

## Square Patterns

### Pattern 1.2

```
# N = 5
1 1 1 1 1
2 2 2 2 2
3 3 3 3 3
4 4 4 4 4
5 5 5 5 5
```

#### Approach:

From the above pattern **we can observe:**

- **Number of Rows:** The pattern has 5 rows. We have to print the pattern for N rows.
- **Number of Columns:** All the rows have 5 columns. Thus, in a pattern of N rows, all the rows will have N columns.
- **What to print:** All the entries in any row, are the same as the corresponding row numbers. Thus in a pattern of N rows, all the entries of the  $i^{\text{th}}$  row are  $i$  ( $1^{\text{st}}$  row has all 1's,  $2^{\text{nd}}$  row has all 2's, and so on).

#### Python Implementation:

```
N=int(input()) #Take user input, N= Number of Rows
row=1; #The loop starts with the 1st row
while row<=N: #Loop will on for N rows
    col=1; #The loop starts with the first column in the current
    row
    while col<=N: #Loop will on for N columns
        print(row,end="") #Printing the row number in all columns
        col=col+1 #Increment the current column (Inner Loop)
    row=row+1 #Increment the current row (Outer Loop)
    print() #Add a new Line after each row
```

### Pattern 1.3

```
# N = 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
1 2 3 4 5
```

#### Approach:

From the above pattern **we can observe:**

- **Number of Rows:** The pattern has 5 rows. We have to print the pattern for N rows.
- **Number of Columns:** All the rows have 5 columns. Thus, in a pattern of N rows, all the rows will have N columns.
- **What to print:** All the entries in any row, are the same as the corresponding column numbers. Thus in a pattern of N rows, all the entries of the  $i^{\text{th}}$  column are  $i$  (1<sup>st</sup> column has all 1's, 2<sup>nd</sup> column has all 2's, and so on).

#### Python Implementation:

```
N=int(input()) #Take user input, N= Number of Rows
row=1; #The loop starts with the 1st row
while row<=N: #Loop will on for N rows
    col=1; #The loop starts with the first column in the current
    row
    while col<=N: #Loop will on for N columns
        print(col,end="") #Printing the column number in all
columns
        col=col+1 #Increment the current column (Inner Loop)
    row=row+1 #Increment the current row (Outer Loop)
    print() #Add a new Line after each row
```

### Pattern 1.4

```
# N = 5
5 4 3 2 1
5 4 3 2 1
5 4 3 2 1
5 4 3 2 1
5 4 3 2 1
```

#### Approach:

From the above pattern **we can observe:**

- **Number of Rows:** The pattern has 5 rows. We have to print the pattern for N rows.
- **Number of Columns:** All the rows have 5 columns. Thus, in a pattern of N rows, all the rows will have N columns.
- **What to print:** All the entries in any row, are  $N - \text{columnNumber} + 1$ . Thus in a pattern of N rows, all the entries of the  $i^{\text{th}}$  column are  $N - i + 1$  (1<sup>st</sup> column has all 5's ( $5 - 1 + 1$ ), 2<sup>nd</sup> column has all 4's ( $5 - 2 + 1$ ), and so on).

#### Python Implementation:

```
N=int(input()) #Take user input, N= Number of Rows
row=1; #The loop starts with the 1st row
while row<=N: #Loop will on for N rows
    col=1; #The loop starts with the first column in the current row
    while col<=N: #Loop will on for N columns
        print(N-col+1,end="") #Printing (N-col+1) in all columns
        col=col+1 #Increment the current column (Inner Loop)
    row=row+1 #Increment the current row (Outer Loop)
    print() #Add a new Line after each row
```

This way there can be several other square patterns and you can easily print them using this approach- **By finding the number of Rows, Columns and What to print.**

### Pattern 1.5

```
# N = 5
1 2 3 4 5
2 3 4 5 6
3 4 5 6 7
4 5 6 7 8
5 6 7 8 9
```

#### Approach:

From the above pattern **we can observe:**

- **Number of Rows:** The pattern has 5 rows. We have to print the pattern for N rows.
- **Number of Columns:** All the rows have 5 columns. Thus, in a pattern of N rows, all the rows will have N columns.
- **What to print:** The first entry in the 1<sup>st</sup> row is 1, the first entry in the 2<sup>nd</sup> row is 2, and so on. Further, these values are incremented continuously by 1 in the remaining entries of any particular row. Thus in a pattern of N rows, the first entry of the i<sup>th</sup> row is i. The remaining entries in the i<sup>th</sup> row are i+1, i+2, and so on. It can be observed that any entry in this pattern can be written as row+col-1.

```
N=int(input()) #Take user input, N= Number of Rows
row=1; #The loop starts with the 1st row
while row<=N: #Loop will on for N rows
    col=1; #The loop starts with the first column in the current
    row
    while col<=N: #Loop will on for N columns
        print(col+row-1,end="") #Printing row+col-1 in all columns
        col=col+1 #Increment the current column (Inner Loop)
    row=row+1 #Increment the current row (Outer Loop)
```

```
print() #Add a new Line after each row is printed
```