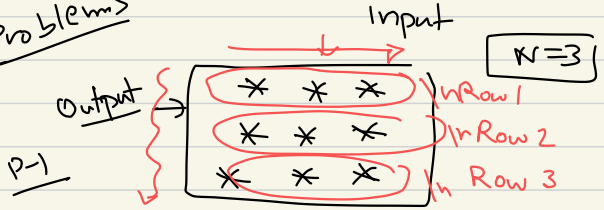
Patterns Problems

Apply the Concepts (Branching, Looping)

P-1

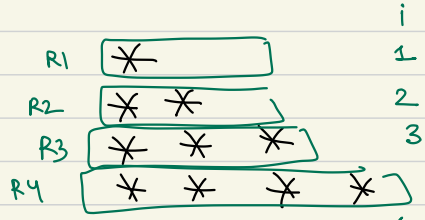


1 → Row

```
for (i=1; i<=N; i++){
    // work
    for(j=1; j<=N; j++){
        print('*');
    }
    println();
}
```

i No stars in ith Row

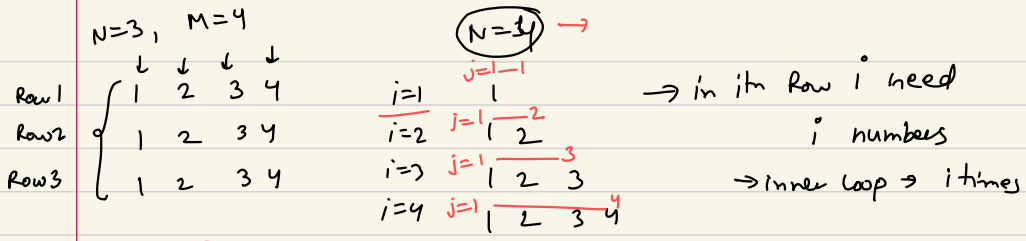
P-2

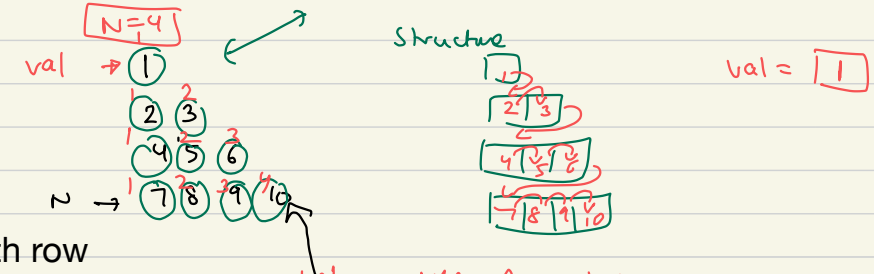


Outer → N

Inner → M

- Row 1
- Row 2
- Row 3





N Rows
I cols in Ith row
Val starts from 1
And inc by 1 at each step

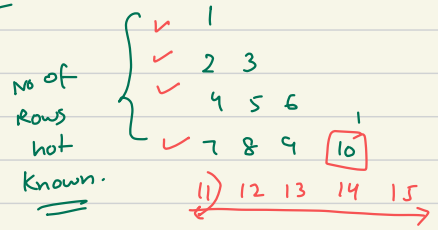
(Q) N = 10 → last No of Pattern

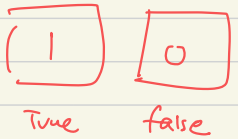
$$\frac{1 + 2 + 3 + \cdots N}{} = 10$$

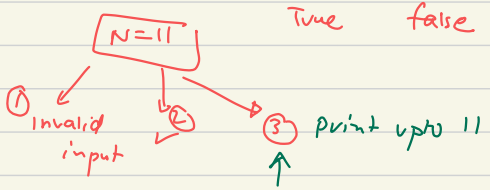
$$\frac{N(N+1)}{2} = 20$$

$$\Rightarrow N^2 + N = 40 \Rightarrow N = ✓$$

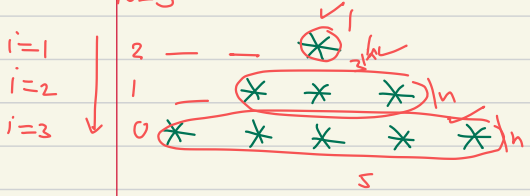
boolean x = true; boolean isRainy = false;







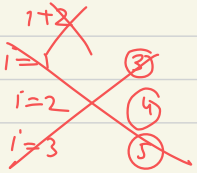
N=3



Obs.

1. There are N Rows
2. each Row $N-i$ Spaces
   $2i-1$ Stars
   new line

N-i	Spaces
3-1	=2
3-2	=1
3-3	=0



	$2i-1$
1	$2(1)-1 = 1$
2	$2(2)-1 = 3$
3	$2(3)-1 = 5$

4, 8, 12, 16 ... 41°

↑ ith term

1, 3, 5, ----

$T_i = a + (i-1)d$

$= 1 + (i-1)2$

$= 1 + 2i - 2$

$= \boxed{2i-1}$

1, 3, 5, ---- (8)

$2i-1$

Find

Airthmetic Progression (Find out ith term of series)

d=3 d=3 d=3

5, 8, 11, 14 .....

a

diff b/w Cons. terms is Constant

$T_{ith} = a + (i-1)d$

$T_4 = 5 + (4-1)3$

$= 5 + 3.3$

$= 14$

5 + 3 + 3 + 3

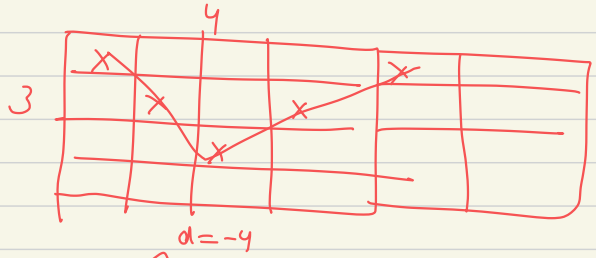
3 times d to get 4th term

3, 7, 15, 20 ✗

3, 7, 11, 15 ✓ (4)

$T_i = a + (i-1)d$

ith term



15, 11, 7, 3, -1, - -

$T_i = a + (i-1)d$

$= 15 + (i-1)-4$

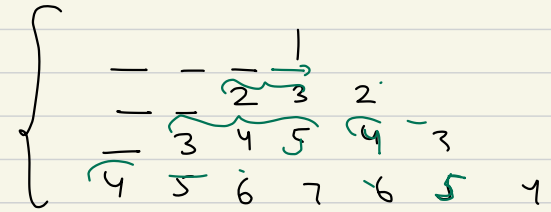
$= 15 - 4i + 4$

$= \boxed{19 - 4i}$

$19 - 4(5) = -1$

5

N=4



1037

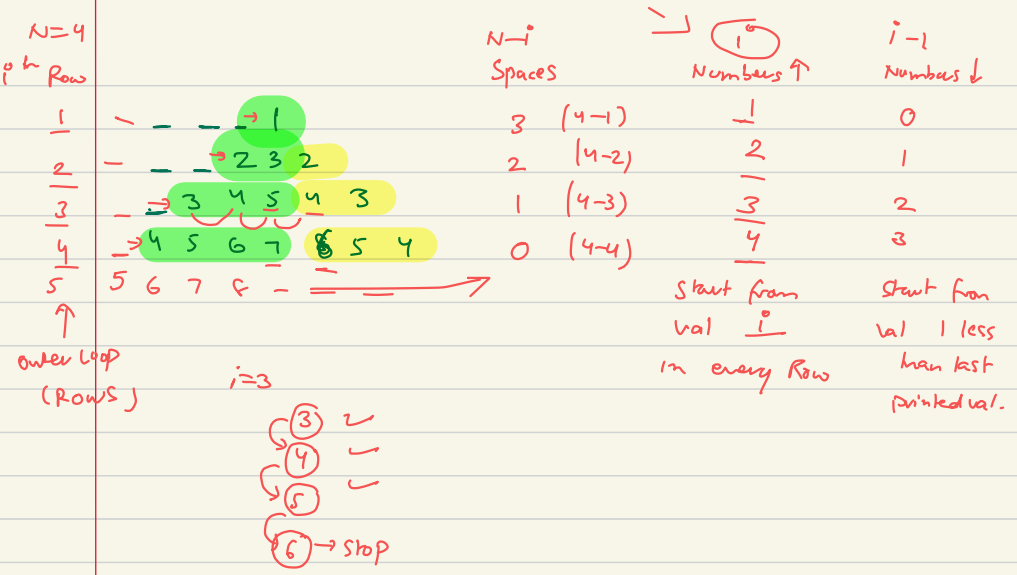
Rows

↳ spaces

→ ↑ No

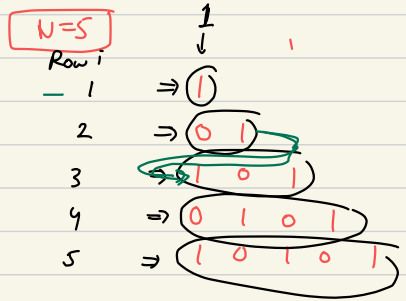
→ NO ↓

3 inner loops


N=4
ith Row
1
2
3
4
5
1
2 3 2
3 4 5 4 3
4 5 6 7 8 5 4
5 6 7 8
outer Loop
(Rows)
N-i
Spaces
3 (4-1)
2 (4-2)
1 (4-3)
0 (4-4)
1
Numbers ↑
1
2
3
4
Start from
val i
in every Row
i-1
Numbers ↓
0
1
2
3
Start from
val 1 less
than last
printed val.

i=3
3
4
5
6
stop

N=5



✓ i No's in every Row

✓ odd start → 1 Row

✓ even Row start → 0

✓ val is update (Toggle) 1 → 0 → 1 → 0 →

val = 0
1
0
1

val = 1 − val
= 1 − 0
= 1 − 1
= 1 − 0

→ update (Toggle)

Repeat ↻ • val = 1 − val

1 − 0

= 1 − 1

= 0

= 1 − 0

= 1

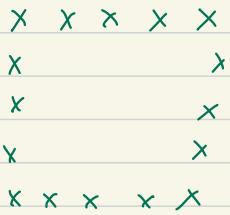
val = 0 ↻

1 ↻

0 ↻

1 ↻

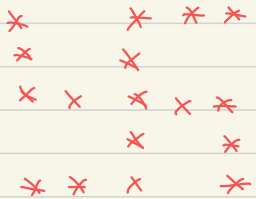
N = 5



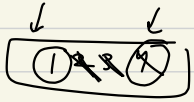
↳ Hollow Square

(optional) Challenge

N=3



N=5



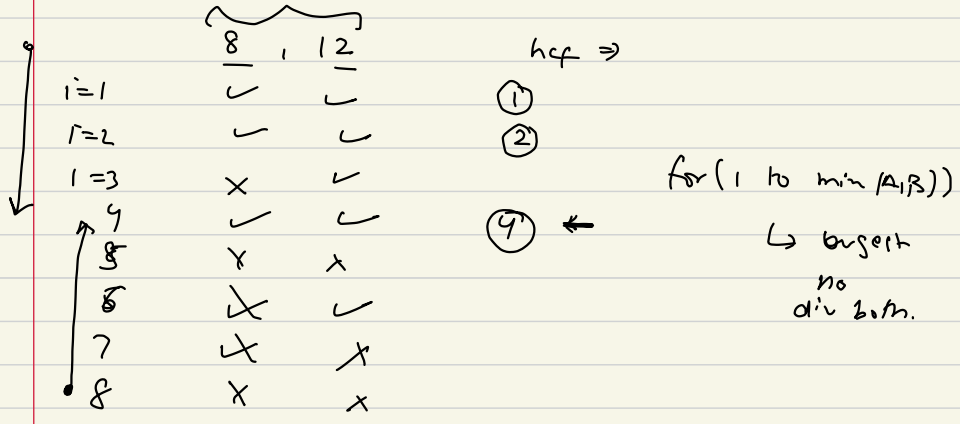
print (n%10)

```
last_digit = n%10
while (n>0){
→ last_digit = n%10;
→ n=n/10
}
```

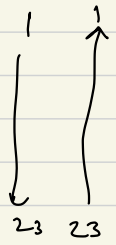
① 0 1/10 ⇒ 0

print (last_digit) → ① , ④

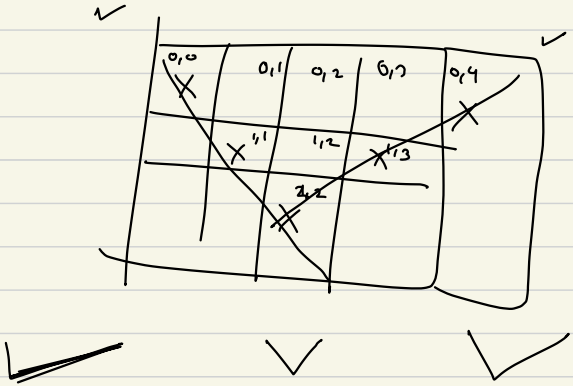
GCD → Maths (Euclid's Algo) Maths (wed)
↳ long Div Method.



Random



49 , 23 gcd = 1



2D Matrix