

Pattern
(Star & Alphabet)

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Step 1- Star Pattern पर Vertical & Horizontal lines
draw करें।

Step 2- i = row, j = column, के अनुसार i & j की Value
diff-2 * के लिये लियें।

Step 3- i & j के Value को Simple करें (इसी बाति
row & start करें।)

Step 4- i & j के बीच संबंध बनायें।

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Step 1- $i = \text{rows}$ & $j = \text{columns}$

1 2 3 4 5

1	*				
2	*	*			
3	*	*	*		
4	*	*	*	*	
5	*	*	*	*	*

Step 2- i j

1 1

2 1, 2

3 1, 2, 3

4 1, 2, 3, 4

5 1, 2, 3, 4, 5

Step 3- i j

1 $j \leq 1$

2 $j \leq 2$

3 $j \leq 3$

4 $j \leq 4$

5 $j \leq 5$

Step 1-

Step 4- $j \leq i$

Code- $\text{for}(i=1; i \leq 5; i++)$

{

$\text{for}(j=1; j \leq 5; j++)$

{

$\text{if}(j \leq i)$

$\text{printf}("*")$;

 else

$\text{print}(" ")$;

}

$\text{printf}("\n")$;

}

Step 4-

Code-

```

    *
  * *
 * * *
* * * *

```

Step 1- $i = \text{row} & j = \text{column}$

	1	2	3	4	5
1					*
2				*	*
3			*	*	*
4		*	*	*	*
5	*	*	*	*	*

j	<u>Step 2-</u>	j	j
$j \leq 1$	1	1	5
$j \leq 2$	2		4, 5
$j \leq 3$	3		3, 4, 5
$j \leq 4$	4		2, 3, 4, 5
$j \leq 5$	5		1, 2, 3, 4, 5

<u>Step 3-</u>	j	j
1	1	$j \geq 5$
2	2	$j \geq 4$
3	3	$j \geq 3$
4	4	$j \geq 2$
5	5	$j \geq 1$

Step 4- $j \geq 6-i$

```

Code- for (i=1; i<=5; i++)
{
  for (j=1; j<=5; j++)
  {
    if ( $j \geq 6-i$ )
      printf(" * ");
    else
      printf("   ");
  }
  printf("\n");
}

```

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Step-1- i = row, j = column

	1	2	3	4	5
1	*	*	*	*	*
2		*	*	*	*
3			*	*	*
4				*	*
5					*

Step-2- i j

- 1 1, 2, 3, 4, 5
- 2 2, 3, 4, 5
- 3 3, 4, 5
- 4 4, 5
- 5 5

Step-3- i j Step

- 1 j >= 1
- 2 j >= 2
- 3 j >= 3
- 4 j >= 4
- 5 j >= 5

Step 4- j >= i

Code- `for(i=1, i<=5; i++)`

`{ for(j=1; j<=5; j++)`

~~if (j <= i)~~

`printf("*");`

`} printf(" ");`

`}`

`printf("\n");`

Step 4

Code -

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

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Step 1- $i = \text{row}, j = \text{column}$

	1	2	3	4	5
1	*	*	*	*	*
2	*	*	*	*	
3	*	*	*		
4	*	*			
5	*				

<u>j</u>	<u>Step 2-</u>	<u>j</u>	<u>Step 3-</u>	<u>j</u>
$j >= 1$	1	1, 2, 3, 4, 5	1	$j <= 5$
$j >= 2$	2	1, 2, 3, 4	2	$j <= 4$
$j >= 3$	3	1, 2, 3	3	$j <= 3$
$j >= 4$	4	1, 2	4	$j <= 2$
$j >= 5$	5	1	5	$j <= 1$

Step 4- $j <= 6-i$

Code -

```

for (i=1; i<=5; i++)
{
  for (j=1; j<=5; j++)
    if (j <= 6-i)
      printf("*");
    else
      printf(" ");
  printf("\n");
}
  
```

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Step 1- $i = \text{row}, \& j = \text{column}$

	1	2	3	4	5	6	7	8	9
1					*		X	X	
2					*	*	*		
3				*	*	*	*	*	
4		*	*	*	*	*	*	*	
5	*	*	*	*	*	*	*	*	*

Step 2- $i \quad j$

- 1 5
- 2 4, 5, 6
- 3 3, 4, 5, 6, 7
- 4 2, 3, 4, 5, 6, 7, 8
- 5 1, 2, 3, 4, 5, 6, 7, 8, 9

Step 3- $i \quad j$

- 1 $j \geq 5 \& i < 5$
- 2 $j \geq 4 \& i < 6$
- 3 $j \leq 3 \& i < 7$
- 4 $j \leq 2 \& i < 8$
- 5 $j \leq 1 \& i < 9$

Step 4- $j \geq 6 - i \& i <= j + i$

Code-

```

for (i = 1; i <= 5; i++)
{
    for (j = 1; j <= 9; j++)
    {
        if ((j <= 6 - i) && (j <= 4 + i))
            printf("*");
        else
            printf(" ");
    }
    printf("\n");
}

```

Step 1- i

Step 2- j

Step 4- j
Code- f



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Step 1 - $i = \text{row}$ & $j = \text{column}$

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

j

Step 2 - $i - j$

$= 5 \& R_k = 5$

$= 4 \& R_k = 6$

$= 3 \& R_k = 7$

$= 2 \& R_k = 8$

$= 1 \& R_k = 9$

Step 3 - $i - j$

1 $j \leq 5 \& R_k \leq 5$

2 $j \leq 4 \& R_k \leq 6$

3 $j \leq 3 \& R_k \leq 7$

4 $j \leq 2 \& R_k \leq 8$

5 $j \leq 1 \& R_k \leq 9$

Step 4 - $j \geq 6 - i \& R_k \leq 4 + i$

Code - $\text{for}(i=1; i \leq 5; i++)$

{ $k=1;$

$\text{for}(j=1; j \leq 9; j++)$

{

$\text{if}(j \geq 6 - i \& R_k \leq 4 + i \text{ } \& R_k)$

{

$\text{printf}("*");$

$k = 0;$

} else

{

$\text{printf}(" ");$

$k = 1;$

}

$\text{printf}("-n");$

}

* * * * * * * * *
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Step 1-

	1	2	3	4	5	6	7	8	9
1	*	*	*	*	*	*	*	*	*
2	*	*	*	*		*	*	*	*
3	*	*	*	-		*	*	*	
4	*	*					*	*	
5	*							*	

i j

i j

Step 2-

1 1, 2, 3, 4, 5, 6, 7, 8, 9
 2 1, 2, 3, 4, , 6, 7, 8, 9
 3 1, 2, 3, , , 7, 8, 9
 4 1, 2, , , , 8, 9
 5 1, , , , , , 9

Step 4- $j <= 6-i \text{ || } j \geq 4+i$

Step 3-1 $j <= 5 \text{ || } j \geq 5$

Step 2-

2 $j <= 4 \text{ || } j \geq 6$

3 $j <= 3 \text{ || } j \geq 7$

4 $j <= 2 \text{ || } j \geq 8$

5 $j <= 1 \text{ || } j \geq 9$

Code-

```

for( i=1; i<=5; i++)
{
  for( j=1; j<=9; j++)
  {
    if( j<=6-i || j>=4+i)
      printf("*");
    else
      printf(" ");
  }
  printf("\n")
}

```

Code-

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

A Q S O S A

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Step 1-

	1	2	3	4	5	6	7
1				1			
2			1	2	1		
3		1	2	3	2	1	
4	1	2	3	4	3	2	1

j j i j

1) $j \geq 5$

Step 2-

1 4

Step 3- 1 $j >= 4 \text{ and } j \leq 4$

2) $j \geq 6$

2 3, 4, 5

2 $j >= 3 \text{ and } j \leq 5$

3) $j \geq 7$

3 1, 2, 3, 4, 5, 6

3 $j >= 2 \text{ and } j \leq 6$

4) $j \geq 8$

4 1, 2, 3, 4, 5, 6, 7

4 $j >= 1 \text{ and } j \leq 7$

5) $j \geq 9$

Step 4-

$j >= 5 - i \text{ and } j \leq 3 + i$

Code `for(i=1; i<=4; i++)`

`{ k=1;`

`for(j=1; j<=7; j++)`

`{`

`if(j >= 5 - i && j <= 3 + i)`

`{`

`printf("%d", k);`

`j <= 4 ? k++ : k--;`

`else`

`printf(" ");`

`}`

`printf("\n");`

`}`

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

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Step 1-

	1	2	3	4	5	6	7
1	A	B	C	D	C	B	A
2	A	B	C	C	B	A	
3	A	B			B	A	
4	A					A	

i j i j

Step 2-

- 1 1, 2, 3, 4, 5, 6, 7
- 2 1, 2, 3, 5, 6, 7
- 3 1, 2, 6, 7
- 4 1, 7

Step 3- 1 $j \leq 4 \text{ || } j \geq 4$

2 $j \leq 3 \text{ || } j \geq 5$

3 $j \leq 2 \text{ || } j \geq 6$

4 $j \leq 1 \text{ || } j \geq 7$

Step 4- $j \leq 5 - i \text{ || } j \geq 3 + i$

Code- int i, j;

char k;

for(i=1; i <= 4; i++)

{ k = 'A';

for(j=1; j <= 7; j++)

{

if($j \leq 5 - i \text{ || } j \geq 3 + i$)

{

printf("%c", k);

$j < 4? k++ : k--;$

}

else

{

printf(" ");

if($j == 4$)

k--;

}

printf("\n");

Step 2

1

2

3

4

5

6

7

Step 3

i

1

2

3

4

5

6

7

Step 4

$j \geq$

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Step 1

Step 2

i	j
1	*
2	*
3	*
4	*
5	*
6	*
7	*

Step 3

i	j
1	4
2	3, 4, 5
3	2, 3, 4, 5, 6
4	1, 2, 3, 4, 5, 6, 7
5	2, 3, 4, 5, 6
6	3, 4, 5
7	4

Step 4

i	j
1	$j >= 4 \& k$ $j <= 4$
2	$j >= 3 \& k$ $j <= 5$
3	$j >= 2 \& k$ $j <= 6$
4	$j >= 1 \& k$ $j <= 7$
5	$j >= 2 \& k$ $j <= 6$
6	$j >= 3 \& k$ $j <= 5$
7	$j >= 4 \& k$ $j <= 4$

Step 4: $j >= 5 \& k$ $j <= 3 + k$

Code -

```

int i, j, k = 0;
for (i = 1; i <= 7; i++)
{
    j <= 4? k++ : k--;
    for (j = 1; j <= 7; j++)
    {
        if (j >= 5 - k && j <= 3 + k)
        {
            printf("*");
        }
        else
            printf(" ");
    }
}

```

→

Code -

```

int i, j, k = 0, raw;
printf("Enter the rawe:");
scanf("%d", &raw);
n = (raw + 1) / 2;
for (i = 1; i <= raw; i++)
{
    if (raw % 2 == 0)
    {
        if (i <= n) k++;
        if (i > n) k--;
    }
    else
        j <= n? k++ : k--;
    for (j = 1; j <= raw; j++)
    {

```

Step 3

Step 4

Step 4

```
if (j >= n + k && j <= n - 1 + k).
```

<

```
    printf("*");
```

>

else

```
    printf(" "));
```

}

```
    printf("\n");
```

}

⑧

→

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

Step 1-	a	1	2	3	4	5	6	7
	1	*	*	*	*	*	*	*
	2		*	*	*	*	*	
	3			*	*	*		
	4				*			

Step 2-	i	j	Step 3-	i	j
	1	1, 2, 3, 4, 5, 6, 7		1	
	2	2, 3, 4, 5, 6		2	
	3		3, 4, 5	3	
	4			4	

Step 4- $j \geq i \& \& j \leq 8-i$

Code-

```
int i, j;
for (i = 1; i <= 4; i++)
{
    for (j = 1; j <= 7; j++)
        if (j >= i && j <= 8 - i)
            printf("*");
        else
            printf(" ");
    printf("\n");
}
```

Step 1

Code-

```
int i, j, now;
printf("Enter the now:");
scanf("%d", &now);
for (i = 1; i <= now; i++)
{
    for (j = 1; j <= 2 * now; j++)
        if (j >= i && j <= 2 * now - i)
            printf("*");
        else
            printf(" ");
    printf("\n");
}
```

Step 2

Step 3-
Code-Step 4-
Code-

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1
2 3 2
3 4 5 4 3
4 5 6 7 6 5 4

Step 1

	1	2	3	4	5	6	7
1				1			
2			4	3	2		
3		3	4	5	4	3	
4	4	5	6	7	6	5	4

i)

Step 2

	i	j
1		4
2		3, 4, 5
3		2, 3, 4, 5, 6
4		1, 2, 3, 4, 5, 6, 7

Step 3

	i	j
1	$i \geq 1 \& i \leq 4$	
2	$i \geq 3 \& i \leq 5$	
3	$i \geq 2 \& i \leq 6$	
4	$i \geq 1 \& i \leq 7$	

Step 4

	$j \geq 5-i \& j \leq 3+i$
--	----------------------------

++)

Code -

```

int i, j, k;
for (i = 1; i <= 4; i++)
{
    k = i;
    for (j = 1; j <= 7; j++)
        if (j <= 5 - i & j >= 3 + i)
            printf("%d", k);
        j < 4 ? k++ : k--;
    }
    else
        printf(" ");
}
printf("\n");

```

6 5 4 3 2 1 0
 5 4 3 2 1 0
 4 3 2 1 0
 3 2 1 0
 2 1 0

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Step 1-

	1	2	3	4	5	6	7
1	6	5	4	3	2	1	0
2	5	4	3	2	1	0	
3	4	3	2	1	0		
4	3	2	1	0			
5	2	1	0				
6	1	0					
7	0						

Step 2-

i	j
1	1, 2, 3, 4, 5, 6, 7
2	1, 2, 3, 4, 5, 6
3	1, 2, 3, 4, 5
4	1, 2, 3, 4
5	1, 2, 3
6	1, 2
7	1

Step 3-

i	j
1	$j \leq 7$
2	$j \leq 6$
3	$j \leq 5$
4	$j \leq 4$
5	$j \leq 3$
6	$j \leq 2$
7	$j \leq 1$

Step 4- $j \leq 8-i$

```
Code- int i, j, k;
for (i=1; i<=7; i++)
{
    k = 7 - i;
    for (j=1; j<=7; j++)
    {
        if (j <= 8 - i)
        {
            printf("%d", k);
            k--;
        }
        else
            printf(" ");
    }
    printf("\n");
}
```

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

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<u>Step 1-</u>	1	2	3	4	5	
1					1	
2				1	2	
3			1	2	3	
4		1	2	3	4	
5	1	2	3	4	5	
6		1	2	3	4	
7	.		1	2	3	
8				1	2	
9					1	

i j i j

Step 2-

1 5 Step 3 - 1 $j \geq 5$

2 4, 5 2 $j \geq 4$

3 3, 4, 5 3 $j \geq 3$

4 2, 3, 4, 5 4 $j \geq 2$

5 1, 2, 3, 4, 5 5 $j \geq 1$

6 2, 3, 4, 5 6 $j \leq 2$

7 3, 4, 5 7 $j \geq 3$

8 4, 5 8 $j \geq 4$

9 5 9 $j \geq 5$

Step 4 - ~~$j \geq 6 - k$~~

Step 1 -

Code -

```

int i, j, k = 0, n;
for (i = 1; i <= 9; i++)
{

```

$i < 6 ? k++ : k--;$

$n = 1;$

```
for ( j=1; j<=5; j++)
```

<

```
    if ( j == 6-k )
```

<

```
        printf("%d", i);
```

)

```
    else
```

```
        printf("." );
```

)

```
    printf("\n");
```

)

j

= 5

```
\ * * * * /
```

```
* \ * * / *
```

```
* * \ * / ***
```

```
* * * / * **
```

```
* * / * \ * *
```

```
* / * * * / *
```

```
/ * * * * \
```

= 3

= 4

= 5

Step 1:-

	1	2	3	4	5	6	7
1	\	*	*	*	*	*	/
2	*	\	*	*	*	/	*
3	*	*	\	*	/	*	*
4	*	*	*	/	*	*	*
5	*	*	/	*	/	*	*
6	*	/	*	*	*	/	*
7	/	*	*	*	*	*	/

for 'x'
X

for

Step 2-

	i	j	i	j
1	2, 3, 4, 5, 6	1	1	7
2	3, 4, 5, 6, 7	2	2	6
3	1, 2, 4, 6, 7	3	3	5
4	1, 2, 3, 5, 6, 7	4	4	
5	1, 2, 4, 6, 7	5	3	5
6	1, 3, 4, 5, 7	6	2	6
7	2, 3, 4, 5, 6	7	1	7

Code

Step 3-

- 1 j = 1 || j = 7
- 2 j = 2 || j = 6
- 3 j = 3 || j = 5
- 4 j = 4 || j = 4
- 5 j = 3 || j = 5
- 6 j = 2 || j = 6
- 7 j = 1 || j = 7

Step 4- j = i || j = 8-i

Step 5-

	i	\	/
1	1		7
2	2		6
3	3		5
4	4		4 or 4
5	5		3
6	6		2
7	7		1

Step 6-

j = 8-i (for /) on 4
or j = i (for \) on 4

j
7
2 6
3 5
4
3 5
2 6
7

Code-

```
int i, j;  
for(i=1; i<=7; i++)  
{  
    for(j=1; j<=7; j++)  
    {  
        if(j==i || j==8-i)  
        {  
            if(j==8-i) or if(j==i)  
                printf("/"); or printf("\\");  
            else  
                printf("\\"); or printf("/");  
        }  
        else  
            printf("*");  
    }  
    printf("\n");  
}
```

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Step 2 - k
 1
 2
 3
 4
 5
 4
 3
 2
 1

Step 1 -

	1	2	3	4	5	6	7	8	9
1	*	*	*	*	*	*	*	*	*
2	*	*	*	*		*	*	*	x
3	*	*	*			x	x	*	
4	*	x					x	x	
5	*							x	
6	*	*						*	*
7	*	*	*			x	*	*	*
8	*	*	*	*	*	*	*	x	*
9	*	*	*	*	x	*	*	*	*

Step 4 - j

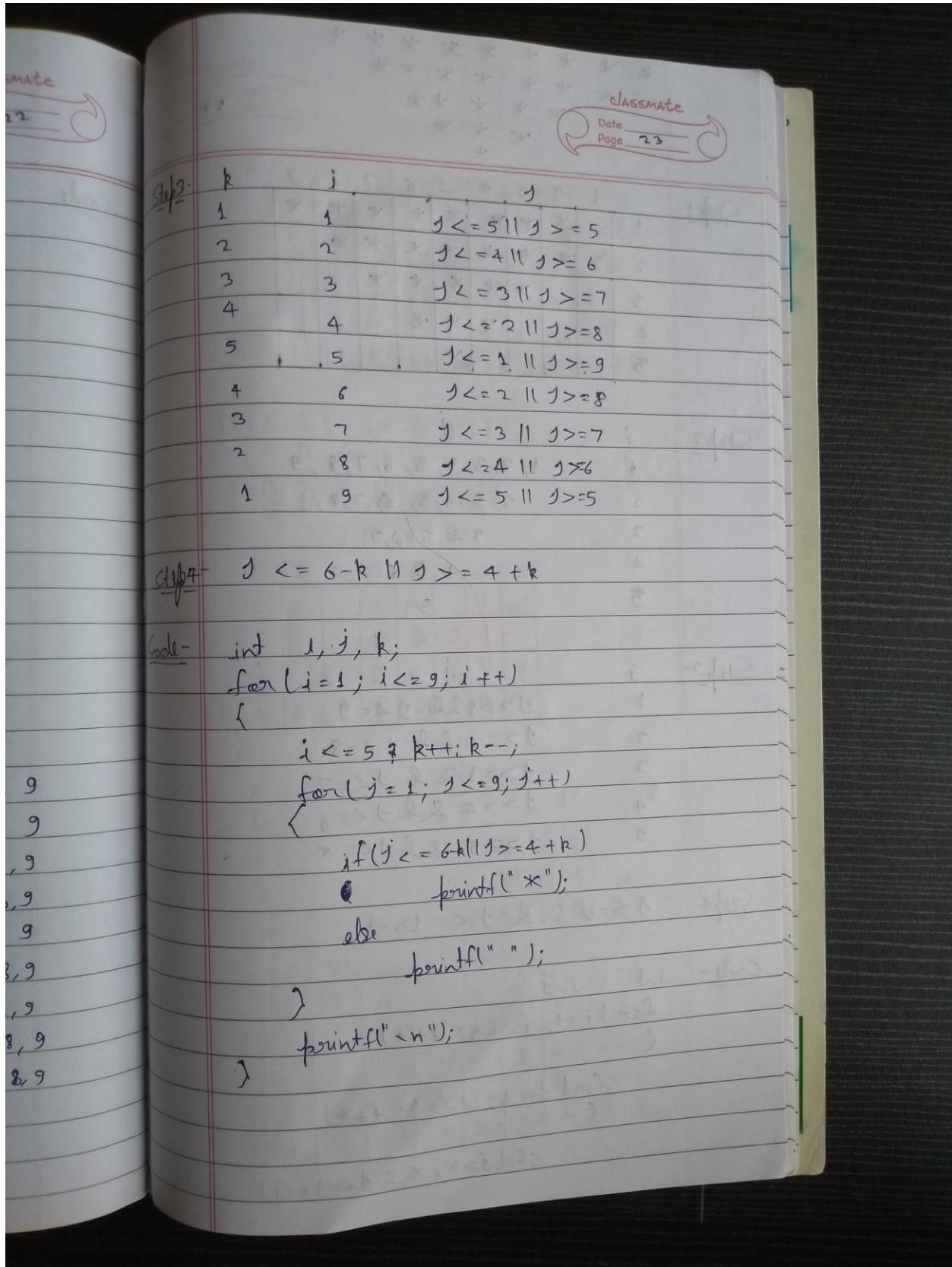
Code - int
for
{

Step 2 -

i

j

1	4 1, 2, 3, 4, 5, 6, 7, 8, 9	
2	1, 2, 3, 4,	6, 7, 8, 9
3	1, 2, 3,	7, 8, 9
4	1, 2,	8, 9
5	1,	9
6	1, 2	8, 9
7	1, 2, 3	7, 8, 9
8	1, 2, 3, 4	6, 7, 8, 9
9	1, 2, 3, 4, 5, 6, 7, 8, 9	
		}



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Step 1-

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

Step 2-

i j

1 1, 2, 3, 4, 5, 6, 7, 8, 9

2 2, 3, 4, 5, 6, 7, 8

3 3, 4, 5, 6, 7

4 4, 5, 6

5 5

A

Step 1-

Step 2-

i j

1 $j \geq 1 \& \& j \leq 9$

2 $j \geq 2 \& \& j \leq 8$

3 $j \geq 3 \& \& j \leq 7$

4 $j \geq 4 \& \& j \leq 6$

5 $j \geq 5 \& \& j \leq 5$

Step 2-

Step 4-

$j \geq i \& \& j \leq 10-i$

Code- int i, j;

for(i=1; i<=5; i++)

{

 for(j=1; j<=9; j++)

{

 if(j>=i && j<=10-i)

Step 3-

Step 4-

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```

    printf("*");
else
    printf(" ");
}
printf("\n");

```

A
 A B A
 C B A
 A B C D C B A

	1	2	3	4	5	6	7
1				A			
2			A	B	A		
3		A	B	C	B	A	
4	A	B	C	D	C	B	A

Step 2- i j

1 4

2 3, 4, 5

3 2, 3, 4, 5, 6

4 1, 2, 3, 4, 5, 6, 7

Step 3- i j

1 $j \geq 4 \& \& j \leq 4$

2 $j \geq 3 \& \& j \leq 5$

3 $j \geq 2 \& \& j \leq 6$

4 $j \geq 1 \& \& j \leq 7$

Step 4- i j

$j \geq 5 - i \& \& j \leq 3 + i$

Code-

```

int i, j;
char k;
for (i=1; i<=4; i++)
{
    k='A';
    for (j=1; j<=7; j++)
    {
        if (j>=5-i & & j<=3+i)
        {
            printf("%c", k);
            j<4 ? k++ : k--;
        }
        else
            printf(" ");
    }
    printf("\n");
}

```

A A1

ABL2

ABC123

ABCD1234

Step 1-

	1	2	3	4	5	6	7	8
1				A	1			
2			A	B	1	2		
3	A	B	C	D	1	2	3	
4	A	B	C	D	1	2	3	4

Step 2-Step 3-Step 4-Code-int
for

Step 2-

	i	j
1		
2		4
3		3, 4, 5
4		2, 3, 4, 5, 6, 7 1, 2, 3, 4, 5, 6, 7, 8

(i)

Step 3-

	i	j
1		$j \geq 4 \& j \leq 5$
2		$j \geq 3 \& j \leq 6$
3		$j \geq 2 \& j \leq 7$
4		$j \geq 1 \& j \leq 8$

Step 4- $j >= 5 - i \& j \leq 4 + i$

Code-

```

int i, j, k;
for( i = 1; i <= 8; i <= 4 + i )
{
    k = 'A';
    for( j = 1; j <= 8; j++ )
    {
        if( j == 5 )
            k = 'I';
        printf( "%c", k );
        k++;
    }
    else
        printf( " " );
    printf( "\n" );
}

```

* * * * *

* * * * *

* * * * *

* * * * *

Step 1-

	1	2	3	4	5	6	7	8
1				*	*	*	*	*
2			*	*	*	*	*	*
3		*	*	*	*	*		
4	*	*	*	*	*			

Step 2-

	i	j	
1			4, 5, 6, 7, 8
2			3, 4, 5, 6, 7
3			2, 3, 4, 5, 6
4			1, 2, 3, 4, 5,

Step 1-1
2
3
4Step 3-

	i	j	
1		$j \geq 4 \& j \leq 8$	
2		$j \geq 3 \& j \leq 7$	
3		$j \geq 2 \& j \leq 6$	
4		$j \geq 1 \& j \leq 5$	

Step 2-Step 4- $j \geq 5-i \& j \leq 9-i$ Step 3-

Code- int i, j;

for(i=1; i<=4; i++)

{

for(j=1; j<=8; j++)

{

if(j>=5-i && j<=9-i)

printf("*");

}

printf(" "));

Step 4-

Code- int i;

f

}

 printf("\n");

1
1 2 A
1 2 3 A B
1 2 3 4 A B C

Step 1-

	1	2	3	4	5	6	7
1			1				
2			1	2	A		
3		1	2	3	A	B	
4	1	2	3	4	A	B	C

i j

Step 2-

1
2 1, 2, A
3 1, 2, 3, A, B
4 1, 2, 3, 4, A, B, C

Step 3-

i j
1 $j \leq 4 \& i \leq 4$
2 $j \leq 3 \& i \leq 5$
3 $j \geq 2 \& i \leq 6$
4 $j \geq 1 \& i \leq 7$

Step 4- $j \geq 5 - i \& i \leq 3 + i$

Code- int i, j;

for (i=1; i<=4; i++)

Step
k = 49;
for (j = 1; j <= 7; j++)
{
 if (j <= 5 - i && j <= 3 + i)
 {
 if (j == 5)
 k = 65;
 printf("%c", k);
 k++;
 }
 else
 {
 printf(" ");
 }
 printf("\n");
}

1
10
101
1010
10101
101010

Step 1-

	1	2	3	4	5	6
1	1					
2	1	0	1			
3	1	0	1			
4	1	0	1	0		
5	1	0	1	0	1	
6	1	0	1	0	1	0

Step

Code-

Step 2-

i	j
1	1
2	1, 2
3	1, 2, 3
4	1, 2, 3, 4
5	1, 2, 3, 4, 5
6	1, 2, 3, 4, 5, 6

Step 3-

i	j
1	$j \leq 1$
2	$j \leq 2$
3	$j \leq 3$
4	$j \leq 4$
5	$j \leq 5$
6	$j \leq 6$

Step 4- $j \leq i$ Code-

```
int i, j, k;  
for (i=1; i <= 6; i++)  
{
```

```
    k = 1;  
    for (j=1; j <= 6; j++)  
    {
```

```
        if (j <= i)  
        {
```

```
            printf("%d", k);  
            k = 1 - k;
```

```
} else
```

```
    printf("");
```

```
    }  
    printf("\n");  
}
```

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

Step 1-

	1	2	3	4	5	6	7
1	*	*	*	*	*	*	*
2	*						*
3	*		*	*	*		*
4	*		*	*		*	*
5	*		*	*	*		*
6	*						*
7	*	*	*	*	*	*	*

Step 2-

	i	j	
1		1, 2, 3, 4, 5, 6, 7	>
2	1,		7
3	1,	3, 4, 5,	7
4	1,	3, 5,	7
5	1,	3, 4, 5,	7
6	1,		7
7	1, 2, 3, 4, 5, 6, 7		

Step 3 $(i == 1 \text{ || } i == 7 \text{ || } j == 1 \text{ || } j == 7) \text{ || } (i >= 3 \& \& i >= 5 \& \& j >= 3 \& \& j >= 5) \& \& 2(i == 3 \text{ || } i == 5 \text{ || } j == 3 \text{ || } j == 5))$

```
Code- int i, j;
for(i = 1; i <= 7; i++)
{
    for(j = 1; j <= 7; j++)
    {
        if((i == 1 || i == 7 || j == 1 || j == 7) || (i >= 3 & & i >= 5 & & j >= 3 & & j >= 5) & & 2(i == 3 || i == 5 || j == 3 || j == 5))
            printf("*");
        else
            printf(" ");
    }
    printf("\n");
}
```

0								
1 2 1								
2 3 4 3 2								
3 4 5 6 5 4 3								
4 5 6 7 8 7 6 5 4								
5 6 7 8 9 0 9 8 7 6 5								
6 7 8 9 0 1 2 3 4 3 2 1 0 9 8 7 6								
7 8 9 0 1 2 3 4 5 6 7 8 7 6 5 4 3 2 1 0 9 8 7								
8 9 0 1 2 3 4 5 6 7 8 7 6 5 4 3 2 1 0 9 8								
9 0 1 2 3 4 5 6 7 8 9 0 9 8 7 6 5 4 3 2 1 0 9								
0 1 2 3 4 5 6 7 8 9 0 9 8 7 6 5 4 3 2 1 0 9								
1 2 3 4 5 6 7 8 9 0 9 8 7 6 5 4 3 2 1 0 9								
2 3 4 5 6 7 8 9 0 9 8 7 6 5 4 3 2 1 0 9 8								
3 4 5 6 7 8 9 0 9 8 7 6 5 4 3 2 1 0 9 8 7								
4 5 6 7 8 9 0 9 8 7 6 5 4 3 2 1 0 9 8 7 6								
5 6 7 8 9 0 9 8 7 6 5 4 3 2 1 0 9 8 7 6 5								
6 7 8 9 0 1 2 1 0 9 8 7 6 5								
7 8 9 0 1 2 1 0 9 8 7 6 5								
8 9 0 1 2 3 4 5 6 5 4 3 2 1 0 9 8 7								
9 0 1 2 3 4 5 6 7 8 7 6 5 4 3 2 1 0 9 8 7 6								
0								

Step 1-

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1										0											
2										1	2	1									
3										2	3	4	3	2							
4										3	4	5	6	5	4	3					
5										4	5	6	7	8	7	6	5	4			
6										5	6	7	8	9	0	9	8	7	6		
7										6	7	8	9	0	1	0	9	8	7	6	
8										7	8	9	0	1	2	3	4	3	2	1	0
9										8	9	0	1	2	3	4	5	6	5	4	3
10										9	0	1	2	3	4	5	6	5	4	3	2
11										0	1	2	3	4	5	6	7	8	7	6	5
12										1	2	3	4	5	6	7	8	9	0	1	0
13										2	3	4	5	6	7	8	9	0	1	2	3
14										3	4	5	6	7	8	9	0	1	2	3	4
15										4	5	6	7	8	9	0	1	2	3	4	5
16										5	6	7	8	9	0	1	2	3	4	5	6
17										6	7	8	9	0	1	2	3	4	5	6	7
18										7	8	9	0	1	2	3	4	5	6	7	8
19										8	9	0	1	2	3	4	5	6	7	8	9
20										9	0	1	2	3	4	5	6	7	8	9	0
21										0											

Step 3-Step 2-

- 1
 2
 3
 4
 5
 6
 7
 8
 9
 10
 11
 12
 13
 14
 15
 16
 17
 18
 19
 20
 21
- 1, 11
 10, 11, 12
 9, 10, 11, 12, 13
 8, 9, 10, 11, 12, 13, 14
 7, 8, 9, 10, 11, 12, 13, 14, 15
 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16
 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18
 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19
 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20
 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19
 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18
 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17
 7, 8, 9, 10, 11, 12, 13, 14, 15
 8, 9, 10, 11, 12, 13, 14
 9, 10, 11, 12, 13
 10, 11, 12
 11

Step 4-
Code-

1

j

1	$j >= 11 \&& j <= 11$
2	$j >= 10 \&& j <= 12$
3	$j >= 9 \&& j <= 13$
4	$j >= 8 \&& j <= 12$
5	$j >= 7 \&& j <= 15$
6	$j >= 6 \&& j <= 16$
7	$j >= 5 \&& j <= 17$
8	$j >= 4 \&& j <= 18$
9	$j >= 3 \&& j <= 19$
10	$j >= 2 \&& j <= 20$
11	$j >= 1 \&& j <= 21$
12	$j >= 2 \&& j <= 20$
13	$j >= 3 \&& j <= 20$
14	$j >= 4 \&& j <= 18$
15	$j >= 5 \&& j <= 17$
16	$j >= 6 \&& j <= 16$
17	$j >= 7 \&& j <= 15$
18	$j >= 8 \&& j <= 14$
19	$j >= 9 \&& j <= 13$
20	$j >= 10 \&& j <= 12$
21	$j >= 11 \&& j <= 11$

Step 2 $j >= n+1-m \&& j <= n-1+m$

Code int i, j, k = 1, n = 21, m = 0;

for (i = 1; i <= 21; i++)

{

 if (i <= n ? m++ : m--;

 k = m - 1;

 for (j = 1; j <= 21; j++)

{

 if (j >= n + 1 - m && j <= n - 1 + m)

 printf("%d", j < n ? k++ : %16d, k - 9000);

 else if (j == n + 1 - m)

 printf(" ");

 }

 }

 printf("\n");

}

A
 B A
 C B A
 D C B A

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Step 1-

	1	2	3	4
1	A			
2	B	A		
3	C	B	A	
4	D	C	B	A

Step 1-

Step 2-

i	j
1	1
2	1, 2
3	1, 2, 3
4	1, 2, 3, 4

Step 3-

i	j
1	$j \leq 1$
2	$j \leq 2$
3	$j \leq 3$
4	$j \leq 4$

Step 2-

Step 3- $j \leq i$

Step 3-

Code -

```

int i, j, k;
for(i = 1; i <= 4; i++)
{
  k = 64 + i;
  for(j = 1; j <= 4; j++)
  {
    if(jk == i)
    {
      printf("%c", k--);
    }
    else
    {
      printf(" ");
    }
  }
  printf("\n");
}
  
```

Step 4-

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

		1	2	3	4	5	6	7	
i	j	j		j					
1	$j \leq 1$	1		1					$i = j$
2	$j \leq 2$	2		1	2				
3	$j \leq 3$	3	2	1	2	3			
4	$j \leq 4$	4	3	2	1	2	3	4	
		j		j					
	<u>Step 2-</u>	1		1					<u>Step 3-</u>
		2		1, 2					
		3		1, 2, 3					
		4		1, 2, 3, 4					
		j		j					
	<u>Step 3-</u>	1		$j >= 4 \& \& j \leq 4$					
		2		$j >= 3 \& \& j \leq 5$					
		3		$j >= 2 \& \& j \leq 6$					
		4		$j >= 1 \& \& j \leq 7$					

Step 4- $j >= 5-i \& \& j \leq 3+i$

```

int i, j, k;
for (i=1; i<=4; i++)
{
    k=i;
    for (j>=5-i && j<=3+i)
    {
        printf("%d", k);
        j<4? k-- : k++;
    }
    printf(" ");
}
printf("\n");

```

1
 3 * 2
 4 * 5 * 6
 10 * 9 * 8 * 7
 11 * 12 * 13 * 14 * 15

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Step 1-

	1	2	3	4	5	6	7	8	9
1	1								
2	3	*	2						
3	4	*	5	*	6				
4	10	*	9	*	8	*	7		
5	11	*	12	*	13	*	14	*	15

Step 6-

Step 2-

- 1 1
- 2 1, 2, 3
- 3 1, 2, 3, 4, 5
- 4 1, 2, 3, 4, 5, 6, 7
- 5 1, 2, 3, 4, 5, 6, 7, 9

Step 7-

Step 3-

- i j
- 1 $j \leq 1$
- 2 $j \leq 3$
- 3 $j \leq 5$
- 4 $j \leq 7$
- 5 $j \leq 9$

Step 4- ($j \leq 2 * i - 1$)

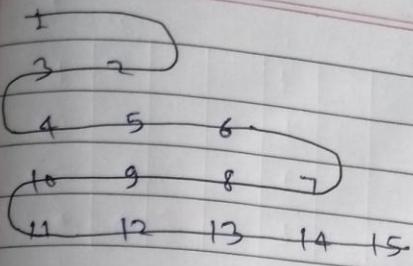
for Number -

Step 5-

- i j
- 1 1
- 2 1, 3
- 3 1, 3, 5
- 4 1, 3, 5, 7
- 5 1, 3, 5, 7, 9

(R = 11)

Step 6-



1
3 - -
4 + +
10 - -
11 + +

8 m = 0

m = m + 1

m = m + j

m = m + 1

m = m + i

m = m + 1

j = 1

j = 2

j = 3

j = 4

j = 5

101 ✓