

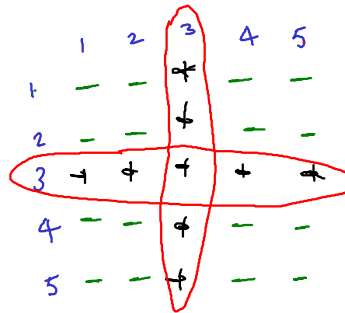
# Advance Pattern Printing Problems

## Pattern1 : Plus Pattern Printer

```

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

$$\begin{array}{r} \textcircled{2} \\ 2 \overline{) 5} \\ \underline{4} \\ 1 \end{array}$$

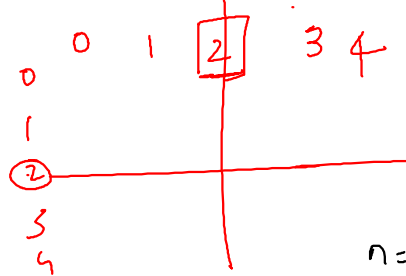
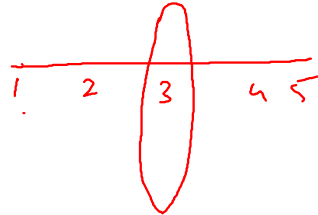


5  
1 2  $\textcircled{3}$  4 5  
1 2  $\textcircled{3}$  4 5

(i)  
row = 3  
column = 3  
(j)  
do e  
" "

$$n = 5$$

$$mid = \frac{n}{2} = \frac{5}{2} = 2$$



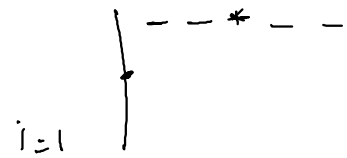
$n = 5$

$mid = 2$

```

int mid=n/2;
for(int i=0;i<n;i++){
    for(int j=0;j<n;j++){
        if(i==mid || j==mid){
            cout<<"*";
        }else{
            cout<<" ";
        }
    }
    cout<<endl;
}
    
```

$i = 0$   
 $j = 0$   
 $0 == 2 || 0 == 2 \times$   
 $j = 1$   
 $0 == 2 || 1 == 2 \times$   
 $j = 2$   
 $0 == 2 || 2 == 2 \checkmark$   
 $j = 3$   
 $0 == 2 || 3 == 2 \times$   
 $j = 4$   
 $j = 5$   $5 < 5 \times$

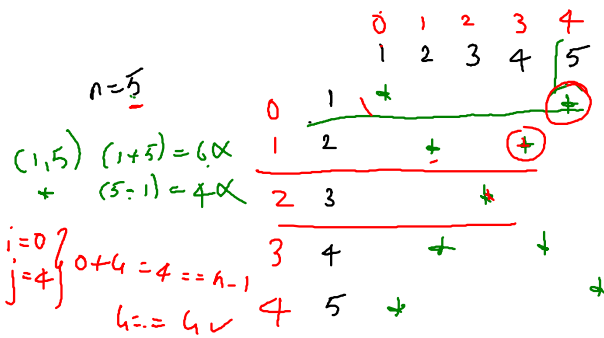


# Pattern2 : Cross Star

```

*      *
*      *
*
*      *
*      *

```



1<sup>st</sup> row  $(1,1)$   
 $(1,5)$   
 $(0,4)$

2<sup>nd</sup> row  $(2,2)$   
 $(1,3)$   $(2,1)$

3<sup>rd</sup> row  $(3,3)$   
 $(2,2)$

4<sup>th</sup> row  $(4,2)$   
 $(3,2)$   $(4,1)$

5<sup>th</sup> row  $(5,1)$   
 $(4,1)$   $(5,5)$

$i=1, j=3 \rightarrow 4 == 4 \checkmark$   
 $5 \text{ rows.}$   
 $i=2, j=2$

row & column is same

$\checkmark (i=j) \rightarrow \star$

$i=3, j=1$  |  $i=4, j=0$

$(i=j \parallel i+j == n-1) \{$

$\star$   
 $\}$  else F

3

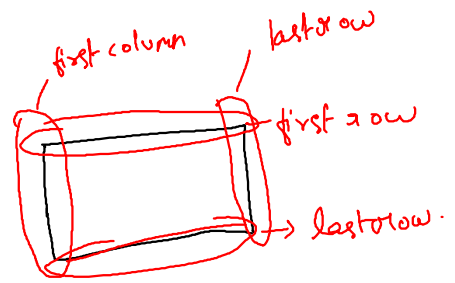
### Pattern3: Hallow Rectangle

```

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

rows = 5  
columns = 6

{ 0, 1, 2, 3, 4 }  
 i = row = 1  
 { 1, 2, 3, 4, 5 }  
 j = col = 1



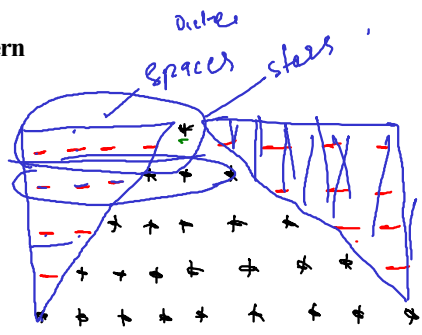
{ 0 1 2 3 4 5 }  
 j = col = 1  
 { 1 2 3 4 5 6 }  
 j = col = 6

#### Pattern4: Centered Pyramid Star Pattern

$i=1$     $n=5$   
 $(n-1) \Rightarrow 4$   
 $==--*$   
 $i=2$     $n-2=3$   
 $==--*$   
 $i=3$     $n-3=2$   
 $==--*$   
 $i=4$     $n-4=1$   
 $==--*$   
 $i=5$     $n-5=0$

$1$   
 $2$   
 $3$   
 $4$   
 $5$

$(n-i)$



$n=5$

$1, 3, 5, 7, 9, \dots$   
 odd number  
AP


$AP = a + (n-1)d$   
 $\Rightarrow 1 + (n-1)2$   
 $\Rightarrow 1 + 2n - 2$   
 $a_n \Rightarrow 2n - 1 //$

$i=1 \quad (2 \times 1 - 1) \Rightarrow (2 \times 1 - 1) \Rightarrow 1$   
 $i=2 \quad (2 \times 2 - 1) \Rightarrow 4 - 1 \Rightarrow 3$   
 $i=3 \quad (2 \times 3 - 1) \Rightarrow 6 - 1 \Rightarrow 5$   
 $i=4 \quad (2 \times 4 - 1) \Rightarrow 8 - 1 \Rightarrow 7$   
 $\vdots$

#### Homework- Pattern5: Centered Inverted Pyramid Star Pattern



# Pattern6: Hollow Pyramid Star Pattern



$(n-1) = 3$   
 $(n-i)$

$n=4$

spaces  $\rightarrow$  1st loop

2nd loop

starting ending } \*

$i=4, n=4$

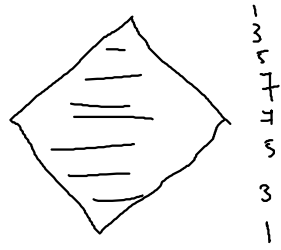
	1	2	3	4	5	6	7	
1	-	-	-	*				1
2	.	.	*	-	*			3
3			*	-	-	-	*	5
4				*	-	-	-	7
5					*	-	-	9
6						*	-	
7							*	

$(2i-1)$

$(j=1 || j=2+i-1 || i=n)$

else -

## Pattern7: Full Diamond Star Pattern



Similar to pattern f.

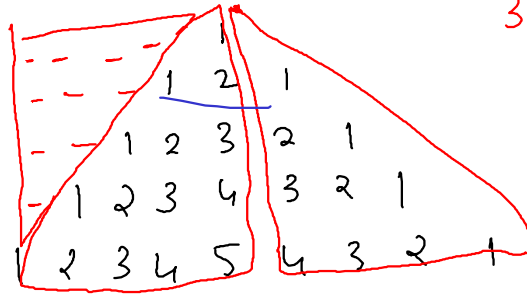
pattern 5 H/w

# Pattern8: Number Pyramid

2nd triangle

```

  1
 1 2
1 2 3
1 2 3 4
1 2 3 4 5
  
```



3 triangle .

1st triangle - spaces

2nd triangle - number

3rd triangle - number

✓

```

i=1
j=1
i=2
j=1 2
i=3
j=1 2 3
  
```

```

i=4
j=1 2 3 4
i=5
j=1 2 3 4 5
  
```

(j)  
(j <= i)

```

  1
 2 1
3 2 1
4 3 2 1
  
```

i=1

j=0 → i-1

j >= 0

(j)

```

  1
 2 1
3 2 1
4 3 2 1
  
```

i=3

j=2

j=1  
j=0

2 >= 0 ✓

1 >= 0 ✓  
0 >= 0 ✓

i=4

j=3

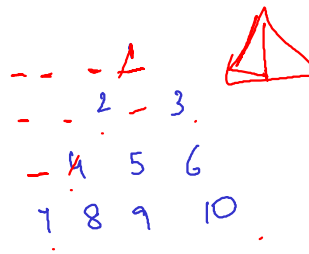
2  
1

i=5

j=4  
3  
2  
1

# Pattern9: Continuous Number Pyramid

spaces triangle



-1  
-2  
-3  
-4

$j \leq i$

num = 1  
num++



# Homework- Pattern10: Alphabet Pyramid

similar to  
pattern n 8

```

      A
    A B A
  A B C B A
A B C D C B A
A B C D E D C B A
  
```

✓

```

      1
     1 2 1
    1 2 3 2 1
   -----
      4
      5
  
```

## Homework - Pattern11: Continuous Alphabet Pyramid

similar pattern 9

```

      A
     B  C
    D E F
   G H I J
  
```