
for i in range(1,n+1):
    if i <= 5:
        print((((n-4)-i)*"  "+i*"* "+(i-1)*"* ")
    else:
        print(((i-(n-4))*"  "+((n+1)-i)*"* "+(n-i)*"* ")
```

```
# using 2 for loop
n=9
for i in range(1,(n+1)):
    if i <=5:
        for j in range(((n-4)-i)):
            print(end=" ")
        for j in range(i):
            print("* ",end="")
        for j in range(i-1):
            print("* ",end="")
        print()
    else:
        for j in range(i-(n-4)):
            print(end=" ")
        for j in range((n+1)-i):
            print("* ", end="")
        for j in range(n-i):
            print("* ",end="")
        print()
```

i=1	*	*	*	*	*	*	*	*	*
i=2		*	*	*	*	*	*	*	
i=3			*	*	*	*	*		
i=4				*	*	*			
i=5					*				
i=6				*	*	*			
i=7			*	*	*	*	*		
i=8		*	*	*	*	*	*	*	
i=9	*	*	*	*	*	*	*	*	*

0 space 9 star   (i-1) space (n-2(i-1)) star

1 space 7 star   (i-1) space (n-2(i-1)) star

2 space 5 star   (i-1) space (n-2(i-1)) star   n <= 5

3 space 3 star   (i-1) space (n-2(i-1)) star

4 space 1 star ⟹ (i-1) space (n-2(i-1)) star

3 space 3 star   (n-i) space (2i-n) star

2 space 5 star   (n-i) space (2i-n) star   n > 5

1 space 7 star   (n-i) space (2i-n) star

0 space 9 star   (n-i) space (2i-n) star

In the pattern there are 5 rows that's why we take n = 5.

```
# using 2 for loop
n=9
for i in range(1,(n+1)):
    if i <=5:
        for j in range(i-1):   ⇐
            print(end=" ")
        for j in range(n-2*(i-1)):   ⇐
            print("* ",end="")
    print()
    else:
        for j in range(n-i):   ⇐
            print(end=" ")
        for j in range(2*i-n):   ⇐
            print("* ", end="")
    print()
```

Note: We always consider left side spaces and can ignore the right side spaces.

Note: Here the general patterns changes after n = 5, so we have to use if and else condition along with the general pattern.

```
# using 1 for loop
n=9
for i in range(1,n+1):
    if i<=5:               ⇩
        print((i-1)*" "+(n-2*(i-1))*"* ")
    else:   ⇧
        print((n-i) * " " + (2*i-n) * "* ")
            ⇧                    ⇧
```

i=1	*	*	*	*	*	*	*	*	*
i=2		*	*	*	*	*	*	*	
i=3			*	*	*	*	*		
i=4				*	*	*			
i=5					*				
i=6				*	*	*			
i=7			*	*	*	*	*		
i=8		*	*	*	*	*	*	*	
i=9	*	*	*	*	*	*	*	*	*

0 space 9 star   (i-1) space (n-2(i-1)) star ⌐

1 space 7 star   (i-1) space (n-2(i-1)) star

2 space 5 star   (i-1) space (n-2(i-1)) star   — n <= 5

3 space 3 star   (i-1) space (n-2(i-1)) star

4 space 1 star ➡ (i-1) space (n-2(i-1)) star ⌐

3 space 3 star   (n-i) space (2i-n) star ⌐

2 space 5 star   (n-i) space (2i-n) star

1 space 7 star   (n-i) space (2i-n) star   — n > 5

0 space 9 star   (n-i) space (2i-n) star ⌐

In the pattern there are 5 rows that's why we take n = 5.

using 2 for loop
```
n=9
for i in range(1,(n+1)):
    if i <=5:
        for j in range(i-1):   ⇐
            print(end=" ")
        for j in range(n-2*(i-1)):   ⇐
            print("* ",end="")
        print()
    else:
        for j in range(n-i):   ⇐
            print(end=" ")
        for j in range(2*i-n):   ⇐
            print("* ", end="")
        print()
```

Note: We always consider left side spaces and can ignore the right side spaces.

Note: Here the general patterns changes after n = 5, so we have to use if and else condition along with the general pattern.

using 1 for loop
```
n=9
for i in range(1,n+1):
    if i<=5:
        print((i-1)*"  "+(n-2*(i-1))*"* ")
    else:
        print((n-i) * "  " + (2*i-n) * "* ")
```