Pattern Printing - 2

Lecture- 8

Raghav Garg

Ques : Print the given pattern

Rhombus

*Ques : Print the given pattern

→

+

1 → 1
2 → 3
3 → 5
4 → 7

$j = 1$ to $2i - 1$

Star Pyramid

*Ques : Print the given pattern

```
1 ___*
2 __***
3 _*****
4 *******
```

```
1 ____*
2 ___***
3 __*****
4 _*******
5 *********
```

nst & nsp
↓ no. of stars
↓ no. of spaces

i → no. of lines

1) Pehli line me ('n-1') spaces honge. & nsp--;

2) nst = 1 , nst += 2

Star Pyramid

```
int nst = 1;
int nsp = n-1;
for(int i=1;i<=n;i++){
    // spaces
    for(int j=1;j<=nsp;j++){
        cout<<" ";
    }
    nsp--;
    for(int k=1;k<=nst;k++){
        cout<<"*";
    }
    nst+=2;
    cout<<endl;
}
```

n = 3

```
1   _ _ *
2   _ * * *
3   * * * * *
```

i = 1 2 3 4

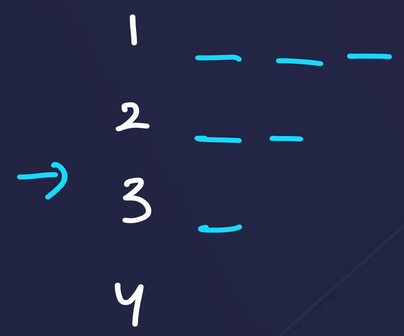
nst = 1 3 5 7

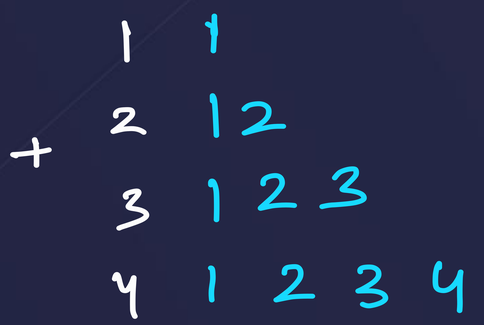
nsp = 2 1 0 -1

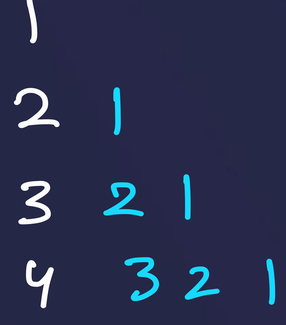
Output

```
.  _ _ *
.  _ * * *
.  * * * * *
.
```

Ques : Print the given pattern







Number Pyramid Palindrome

i ↓

1 1

2 2 1

3 3 2 1

4 4 3 2 1

5 5 4 3 2 1

1 _ _ _ 1

2 _ _ 1 2 1

3 _ 1 2 3 2 1

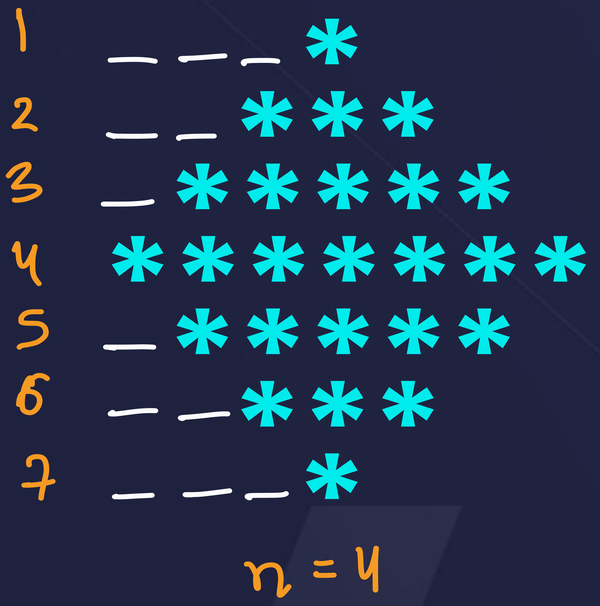
4 1 2 3 4 3 2 1

~~4 3 2 1~~

j = i ; j >= 1 ; j--

*Ques : Print the given pattern

nsp & nst



n = 4

n = 3

n = 2

n = 1

2n - 1 lines print line

Star Diamond

*Ques : Print the given pattern

n = 4

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

nsp = n-1 → 3 → nsp-- / nsp++

nst = 1 → nst += 2 / nst -= 2

nst += 2 → 4th line

nst -= 2 → 5th line

i = 1 to i <= 2*n-1

Star Diamond

```cpp
int nst = 1;
int nsp = n-1;
for(int i=1;i<=2*n-1;i++){
    // spaces
    for(int j=1;j<=nsp;j++){
        cout<<" ";
    }
    if(i<=n-1) nsp--;
    else nsp++;
    // stars
    for(int k=1;k<=nst;k++){
        cout<<"*";
    }
    if(i<=n-1) nst+=2;
    else nst-=2;
    cout<<endl;
}
```

n = 4

nst = 1 3 5 7 5 3 1 -1

nsp = 3 2 1 0 1 2 3 4

i = 1 2 3 4 5 6 7 8

1 _ _ _ *

2 _ _ * * *

3 _ * * * * *

4 * * * * * * *

5 _ * * * * *

6 _ _ * * *

7 _ _ _ *

Output

- _ _ _ *
- _ _ * * *
- _ * * * * *
- * * * * * * *
- _ * * * * *
- _ _ * * *
- _ _ _ *
-

Ques : Print the given pattern

Star Bridge

*Ques : Print the given pattern

```
  1 2 3 4 5 6 7
1 1 2 3 _ 5 6 7
2 1 2 _ _ _ 6 7
3 1 _ _ _ _ _ 7
```

n = 4

m = n-1 = 3

```
1 2 3        _          5 6 7
1 2      +   _ _ _   +    6 7
1            _ _ _ _ _      7
```

Number Bridge

**Ques : Print the given pattern

Ultimate

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

n = 4

n = 1

```
1
```

n = 2

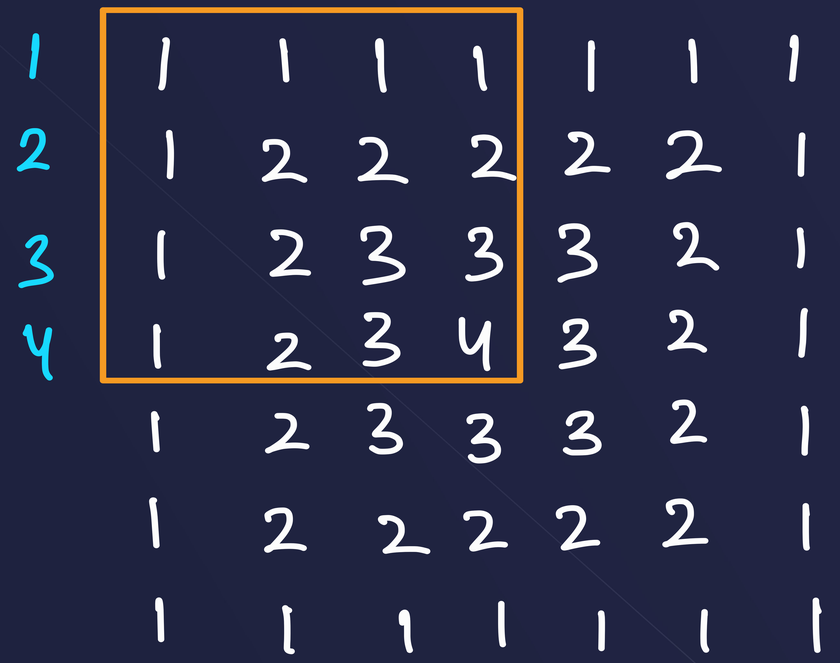
```
2 2 2
2 1 2
2 1 2
```

n = 3

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

i = 1 to 2*n-1

Number SPIRAL



$n = 4$

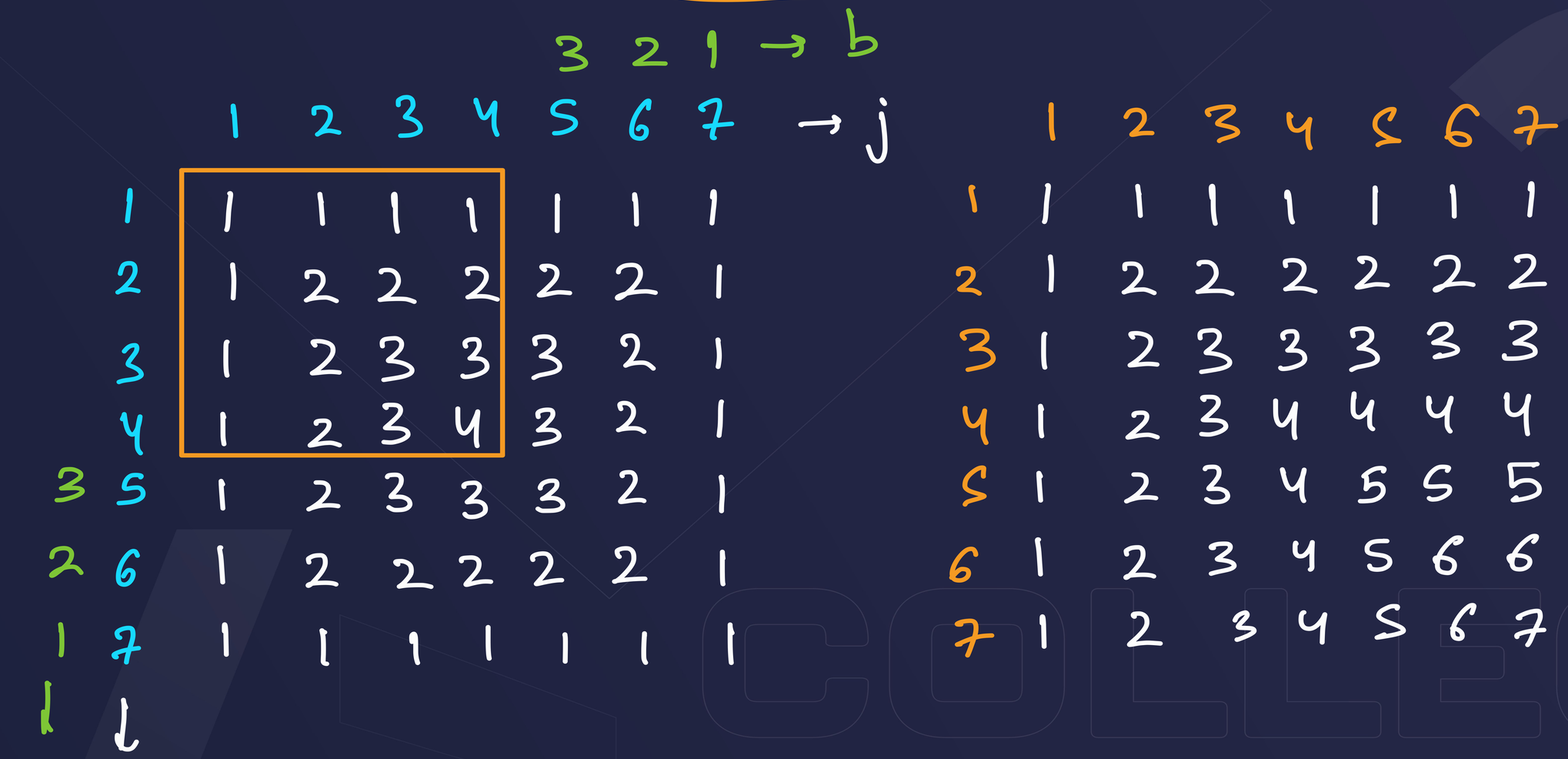
	1	2	3	4	→ j
1	1	1	1	1	
2	1	2	2	2	
3	1	2	3	3	
4	1	2	3	4	

i

$n = 4$

each i,j cell has a value $\min(i,j)$

Pseudo Variables



Final Changes

$1 \rightarrow n - 0$

$2 \rightarrow n - 1$

$3 \rightarrow n - 2$

$\vdots$

$x \rightarrow n - x + 1$

What’s in the next lecture?

A head start to modern programming: Functions!

THANK YOU