

- same code using
nested while

```
char ch='A';
```

```
int i=1;
```

```
while(c[i]<=5){
```

```
    int j=1;
```

```
    while(j<=6-i){
```

```
        printf("%c ",ch);
```

```
        ch++;
```

```
        j++;
```

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

```
i++;
```

```
}
```

i	j	$i <= 5$	$j <= 6 - i$	O/P	ch++	j++	i++
1	1	$i <= 5$	$i <= 5$	A	B	2	
2	2	$2 <= 5$		B	C	3	
3	3	$3 <= 5$		C	D	4	
4	4	$4 <= 5$		D	E	5	
5	5	$5 <= 5$		E	F	6	
6	6	$6 <= 5 X$					2
2	1	$2 <= 5$	$1 <= 4$	F	G	2	
2	2		$2 <= 4$	G	H	3	
3	3		$3 <= 4$	H	I	4	
4	4		$4 <= 4$	I	J	5	
5	5	$5 <= 4 X$					3
3	1	$3 <= 5$	$1 <= 3$	J	K	2	
2	2		$2 <= 3$	K	L	3	
3	3		$3 <= 3$	L	M	4	
4	4	$4 <= 3 X$					4
4	1	$4 <= 5$	$1 <= 2$	M	N	2	
2	2		$2 <= 2$	N	O	3	
3	3		$3 <= 2 X$				
5	1	$5 <= 5$	$1 <= 1$	O	P	2	5
6	2	$6 <= 5 X$	$2 <= 1 X$				6

1*

A	2	C	4	E
F	7	H	9	
J	11	L		
M	14			
O				

*/

code:-

```
char ch = 'A';
int outer = 1;
int num = 1;
```

```
while(outer <= 5) {
```

```
    int inner = 1;
```

```
    while(inner <= 6 - outer) {
```

```
        if(inner % 2 != 0) {
```

```
            printf("%c\t", ch);
```

```
} else {
```

```
    printf("%d\t", num);
```

```
}
```

```
ch++;
```

```
num++;
```

```
inner++;
```

```
}
```

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

```
outer++;
```

```
}
```

No.

Date 21/7/20

o/p
Aouter
1inner
1outer c=5
 $1 \leq c \leq 5$ inner <= 6 - inner ch++ num++
 $1 \leq c \leq 5$

inner++ outer++

outer

inner

outer c=5

 $\text{inner} <= 6 - \text{outer} \times 2 = 0$

1

1

 $1 \leq c \leq 5$ $c = 5$ o/p ch++ num++
A B 2inner++ outer++
2 C 3

2

 $2 \leq c \leq 5$

C D 4

3 E 5

3

 $3 \leq c \leq 5$

4 F 6

4 G 7

4

 $4 \leq c \leq 5$

5 H 8

5 I 9

5

 $5 \leq c \leq 5$

6 J 10

6 K 11

6

 $6 \leq c \leq 5 X$

2

1

 $2 \leq c \leq 4$ $1 \leq c \leq 4$

F G 7

2 L 8

2

 $2 \leq c \leq 4$

H I 9

3 M 10

3

 $3 \leq c \leq 4$

4 N 11

4 O 12

4

 $4 \leq c \leq 4$

5 P 13

5 Q 14

5

 $5 \leq c \leq 5 X$

3

1

 $3 \leq c \leq 5$ $1 \leq c \leq 3$

J K 11

2 L 12

2

 $2 \leq c \leq 3$

3 M 13

3 N 14

3

 $3 \leq c \leq 3$

4 O 15

4 P 16

4

 $4 \leq c \leq 3 X$

4

1

 $4 \leq c \leq 5$ $1 \leq c \leq 2$

M N 14

2 O 15

2

 $2 \leq c \leq 2$

3 P 16

3 Q 17

3

 $3 \leq c \leq 2 X$

5

1

 $5 \leq c \leq 5$ $1 \leq c \leq 1$

O P 16

2 Q 17

2

 $2 \leq c \leq 1 X$

6

 $6 \leq c \leq 5 X$

H.W.

(3)

```
+ outer++  
+           *  
+           = =  
+           * * *  
+           = = = =  
+           * * * + * *  
+ outer++ outer++
```

(4)

```
* * * * *  
* = = =  
* = =  
* =  
*  
*
```

(3) → code:-

```
int outer=1;  
while(outer<=5){  
    int inner=1;  
    while(inner<=outer){  
        if(outer%2!=0){  
            printf("*");  
        }else{  
            printf("= ");  
        }  
        inner++;  
    }  
    printf("\n");  
    outer++;  
}
```

outer	outer $c=5$	inner	inner < outer $\neq 0$	outer $\neq 0$	o/p	inner + outer
1	$1 \leq 5$	1	$1 \leq 1$	$1 \neq 0$	*	2
		2	$2 \leq 1 X$			
2	$2 \leq 5$	1	$1 \leq 2$	$2 \neq 0 X$	=	2
		2	$2 \leq 2$	X	=	3
		3	$3 \leq 2 X$			
3	$3 \leq 5$	1	$1 \leq 3$	✓	*	2
		2	$2 \leq 3$	✓	*	3
		3	$3 \leq 3$	✓	*	4
		4	$4 \leq 3 X$			
4	$4 \leq 5$	1	$1 \leq 4$	X	=	2
		2	$2 \leq 4$	X	=	3
		3	$3 \leq 4$	X	=	4
		4	$4 \leq 4$	X	=	5
		5	$5 \leq 4 X$			
5	$5 \leq 5$	1	$1 \leq 5$	✓	*	2
		2	$2 \leq 5$	✓	*	3
		3	$3 \leq 5$	✓	*	4
		4	$4 \leq 5$	✓	*	5
		5	$5 \leq 5$	✓	*	6
		6	$6 \leq 5 X$			
6	$6 \leq 5 X$					

④

```
int outer = 1;
while(outer <= 5){
    int inner = 1;
    while (inner < 6 - outer){
        if (inner == 1 || outer == 1){
            printf("* ");
        } else {
            printf("= ");
        }
        inner++;
    }
    printf("\n");
    outer++;
}
```

outer	outer ≤ 5	inner	inner ≤ 5 -out	inner ≤ 11 outer $=1$	o/p	inn++	outer++
1	$1 \leq 5$	1	$1 \leq 5$	✓	*	2	
		2	$2 \leq 5$	✓	+	3	
5		3	$3 \leq 5$	✓	*	4	
		4	$4 \leq 5$	✓	*	5	
		5	$5 \leq 5$	✓	*	6	
		6	$6 \leq 5 X$				2
2	$2 \leq 5$	1	$1 \leq 4$	✓	*	2	
10		2	$2 \leq 4$	X	=	3	
		3	$3 \leq 4$	X	=	4	
		4	$4 \leq 4$	X	=	5	
		5	$5 \leq 4$				3
3	$3 \leq 5$	1	$1 \leq 3$	✓	*	2	
15		2	$2 \leq 3$	X	=	3	
		3	$3 \leq 3$	X	=	4	
		4	$4 \leq 3 X$				4
4	$4 \leq 5$	1	$1 \leq 2$	✓	*	2	
		2	$2 \leq 2$	X	=	3	
20		3	$3 \leq 2 X$				5
5	$5 \leq 5$	1	$1 \leq 1$	✓	*	2	
		2	$2 \leq 1 X$				6
6	$6 \leq 5$						