Pattern 12

n=4:

r=0. 0

1. 1 1

2. 2 3 5

3. 8 13 21 34

Structure:

	c=0	c=1	c=2	c=3
r=0	*			
1	*	*		
2	*	*	*	
3	*	*	*	*

0

0 0

0 0 0

0 0 0 0

0

1 1

2 3 5

8 13 21 34

0 1 1 2 3 5 8 13 21 34

```
a=0;
b=1;

n=

if(n>=0) {
    syso(a);
}

if(n>=1) {
    syso(b);
}

for(int i=2; i<n; i++) {
    int c=a+b;
    syso(c);
    a=b;
    b=c;
}
```

0 1 1 2 3 5 8

a =	~~0~~	~~1~~	~~1~~	~~2~~	~~3~~	~~5~~	8
b =	~~1~~	~~1~~	~~2~~	~~3~~	~~5~~	~~8~~	13
c =	~~1~~	~~2~~	~~3~~	~~5~~	~~8~~	~~13~~	21

Condition for first num

Condition for first & second

fibonacci

→ S

c = a+b; (1) making new num

order matters*

→ a=b;
→ b=c;

(2) shifting of a & b

b=c
~~a=b~~

0 1 1 2 3 5 8

a b a c b c

Bonus Question

```
        *
      * * *
    * - * - *
  * - - * - - *
* * * * * * * * *
  * - - * - - *
    * - * - *
      * * *
        *
```

Pattern 13. (Pascal triangle)

n=5.

c=	0.	1.	2.	3.	4.	
r= 0.	1					11^0
1.	1	1				11^1
2.	1	2	1			11^2
3.	1	3	3	1		11^3
4.	1	4	6	4	1	11^4
5.	1	5	10	10	5	1 11^5

$11^5 = 161051$

$\frac{4!}{2!(4-2)!} = \frac{4 \times 3 \times 2!}{2! \, 2 \times 1} = 6$

$\frac{5 \times 4}{2}$

${}^nC_j = 1$

i \ j	0	1	2	3	4
0	${}^0C_0 = 1$				
1	${}^1C_0 = 1$	${}^1C_1 = 1$			
2	${}^2C_0 = 1$	${}^2C_1 = 2$	${}^2C_2 = 1$		
3	${}^3C_0 = 1 \times F_1$	${}^3C_1 = 3 \times F_2$	${}^3C_2 = 3 \times F_3$	${}^3C_3 = 1$	
4	${}^4C_0 = 1 \times F$	${}^4C_1 = 4 \times F$	${}^4C_2 = 6 \times F$	${}^4C_3 = 4 \times F$	${}^4C_4 = 1$
5	${}^5C_0 = 1$	${}^5C_1 = 5$	${}^5C_2 = 10$	${}^5C_3 = 10$	${}^5C_4 = 5$, ${}^5C_5 = 1$

${}^nC_r$ ${}^nC_{n-r}$

(i) P n C solution

(ii) factor bracket

${}^3C_2 = \frac{3!}{2!(3-2)!}$

$${}^{n}C_r = \frac{n!}{(n-r)!\,r!}$$

$${}^{n}C_r \longleftrightarrow {}^{n}C_{r+1}$$ } → There is Relation.

$$\boxed{{}^{n}C_r * \underbrace{\text{Factor}}_{\text{Depend on }(n,\ r)} = {}^{n}C_{r+1}}$$

Factor?

$$n! = n \times (n-1) \times (n-2) \times (n-3) \times \cdots \times 1$$

Properties.

(i) ${}^{n}C_0 = 1$, ${}^{n}C_n = 1$, ${}^{n}C_1 = n$, ${}^{n}C_r = {}^{n}C_{n-r}$

(ii) $${}^{j}C_j = \frac{j!}{(j-j)!\,j!}$$

$0! = 1$

(iii) ${}^{i}C_j \to$ known, ${}^{i}C_{j+1} \to$ To find

$${}^{i}C_j * \{\text{Factor}\} = {}^{i}C_{j+1}$$ } P n C property

$$ {}^{i}C_{j} * \text{Factor} = {}^{i}C_{j+1} $$

$$ (n+1)\,n! = n \times (n-1) \times (n-2) \times \ldots 1 $$

$$ (n+1)! = (n+1) \times n! $$

$$ \frac{\cancel{i!}}{(i-j)!\,j!} \times F = \frac{\cancel{i!}}{[i-(j+1)]!\,(j+1)!} $$

$$ F = \frac{(i-j)!\,j!}{[i-(j+1)]!\,(j+1)!} = \frac{(i-j)! \times \cancel{j!}}{[i-(j+1)]!\,(j+1)\,\cancel{j!}} $$

$$ n! = n * (n-1)! $$

$$ F = \frac{(\overbrace{i-j}^{n})!}{(i-j-1)!\,(j+1)} = \frac{(\overbrace{i-j}^{n})\,\cancel{(\overbrace{i-j}^{n}-1)!}}{\cancel{(\overbrace{i-j}^{n}-1)!}\,(j+1)} $$

$$ \boxed{F = \left(\frac{i-j}{j+1}\right)} $$

$$F = \frac{i - j}{j+1}$$

i \ $j=$	0	1	2	3	4
0	1				
1	1	1			
2	1	2			
3					
4					

$i=2$

$\frac{0\,1}{0}$ $j=1$

val $= 2$

~~num~~ $= 1 * \left(\frac{2-0}{0+}\right) = 1 * 2 = 2$

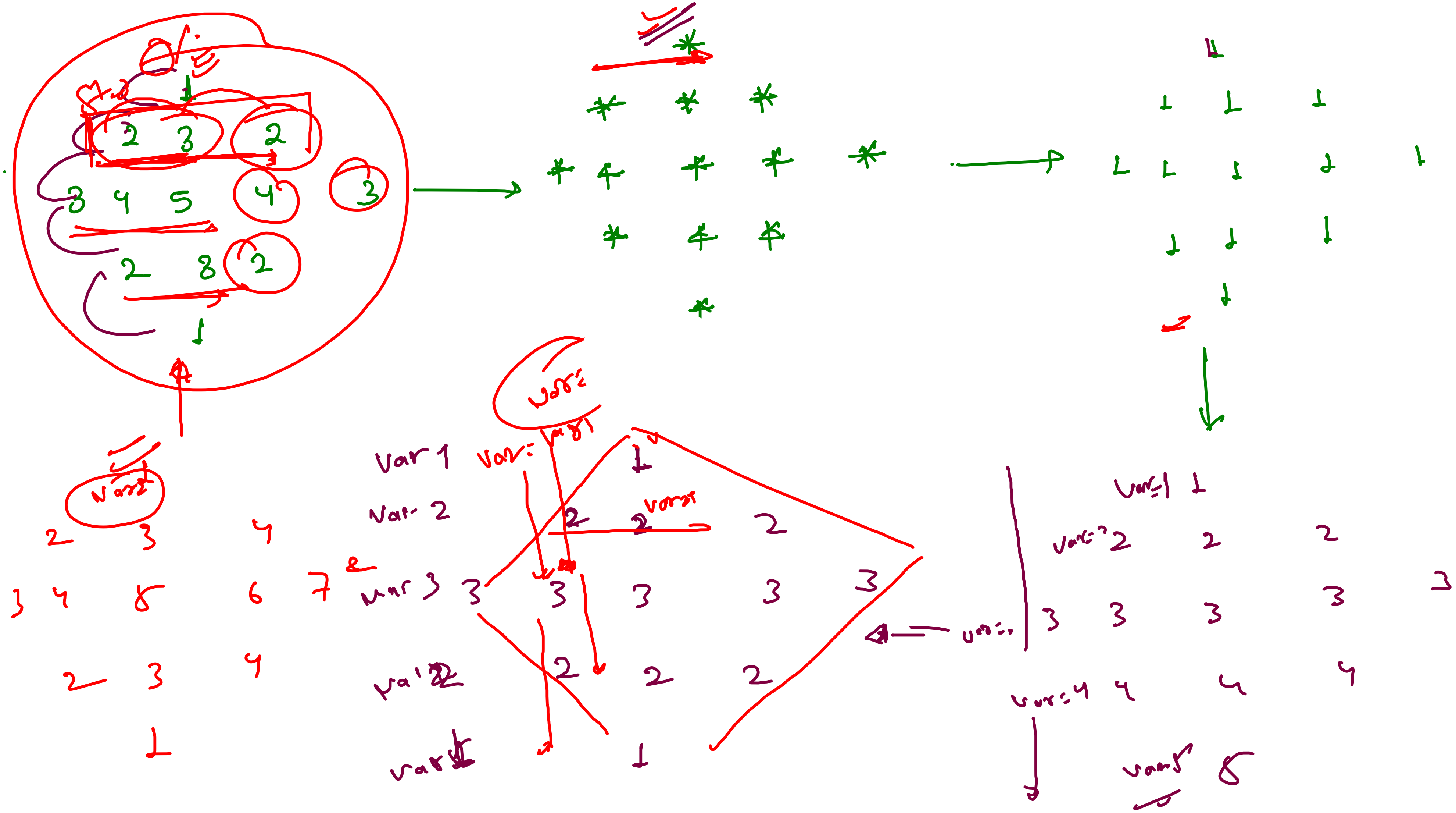
$nu = 2 * \left[\frac{2-1}{1+1}\right]$ $2 * \left(\frac{1}{2}\right)$ $= (2+1)/2$ 0

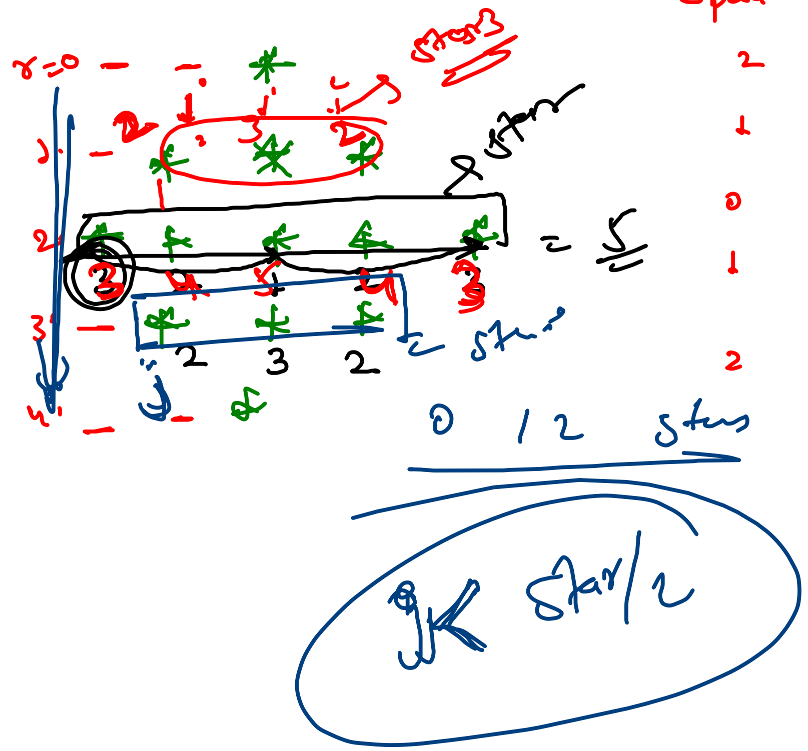
$= 2 * \left((i+1)/(j+1)\right)$

$= (2 \times 1)/2 = 1$

$nn = 2 * \left(\frac{i-j}{j+1}\right) = nu = \left(2 * \left(\frac{1}{1+1}\right)\right) =$

val $* \left[(i-j)/(j+1)\right]$ $(2+1)/(j+1)$ $1/2 \; 2\; 0$


var 1
var 2
var 3



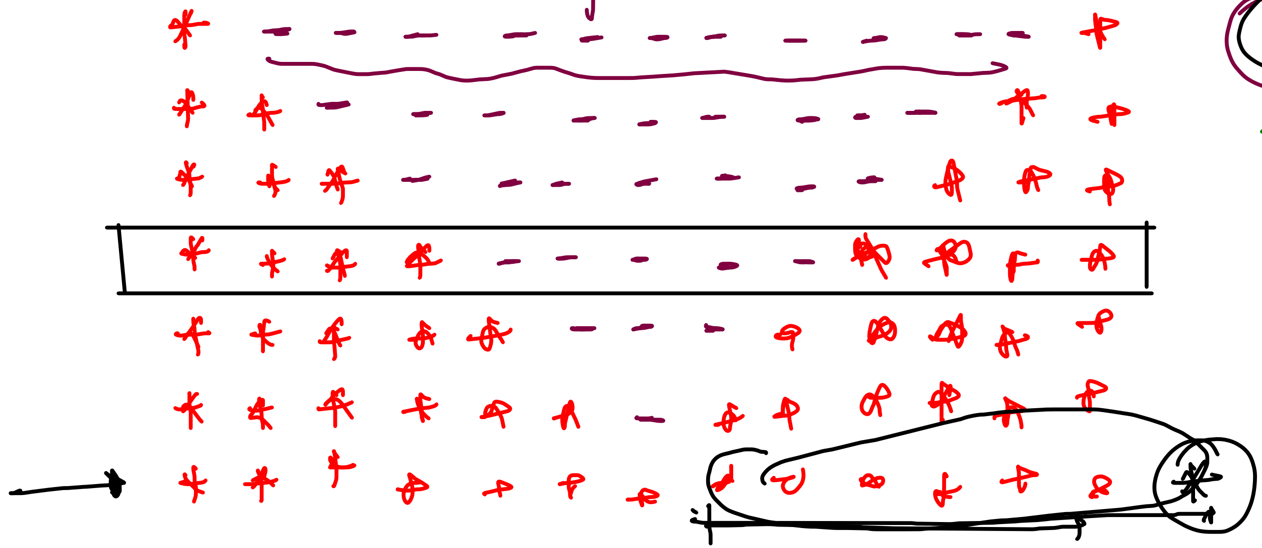
space	star
2	1
1	3
0	5
1	3
2	2

```
space = n/2

star = 1

if(r < n/2) {
    space--;
    star += 2;
} else {
    Space++
    star -= 2;
}
```

Pattern 16

n=7

2n-3



Star	Space	Star
1	n	1
2	11	2
3	9	3
4	7	4
5		5
6	3	6
7	1	6*
	-1	

-2, -2, -2, -2, -2

-1, 1, 3, 5, 7, 9, 11 .... n^{th} term.

formula for n^{th} term → $\boxed{a_n = a+(n-1)d}$

$a=-1$, $d=2$

Arithmetic Pro

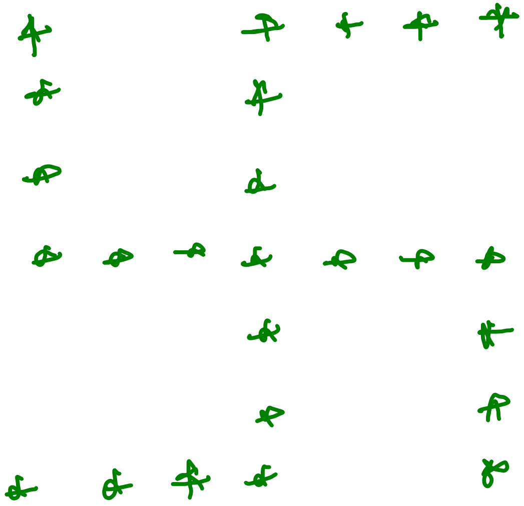
$a_n = -1 + (n-1)2$,

$a_n = -1 + 2n - 2 = 2n-3$

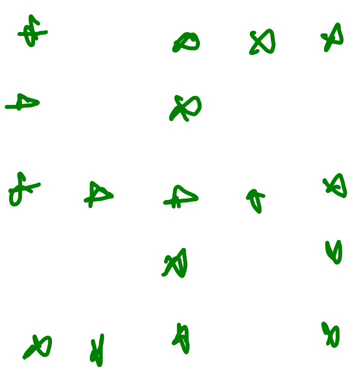
Patter 19 & 20

Pattern:

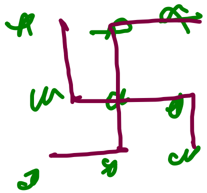
n=7



n=5



n=3



n: 7

space : n/2

star = 1

r = 0 - - - *
1 - - - * *
2 * * *
3 - * - * * * * *
4 - - - * * *
5 - - - * *
6 - - - *

if r == n/2

Space	Star
3 n/2	1
3	2
3	3
3	4
3	3
3	2
3	1

8005006152

Sign Up

Profile

Log Out → Log in

Level UP 300 → code

IT → 600 → Discu

Demo

Level - 2

500

Second

600 } DB & UP code.

$n-1 = 0$

$r >= c$

$r = 0$

$r+c = n-1$

$r = c$

$(n-1, 0)$

$n-1, n-1$

$r+c = n-1$

$r+c >= n-1$ && $r >= c$

i

$r+c = n-1$

$r+c = n-1$

$n-1 + n-1 = n-1$

$n-1 + n-1 = n-1$

$2n-2$ $\quad$ $n-1$

$2(n-1) = n-1$

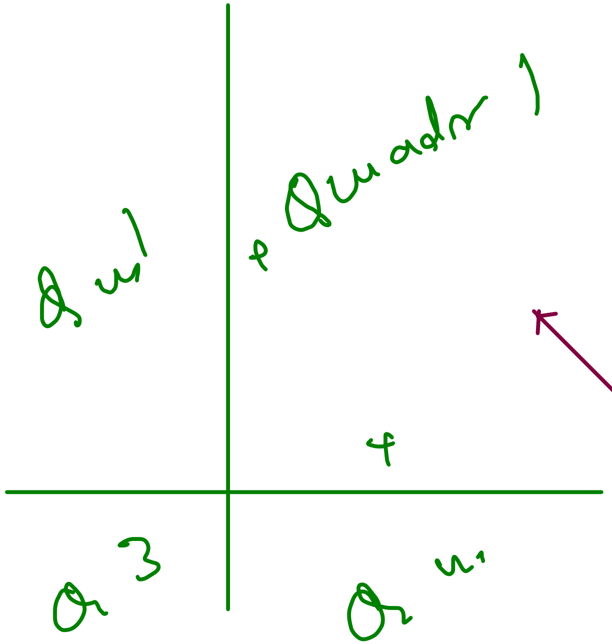
$\boxed{r+c >= n-1}$ & $\boxed{r >= c}$

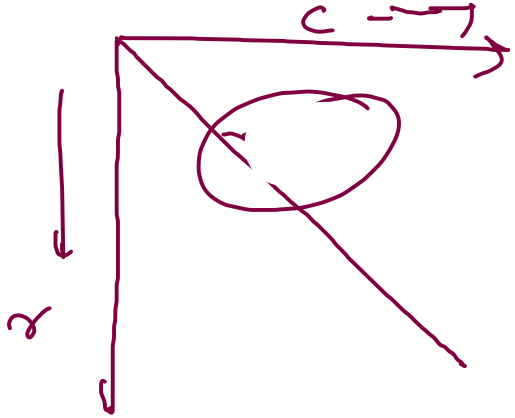
$r+c >= n-1$ & $r >= c$

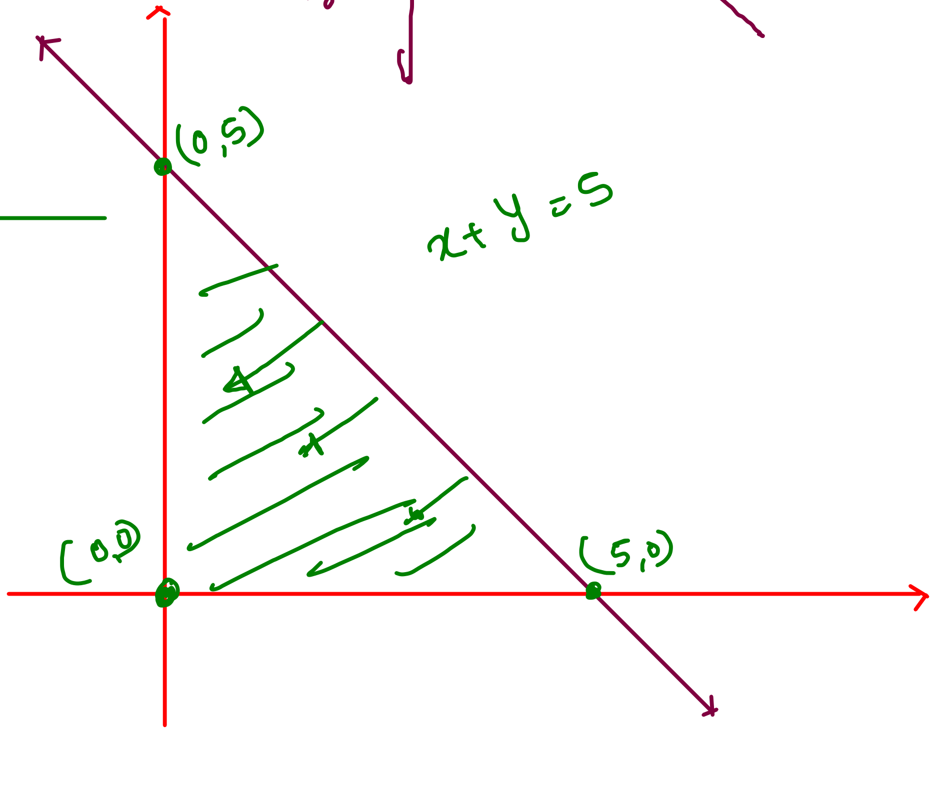
$r+c >= n-1$

$r = c$ $\quad$ $n-1 = 0$

$r >= c$ $\quad$ $n-1 >= 0$







$0+0=5$

$0 = 5$

$x+y <= 5$

$0+0 <= 5$

$0 <= 5$