

Q n=5

```

1)  - - - - *
2)  - - - * * *
3)  - - * * * * *
4)  - * * * * * * *
5)  * * * * * * * *
  
```

$1 \rightarrow 1$   
 $2 \rightarrow 3$   
 $3 \rightarrow 5$   
 $4 \rightarrow 7$   
 $5 \rightarrow 9$

$(x) \rightarrow 2x-1$   
Star

n=5

```

- - - - *
- - - * *
- - * * *
- * * * *
* * * * *
  
```

this pattern  
 we already  
solved

space  $\rightarrow$  (n - row)  
 Stars  $\rightarrow$  row  
 $x \uparrow$

$\phi_n$

1	★ ★ ★ ★ ★
2	★ ★ ★ ★
3	★ ★ ★
4	★ ★
5	★

$n \leq 5$

$1 \rightarrow 5$

$2 \rightarrow 4$

$3 \rightarrow 3$

$4 \rightarrow 2$

$5 \rightarrow 1$

★
★ ★
★ ★ ★
★ ★ ★ ★
★ ★ ★ ★ ★

$n \leq 5$

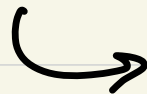
$x^{\text{th row}} \rightarrow n - x + 1$

stars

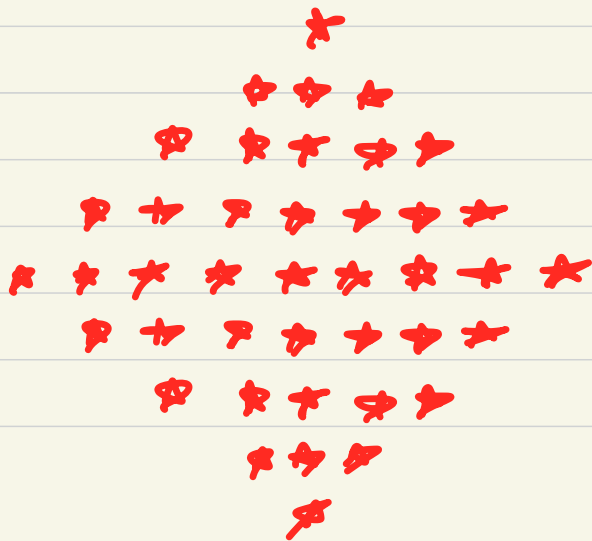
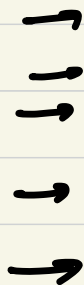
P<sub>n</sub>



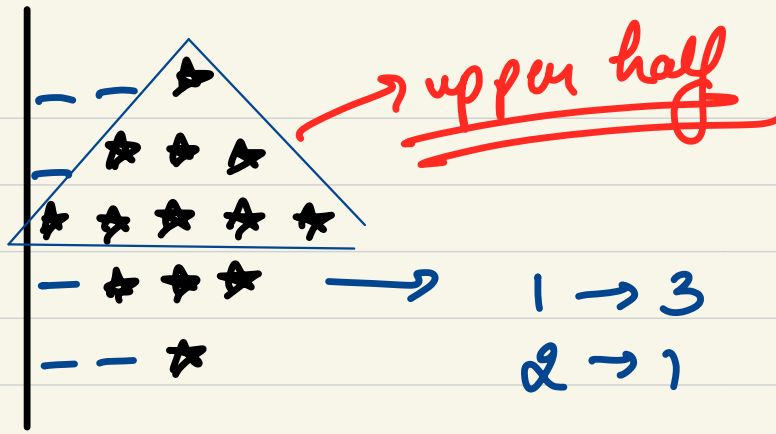
$$n = 3$$



n will be  
always odd



$$n = 5$$



$n = 5$

1)	- * * * * *
2)	- - * * * *
3)	- - - * * *
4)	- - - - *

total  $\rightarrow$   $n-1$  rows

row  $\rightarrow x$   
 space  $\rightarrow x$

1  $\rightarrow$  7  
 2  $\rightarrow$  8  
 3  $\rightarrow$  3  
 4  $\rightarrow$  1

$(2x(n-x) - 1) \rightarrow$  stars

$n-1$        $x \uparrow$

$a - b$

$10 - 1$

$10 - 2$

$10 - 3$

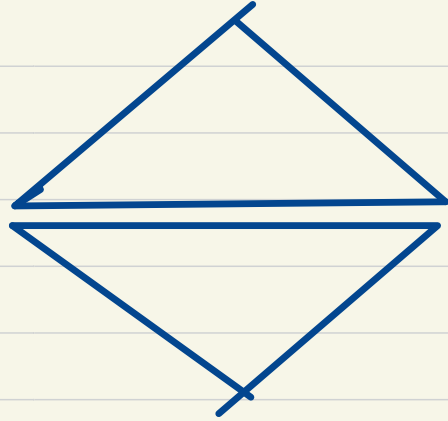
$10 - 4$

$10 - 5$

$10 - 6$

upper triangle (n) ←

→ lower triangle (n) ←



$Q_n$

$n=8$

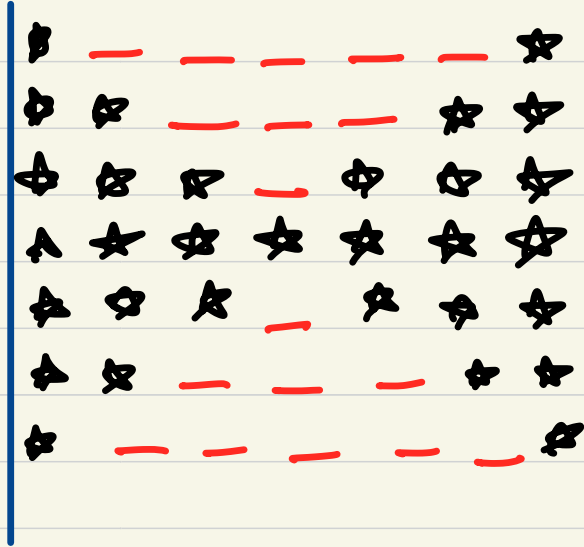
Butterfly

$n=8$



$= \textcircled{1}$

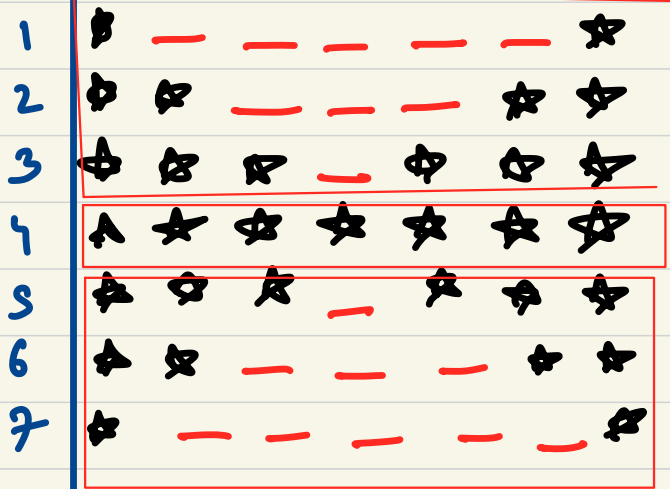
$n \rightarrow \text{odd}$





$n = 7$

#  $\rightarrow$  n rows printing

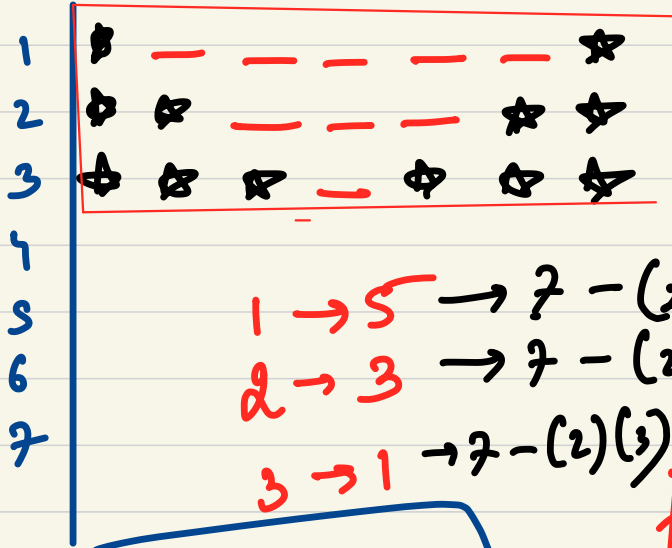


$\rightarrow$  upper

$\rightarrow$  middle

$\rightarrow$  lower

$$n=7$$



→ upper

# In the upper component  
you've 3 rows for

$$\underline{\underline{n=7}}$$

$$1 \rightarrow 5 \rightarrow 7 - (2)(1)$$

$$2 \rightarrow 3 \rightarrow 7 - (2)(2)$$

$$3 \rightarrow 1 \rightarrow 7 - (2)(3)$$

for a given value  $n$ , we have

Spaces →  $n - 2 \times \text{row}$

$$\frac{n-1}{2}$$

$$\underline{\underline{\text{rows}}}$$

In the upper component, the no. of stars before space & after space is same as the row no.

$\left\{ \begin{array}{l} \text{leftStar} = \text{rowNo} \\ \text{rightStar} = \text{rowNo} \\ \text{Spaces} \rightarrow n - 2 \times \text{rowNo} \end{array} \right\}$

---

---

```
for (let row = 1; row <= (n-1)/2; row += 1) {
```

```
  let str = "";  
  leftStar = row;  
  for (let i = 1; i <= leftStar; i += 1) { → left Star  
    str += "★";  
  }
```

```
  spaces = n - 2 * row;  
  for (let j = 1; j <= spaces; j += 1) { → space  
    str += " ";  
  }
```

```
  rightStar = row;  
  for (let k = 1; k <= rightStar; k += 1) { → right Star  
    str += "★";  
  }
```

```
  console.log(str);  
  _____
```

```
}
```

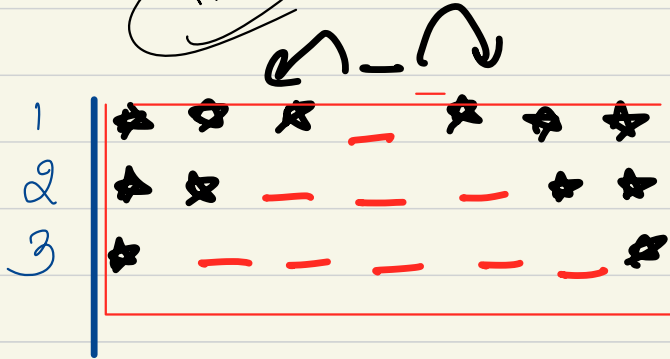
Middle component always consists of one line with

n stars.

```
function middle (n) {  
  let str = "";  
  for (let i = 1; i <= n; i++) {  
    str += " *";  
  }  
  console.log(str);  
}
```

$$\left( \frac{n-1}{2} \right) \text{ rows}$$

$$n=7$$



→ lower

leftStar =

$$\left( \frac{7-1}{2} \right) + 6 \rightarrow 3$$

$$2 \text{ row} - 1$$

$$1 \rightarrow 3$$

$$2 \rightarrow 2$$

$$3 \rightarrow 1$$

$$\left( \frac{n-1}{2} \right) - \text{row} + 1$$

$$3 - \text{row} + 1$$

$$\text{leftStar} \rightarrow \left( \frac{n-1}{2} \right) - \text{row} + 1$$

$$\text{rightStar} \rightarrow \left( \frac{n-1}{2} \right) - \text{row} + 1$$

$$\text{Spaces} \rightarrow 2 \times \text{row} - 1$$

Q<sub>3</sub>

HW

$n=7$

\*\*\* - \*\*\*  
\*\*\* - - - \*\*  
\*\* - - - - \*\*  
\* - - - - - \*  
\* - - - - - \*  
\*\* - - - - \*\*  
\*\*\* - - \*\*  
\*\*\*\* - \*\*\*\*



$Q_m$

-	-	-	1				
-	-	1	2	1			
-	1	<del>2</del>	3	2	1		
1	2	3	4	3	2	1	

$$n = 4$$

$Q_n$

5							
5	4						
5	4	3					
5	<del>4</del>	3	2				
5	4	3	2	1			
5	4	3	2	1	0		
5	4	3	2	1			
5	4	3	2				
5	4	3					
5	4						
5							

$$\underline{n = 5}$$