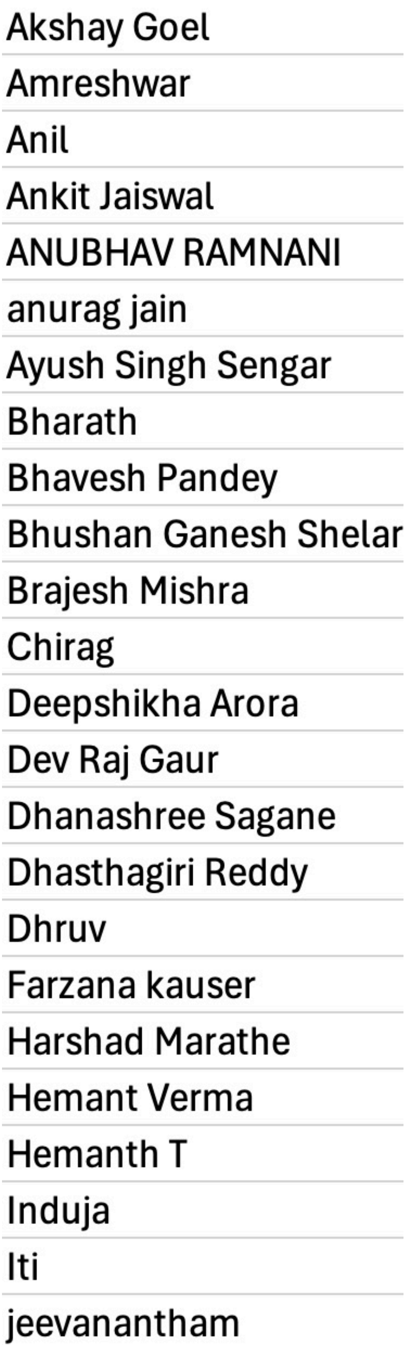
Patterns



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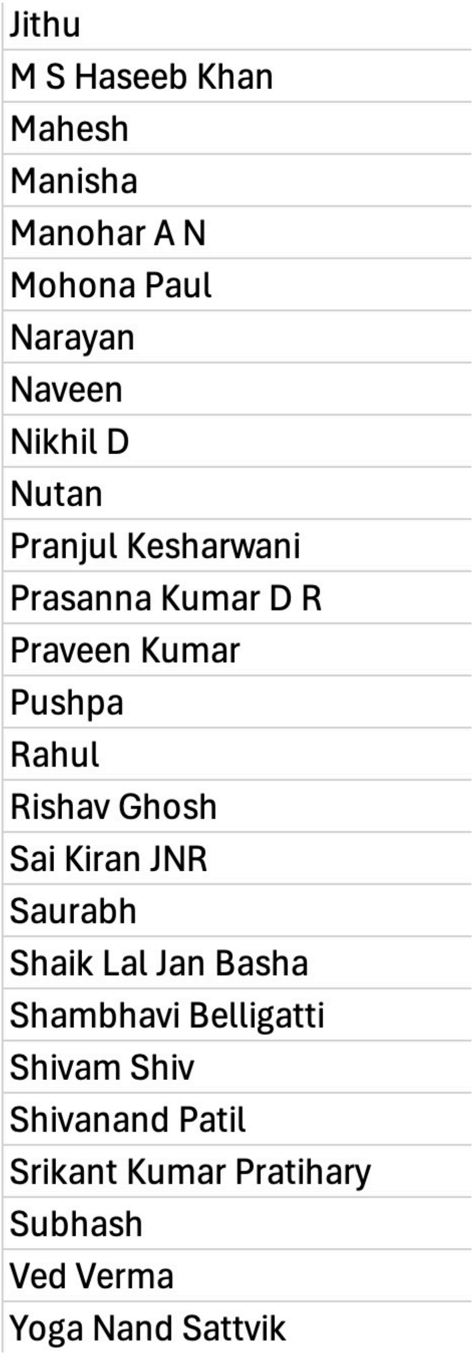

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Q1> Given N as input, print * N times

I : 5

O : * * * * *

```
public static void main (.... ) {
        // Initialise scanner .....
        int N = scanner.nextInt();

        for (int t = 1 ; t <= N ; t++) {

                System.out.print("*");
        }
}
```

Q2> Given N as input. Print a square of N*N size containing * in each cell

I : 5

O :

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

```
public static void main (.... ) {
        // Initialise scanner .....
        int N = scanner.nextInt();
        for (int r = 1 ; r <= N ; r++) {
```

```
        for (int c = 1 ; C<=N ; c++) {
            System.out.print("*") ;
        }
        System.out.println() ;
    }
}
```

Q3> Given input N, M . Print a rect. of N*M size containing * in each cell

I : N= 3 M = 4

O :

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

```
public static void main (....) {
    // Initialise Scanner .....
    int N = scanner.nextInt() ;
    int M = scanner.nextInt() ;
    for (int r = 1 ; r <= N ; r++) {
        for (int c = 1 ; C<=M ; c++) {
            System.out.print("*") ;
        }
        System.out.println() ;
    }
}
```

r	c
1	[1,2,3,4]
2	[1,2,3,4]
3	[1,2,3,4]

Q4> Given N as input, print staircase of size N

I: 5

O:

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

Row	Stars
1	1
2	2
3	3
4	4
5	5

```
public static void main (....) {
    // Initialise Scanner .....
    int N = scanner.nextInt();
    for (int r = 1 ; r <= N ; r++) {
        for (int c = 1; c<=r; c++) {
            System.out.print("*");
        }
        System.out.println();
    }
}
```

r	c
1	[1]
2	[1 2]
3	[1 2 3]
4	[1 2 3 4]
5	[1 2 3 4 5]

Q5> Given N as input . Print the pattern as shown

I: 3

O:

```
*
* 2
* 2 *
```

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

Dry Run

I: 4

O:

```
*
* 2
* 2 *
* 2 * 4
```

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

Dry run

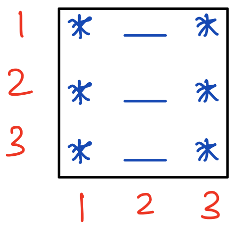
```
public static void main (....) {
        // Initialise Scanner .....
        int N = scanner.nextInt();
        for (int r = 1 ; r <= N ; r++) {
            for (int c = 1 ; C <= r ; c++) {
                if ( c%2 == 0 ) { // even
                        system.out.print(c);
                } else {
                        System.out.print("*");
                }
            }
            System.out.println();
        }
}
```

N = 3

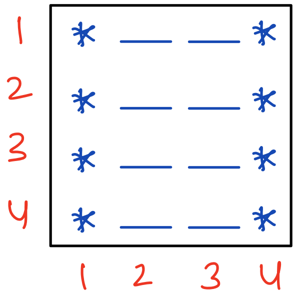
r	c	
1	[1]	*
2	[1 2]	* 2
3	[1 2 3]	* 2 *

Q6> Given N as input, print the pattern as shown

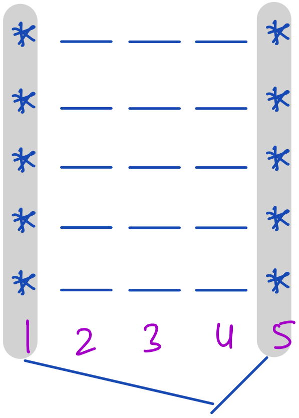
N= 3



N= 4



N=5



For the first and last column print *
otherwise print _

```
public static void main (.... ) {
        // Initialise Scanner .....
        int N = scanner.nextInt() ;
        for (int r = 1 ; r<=N ; r++) {
                for (int c = 1 ; C<=N ; c++) {
                        if ( c==1 || c==N) {
                                System.out.print("*") ;
                        }
                        else { System.out.print("_") ;}
                }
                System.out.println() ;
        }
}
```

Q7> Given N as input, Print the pattern as shown

N = 3

	r	stars
* * *	1	3
* *	2	2
*	3	1

N = 4

	r	stars
* * * *	1	4
* * *	2	3
* *	3	2
*	4	1

```
public static void main (....) {
        // Initialise Scanner .....
        int N = scanner.nextInt(); // N=3
        for (int r = 1 ; r <= N ; r++) {
            for (int c = N ; c >= r ; c--) {
                System.out.print("*") ;
            }
            System.out.println() ;
        }
}
```

r	c		
1	3	2	1
2	3	2	
3	3		

```
f r ⟶ [1 to N] {
    f c ⟶ [r to N] {
        print(*)
```

```
f r ⟶ [1 to N] {
    count = N-r+1
    for c ⟶ [1 to count]
        print (*)
```

Break 22:35

Q8> Given N as input, Print the pattern as shown

N = 3 N = 4

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

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

r	spaces	stars
1	2	2
2	1	2
3	0	2

N=3

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

r	spaces	stars
1	$\overset{3-1}{N-r} = 2$	2
2	$\overset{3-2}{N-r} = 1$	2
3	$\overset{3-3}{N-r} = 0$	2

For every row do the below

- * loop N-r time and print space *

```
public static void main (....) {
        // Initialise scanner .....
        int N = scanner.nextInt(); // N=3
        for (int r = 1 ; r <= N ; r++) {
                System.out.print("*");
                for (int c = 1 ; c <= N-r ; c++){
                        system.out.print("  ");
                }
                System.out.print("*");
                system.out.println();
        }
}
```

N=4

r	N-r	c	print
1	3	[1 2 3]	* s s s *
2	2	[1 2]	* s s *
3	1	[1]	* s *
4	0	[]	**

Q9> Given N as input, Print the pattern as shown

N = 3

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

N = 4

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

N = 4

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

r	spaces	stars
1	3	1
2	2	2
3	1	3
4	0	4

For every row

→ print <u>N-r</u> spaces first

→ print <u>r</u> stars

```
public static void main (....) {
        // Initialise Scanner .....
        int N = scanner.nextInt(); // N=3
        for (int r = 1 ; r<=N ; r++) {
                // Print N-r spaces
                for (int c = 1 ; c<= N-r ; c++){
                        System.out.print("  ");
                }
                // Print r stars
                for (int c = 1 ; c<= r ; c++){
                        System.out.print("*");
                }
                System.out.println();
        }
}
```

N = 4

r	N - r	c
1	3	1 2 3
2	2	1 2
3	1	1
4	0	

second loop

r	c	
1	1	S S S *
2	1 2	S S * *
3	1 2 3	S * * *
4	1 2 3 4	* * * *

Q10> Given N as input, Print the pattern as shown

N = 4

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

N = 4

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

r	left*	spaces	right*
1	4	0	4
2	3	2	3
3	2	4	2
4	1	6	1

N = 4

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

r	left*	spaces	right*
1	N-r+1		N-r+1
2		(r-1)*2	
3			
4			

```
for every row
    print N-r+1 stars
    print 2*(r-1) spaces
    print N-r+1 stars
```

```
public static void main (....) {
    // Initialise Scanner .....
    int N = scanner.nextInt(); // N=3
    for (int r = 1 ; r <= N ; r++) {
        // Print N-r+1 stars
        for ( int c = 1 ; c <= N-r+1 ; c++ ) {
            System.out.print ("*");
        }
        // Print 2*(r-1) spaces
        for ( int c = 1 ; c< = 2*(r-1) ; c++) {
            System.out.print ("  ");
        }
        // Print N-r+1 stars
        for ( int c = 1 ; c <= N-r+1 ; c++ ) {
            System.out.print ("*");
        }

        System.out.println ();
    }
}
```

N = 4

r	N-r+1	2*(r-1)	N-r+1	print
1	4-1+1=4	2*(1-1)=0	4-1+1=4	********
2	4-2+1=3	2*(2-1)=2	4-2+1=3	***ss***
3	4-3+1=2	2*(3-1)=4	4-3+1=2	**ssss**
4	4-4+1=1	2*(4-1)=6	4-4+1 =1	*ssssss*

Q11> Given N as input, Print the pattern as shown

N = 4

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

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

N = 4

r	left spaces	stars	right spaces
1	3	1	3
2	2	3	2
3	1	5	1
4	0	7	0
	N-r	(2*r)-1	N-r

```
public static void main (....) {
        // Initialise Scanner .....
        int N = scanner.nextInt(); // N=3
        for (int r = 1 ; r <= N ; r++) {
                // Print N-r spaces
                for ( int c = 1 ; c <= N-r ; c++) {
                        System.out.print("  ");
                }
                // Print 2*r - 1
                for (int c = 1 ; c< = 2*r -1 ; c++) {
                        System.out.print("*");
                }
                // Print N-r spaces
        for ( int c = 1 ; c <= N-r    ; c++ ) {
                System.out.print("  ");
        }

        System.out.println();
    }
}
```