DSA

Patterns

Square Pattern

n=4

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

we will be using the nested loops.

① Outer loops will run n lines means it will count the number of lines.

② Inner loop will decide what to print in a single row.

```
xxxx
xxxx
xxxx
```

```
for(i=1 ; i<=n ; i++){
   for (int j =1 ; j <=n : j++){
     cout << j ;
        } cout<<endl;
      }
```

Outer loop will remain same.

```
for(int j=1 ; j<=n : j++){
        cout <<"*"
      }
```

In general, loops

when i or j= 1   1 to n

when i or j= 0   0 to n-1/<n

In chracters   char chr="A"

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

Outer loop will remain same

Inner loop   for (j=0 ; j<n ; j++){
      cout << chr
          chr++; }

1,2,3 <u>n=3</u>
4,5,6
7,8,9

Out of [illegible] loop

```
num = 1 — for no keeping it reset
for(i=0; i<n; i++){
  for (j=0; j<n; j++){
    cout <<num;
    num++
  }
  endl;
```

ABC
DEF n=3
GHI

Triangle Pattern

```
0 *
1 * *
2 * * *
3 * * * *
```

n=4

Outer loop 0 to n-1 / 0<n

```
for(i=0; i<n ; i++){
  Inner loop
  (i+1) stars
  1 to i+1 (i+1)
  0 to i   (i+1)
  for (int j=0; j<i+1 ; j++){
    cout<<"*" ;}
  endl; }
```

```
0 1 (i+1)
1 2 2 (i+1)
2 3 3 3(i+1)
3 4 4 4(i+1)
```

```
for(i=0; i<n : i++){
for ( j=0 ; j<i+1 ; j++){
      cout <<(i+1);
    }
  cout<<endl;
  }
```

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

```
1                for(i=0; i<n ;i++){
1 2                  for(j=1 ; i+1 ;j++)
1 2 3                     cout<<j ;
1 2 3 4
```

Reverse Triangle

```
      1           for (i=0 to i<n : i++ ){
      2 1         for(j = i+1: j>0 ; j--){
      3 2 1            cout<<j;
      4 3 2 1
```

Floyd's triangle

```
 1      n=4            int num=1
 2 3                 for (i=0 ; i<n ; i++){
 4 5 6                 for (j=0 to i+1)){
 7 8 9 10                cout<<num ;
                          num++ ;
                         }
                        }
```

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

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

Inverted Triangle Pattern :-

```
1 1 1 1   n=4                          for(i=0 ; i<n : i++){
  2 2 2     space   num                  for(j=0 ; j<i ; j++){
    3 3       0      4     AAAA             cout<<" ".
      4       1      3     BBB           for ( j=0 ; j<n-i ; j++
              2      2     CCC              cout <<(i+1)
              3      1     DD
```

Pyramid

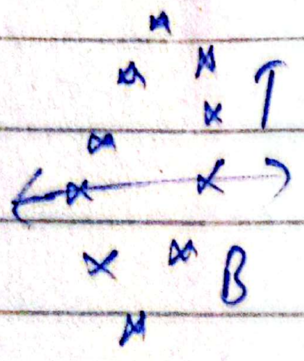
```
      1
    1 2 1
  1 2 3 2 1
1 2 3 4 3 2 1
```

```
for (i=0 ; i<n ; i++){
    spaces
        n-i-1

    num1
        1 to i+1

    num2
        j=0 to i
        (i times)
```

Hollow Diamond Pattern



```
for(i=0; i<n; i++){
    spaces (n-i-1)
        cout<<"*"
    spaces 2*i-1
        if ( i!=0){
            cout<<"*";
```