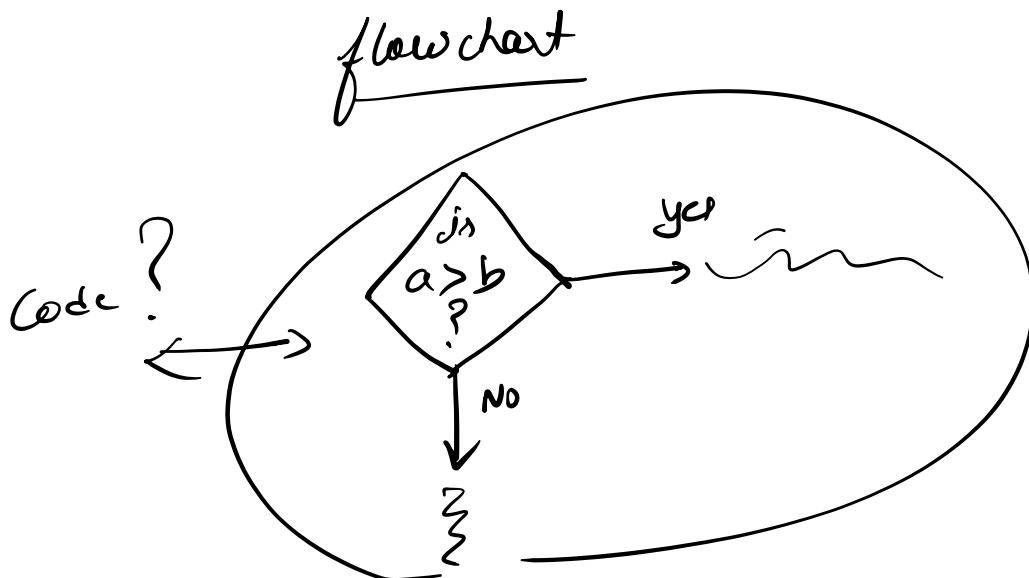


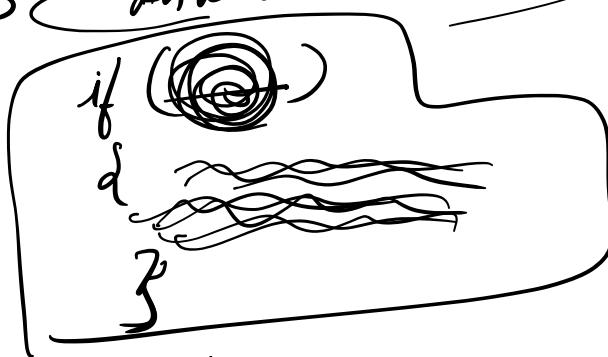
Conditionals & Loops

→ Conditionals



→ PS → i/p → a, b

(O/P) { a > b → "Answer is A"
b > a → "Answer is B"



if (a > b)
a

cout << "Answer is A";

}

...

~~if~~ $(b > a)$ {
 2 cout << "Answer is B";
 3 }

$a = 5$ $b = 14$

~~if~~ {
 2 }
 3

~~if~~ ($a \geq b$) {
 2 do something
 3 }

~~if~~ $\rightarrow a = 5$

$+ve$
 ↘
 $+ve$
 not $+ve$

~~if~~ ($a > 0$) {
 2 print(+ve)
 3 }

~~if~~ - else block

$a = 5$
 $a = -2$

~~else~~ {
 2 print(not +ve)
 3 }

~~if~~ {
 2 }
 3

~~if~~ () {
 2 }
 3
~~else~~ {
 2 }
 3

`int n`
 i/p

`cin >> n` ?
`cout << (n)` print/display

`n`

`cin >> n;`

`a = +ve` ?
`a = -ve`

`a > b → A`
`b > a → B`

`cin >> a >> b;`

`cin → " " space`
`" \t " tab`
`" \n " enter`

`cin.get()`

`+ve, -ve, 0`

$\underline{\underline{a = 5}}$

`if (a > 0)`
`a +ve`
`}`

`else`

`-ve / 0`

if ($a < 0$)
 └ ↗ var
 } class
 └ ↗ 0

{
 if ()
 └
 else if ()
 └
 else if ()
 └
 else if ()
 └
 else if ()
 └
 else
 └

if = else - if - else

if () 2 3	if () 2 3	if () 2 3
if () 2 3	else 2 3	else 2 3
if () 2 3		if () 2 3

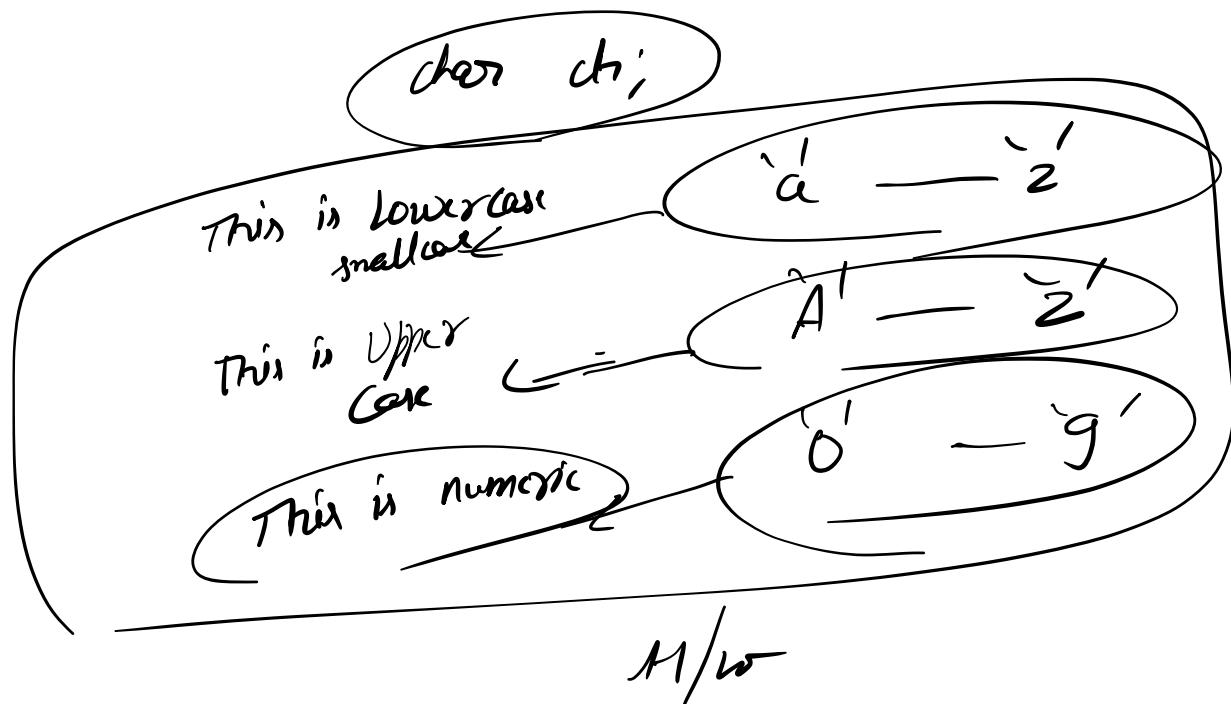
if ()
2
3

else if ()
2
3

else if ()
2
3

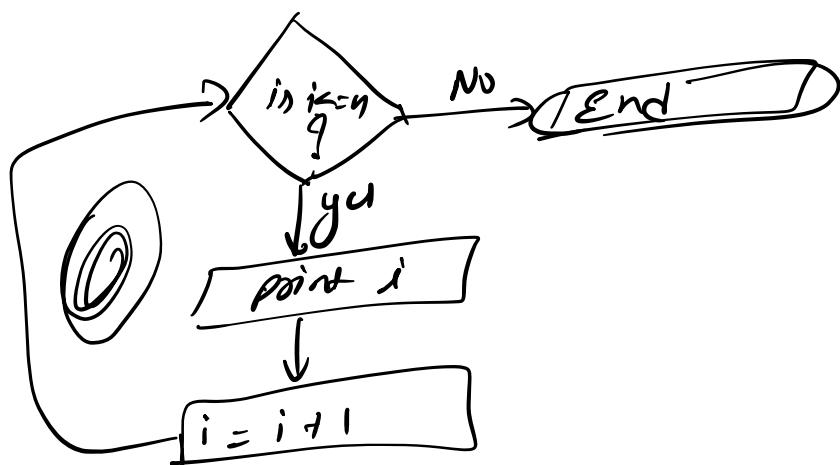
else
2
3

2



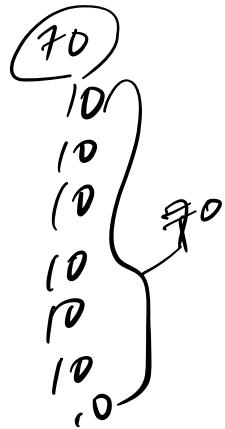
flowchart \hookrightarrow Looping

1 - to N

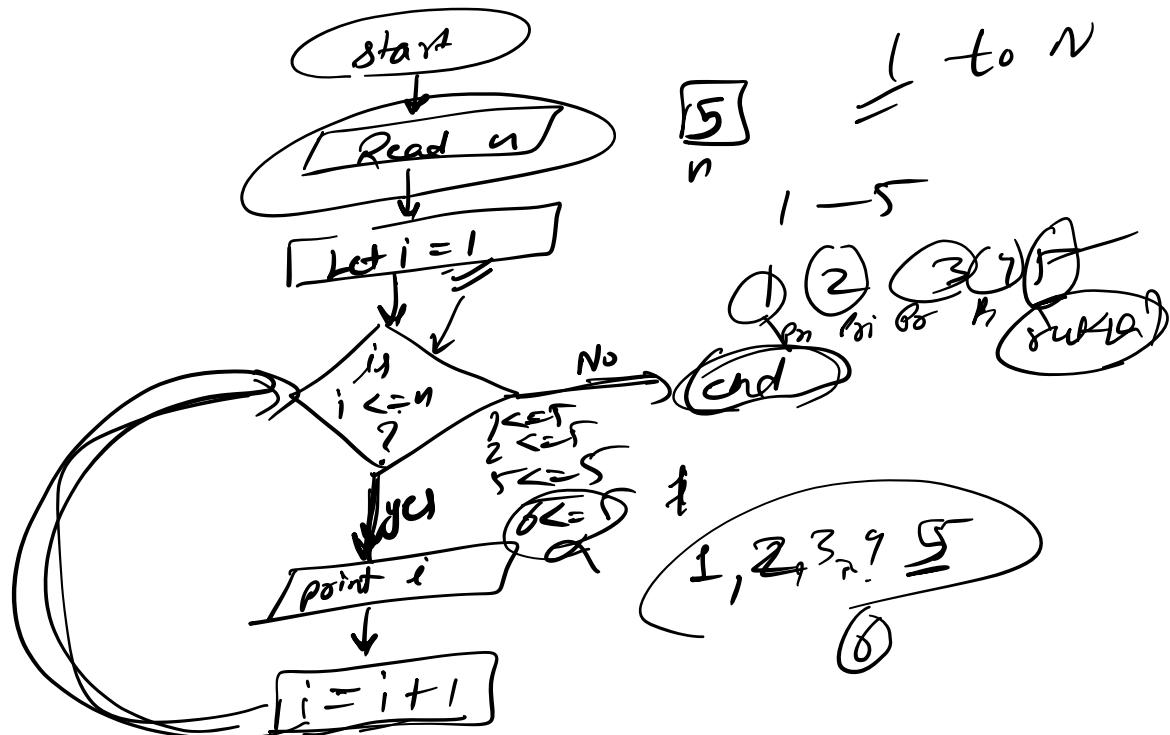


Point numbers 1 to N

→ while Loop



point (1 to N)



```

int n;
cin >>n;
int i=1
while (i<=n)
{
    //print
    cout << i;
    i = i + 1;
}

```

1 ————— 5
 |—————
 1 2 3 4 5
 (≤)

→ sum → 1 to N

1 + 2 + 3 + 4 + 5 ↗
sum = 0, 1, 3, 6, 10, 15 ↗
i = 1, 2, 3, 4, 5, 6 ↗ out of loop

```

sum = 0
i = 1
while (i<=n)
{
    sum = sum + i;
    i = i + 1;
}

```

$$\text{sum} = \frac{n}{2} (a+l)$$

$$= \frac{100}{2} (1+100)$$

$$= 50 \times 101 = 5050$$

→ 1 to N

(n) ← i/p

→ find sum of all even nos → H/cor

→ H/w table
FtoC =

→ prime no



$$5/2 = 2$$

$$\begin{aligned} 5/1 &= 1 \\ 5/3 &= 2 \\ 5/4 &= 1 \end{aligned}$$



it \rightarrow modulo op \rightarrow remainder

\rightarrow Prime or Not?



1 (2)

↓

$\frac{70}{7} = 0 \rightarrow$ Not prime

$\frac{7}{7} = 1 \rightarrow$ prime

1 2 3 4 5 6 ~~7~~ $\frac{70}{07} = 0$

$i < n$

$i <= n$

1 2 3 4 5 6 ~~7~~

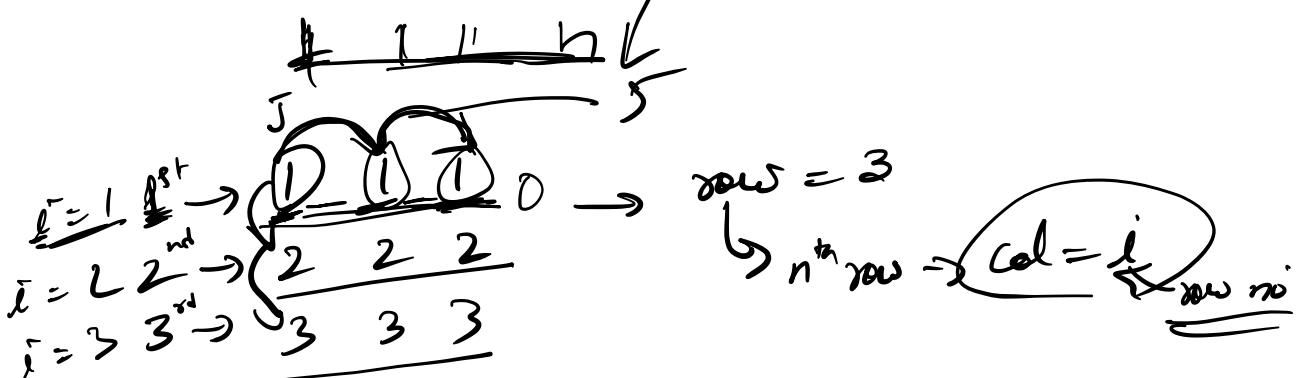
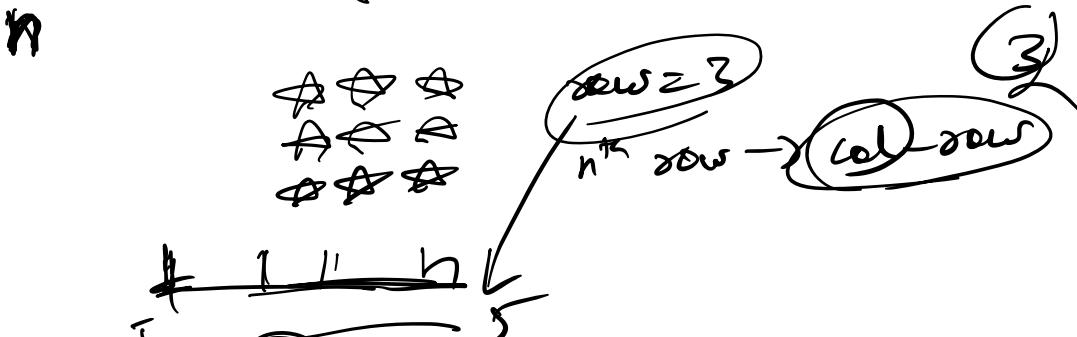
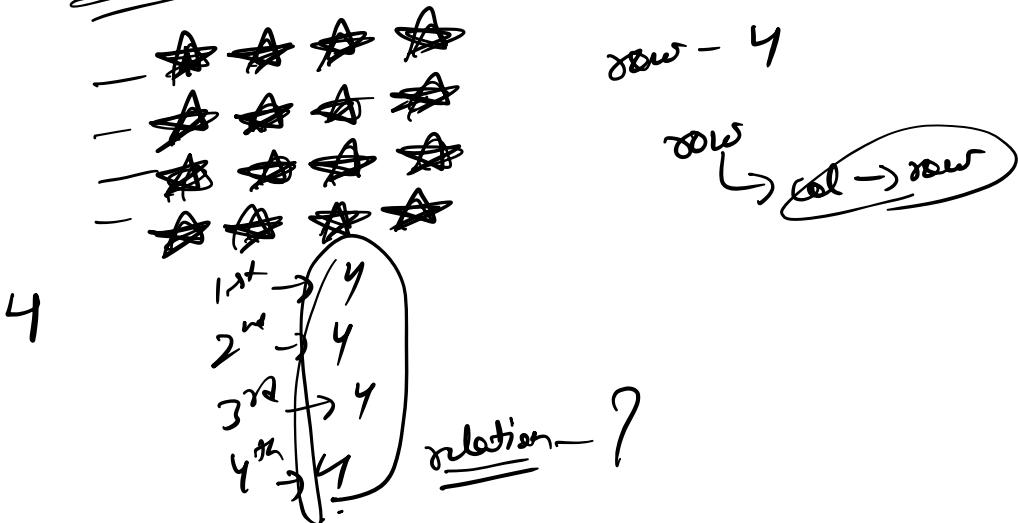
$i < n$

$i <= n$

Divide prime
 $70/7 = 0$ Rem/ = 0



→ Pattern:-



while ($i < n$) $\leftarrow \text{row } i - 1$

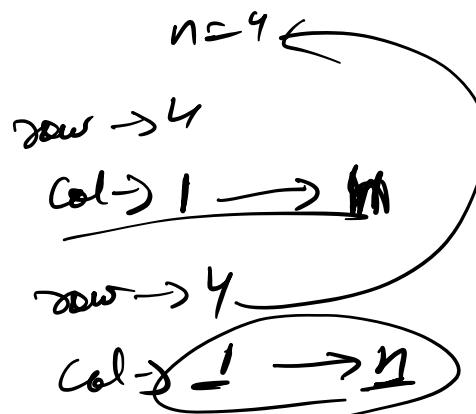
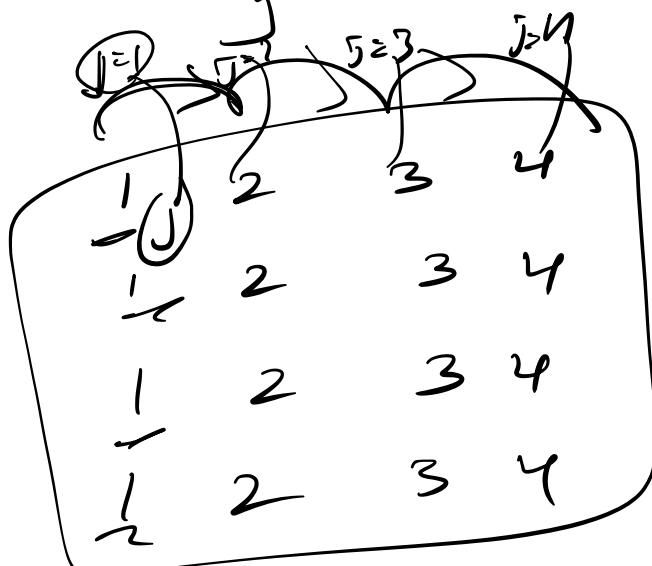
2

$j = 1$

while ($j < n$)

2
 $\text{cout} << i;$
 $j = j + 1;$
 $\text{cout} << j;$

$i \neq j + 1$



while ($i < n$)

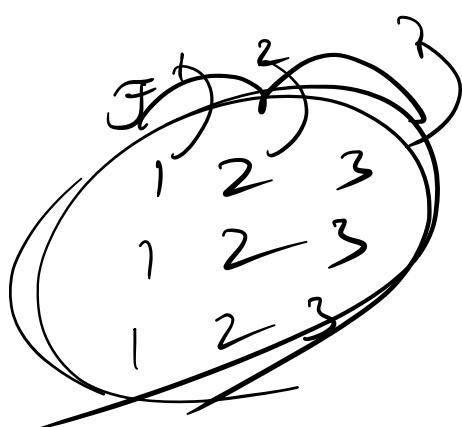
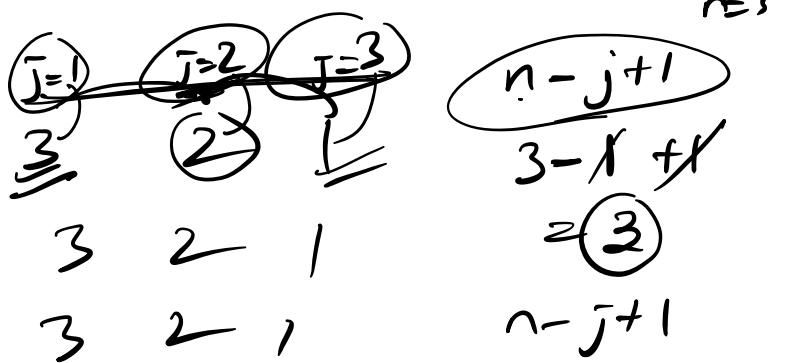
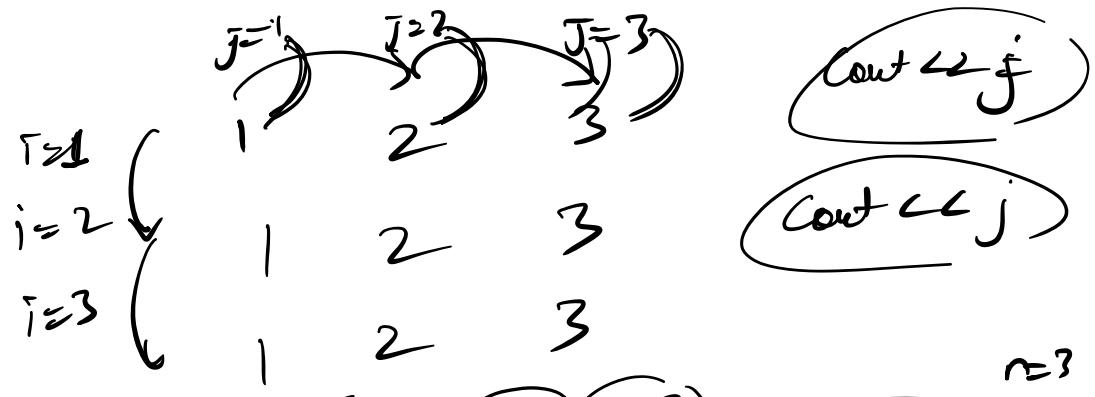
2

$j = 1$
 while ($j < n$)

$\text{cout} << j;$
 $j = j + 1;$

$\text{cout} << j;$
 $j = j + 1;$

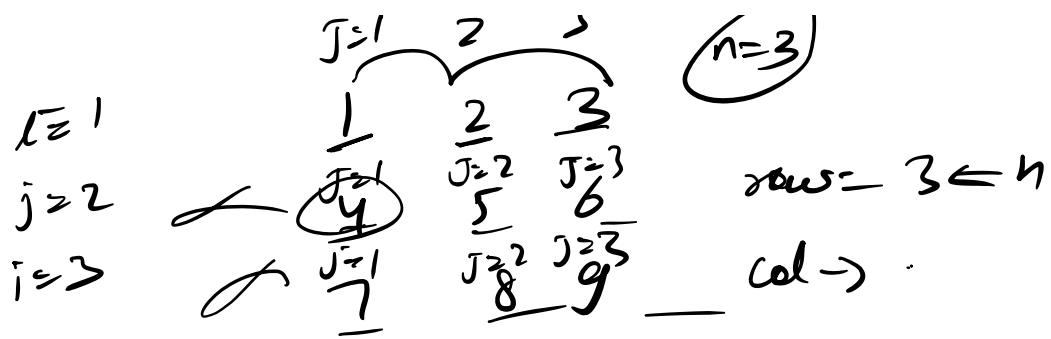
3 1



3 2 1

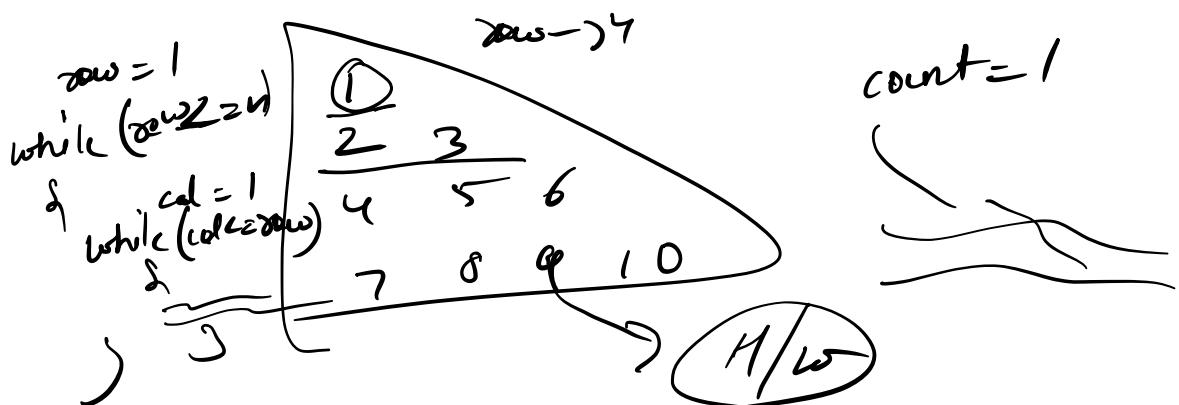
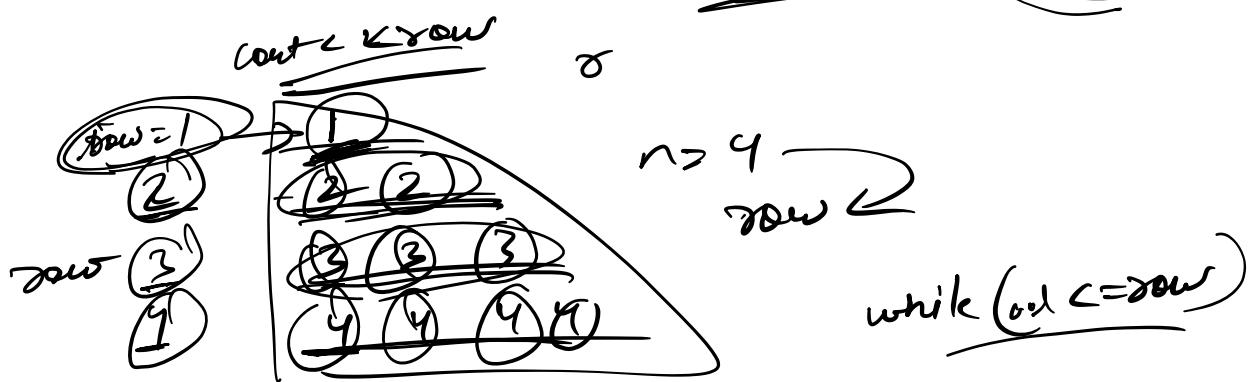
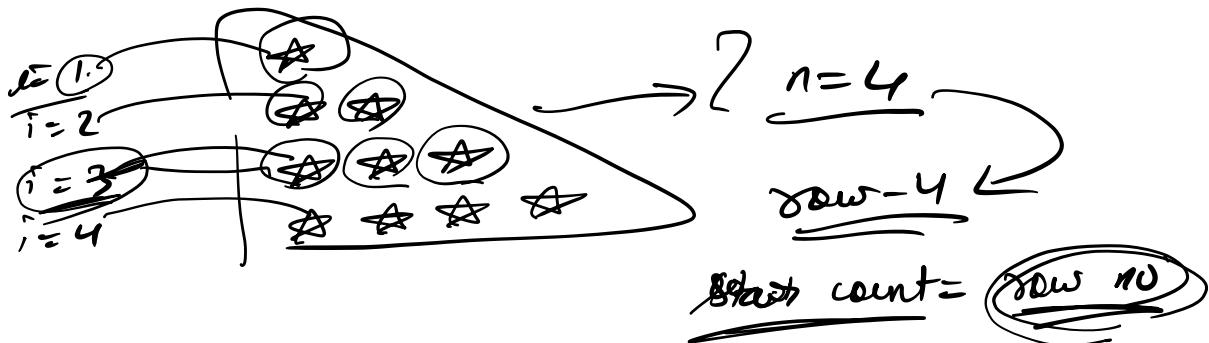
3 2 1

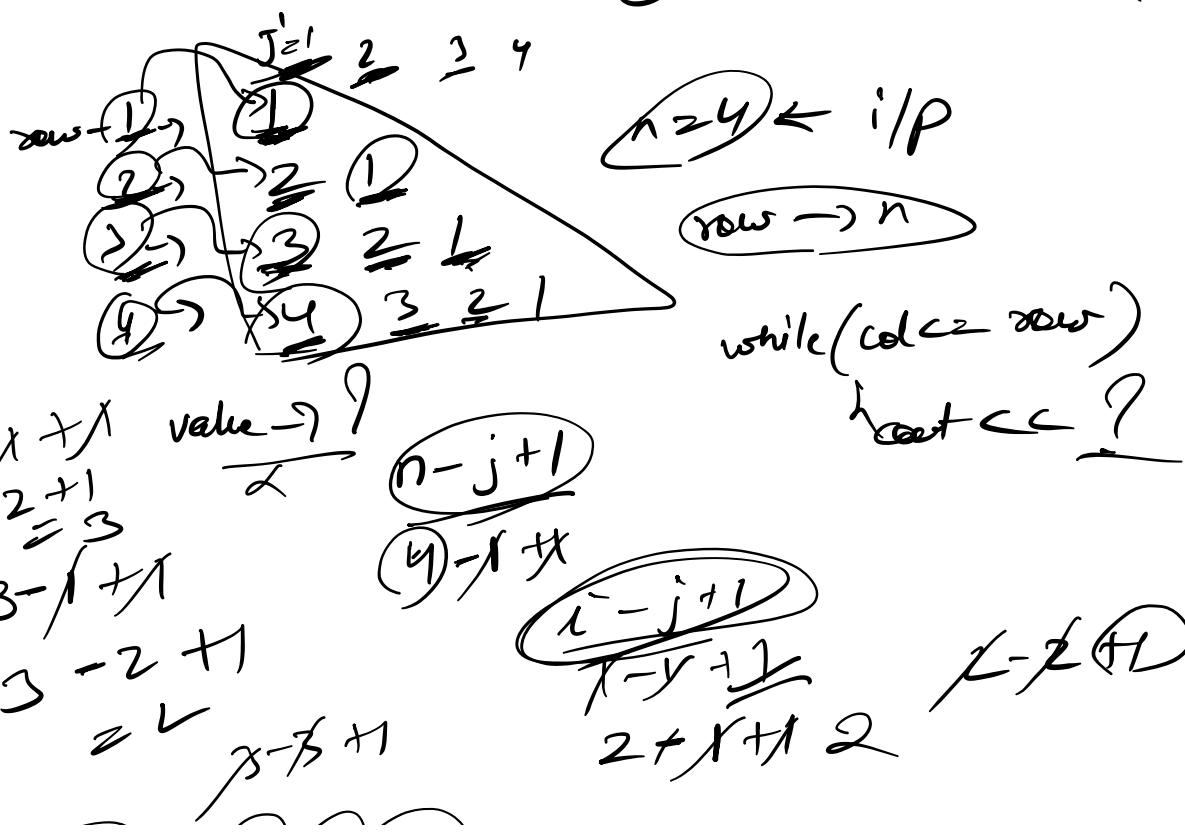
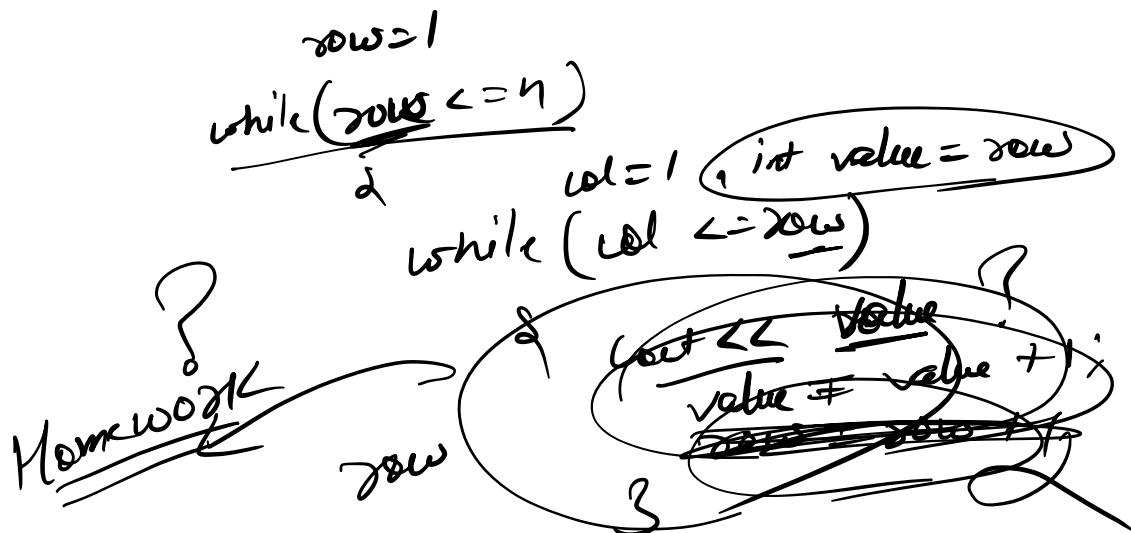
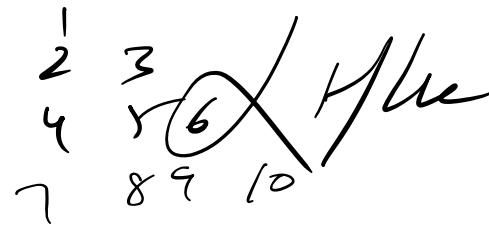
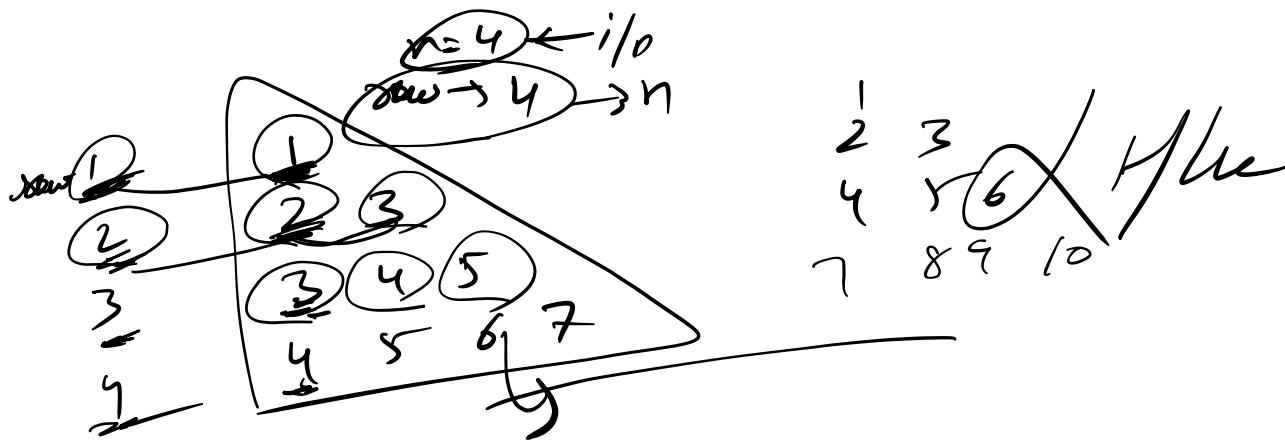
3 2 1

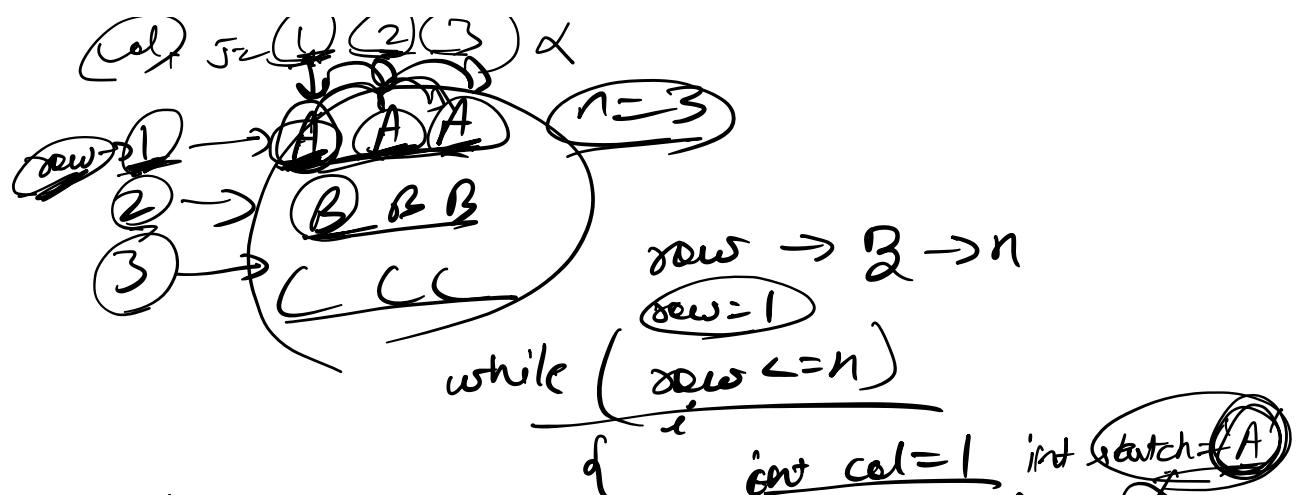


counting - ?

count = 1







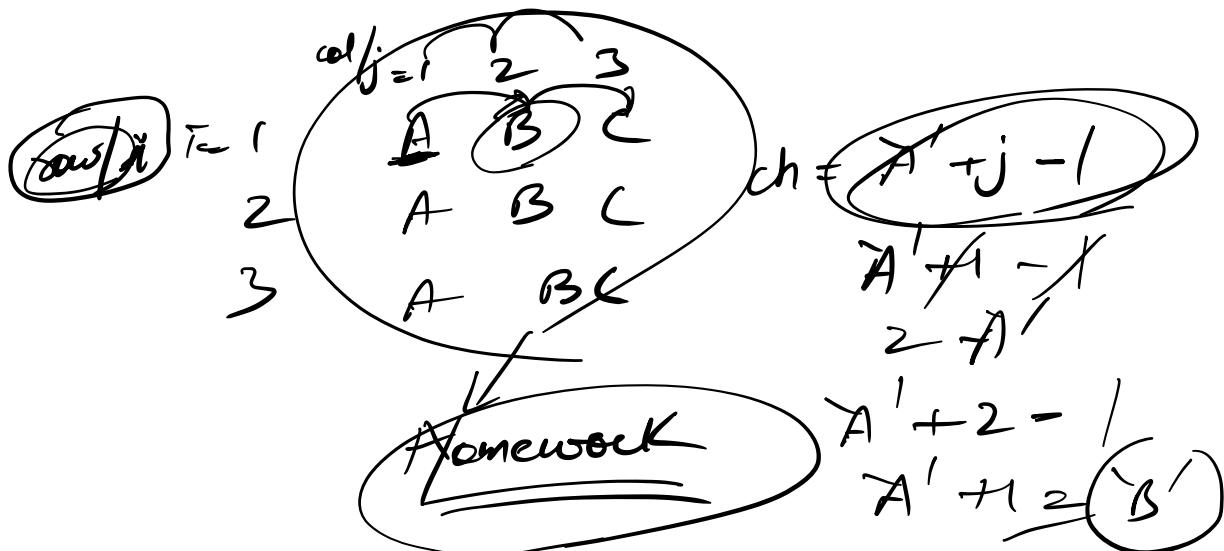
$$\begin{aligned}
 \text{char } ch \\
 &= 'A' + \cancel{\text{row}} - 1 \\
 &= \cancel{A} + \cancel{1} - 1 \\
 &= \cancel{A}
 \end{aligned}$$

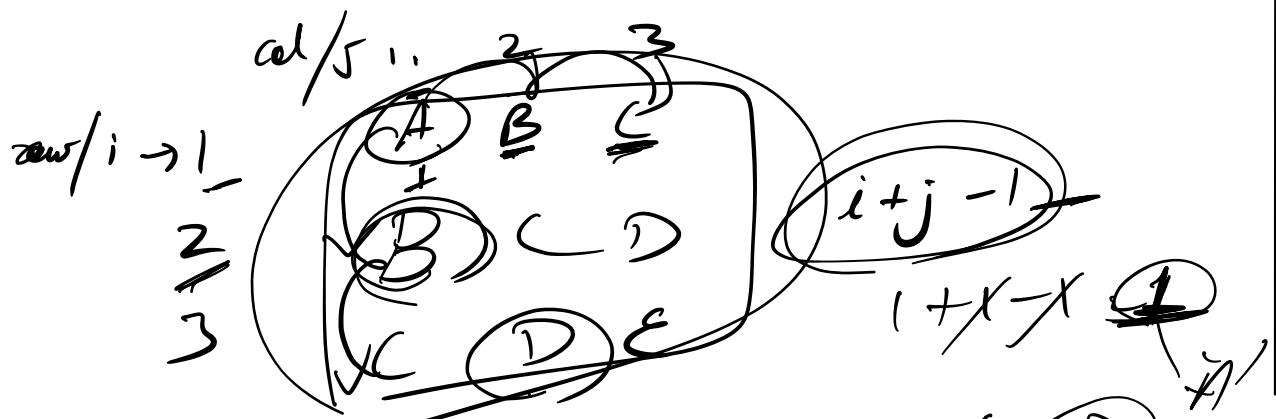
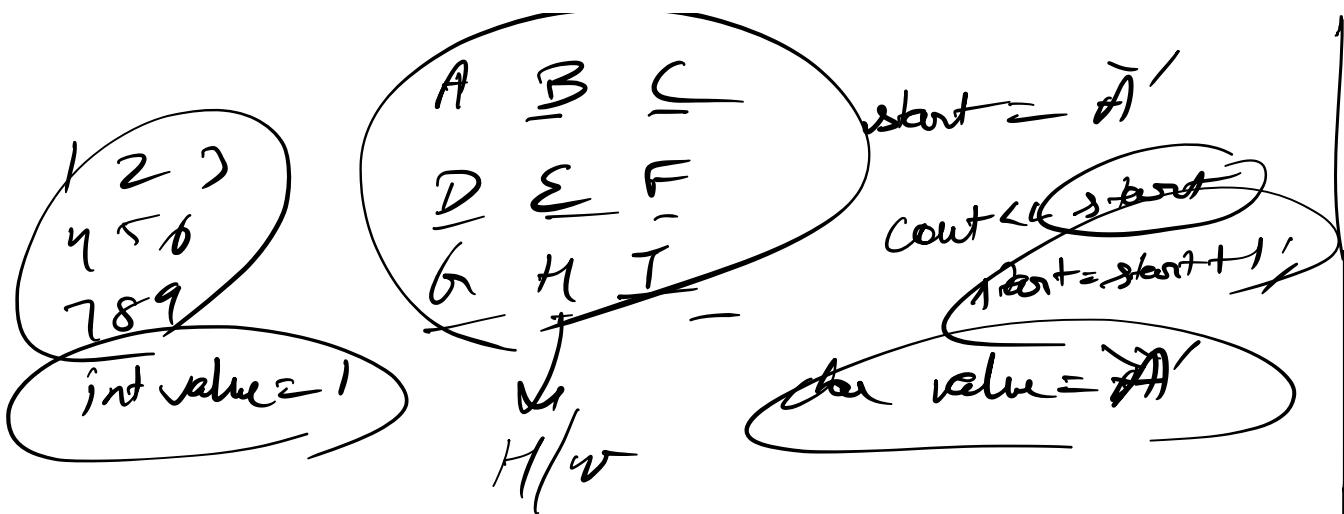
$$\cancel{A} + 2 - 1$$

$$= \cancel{A} + 1 + \cancel{B}$$

$$\cancel{A} + \cancel{i} - 1$$

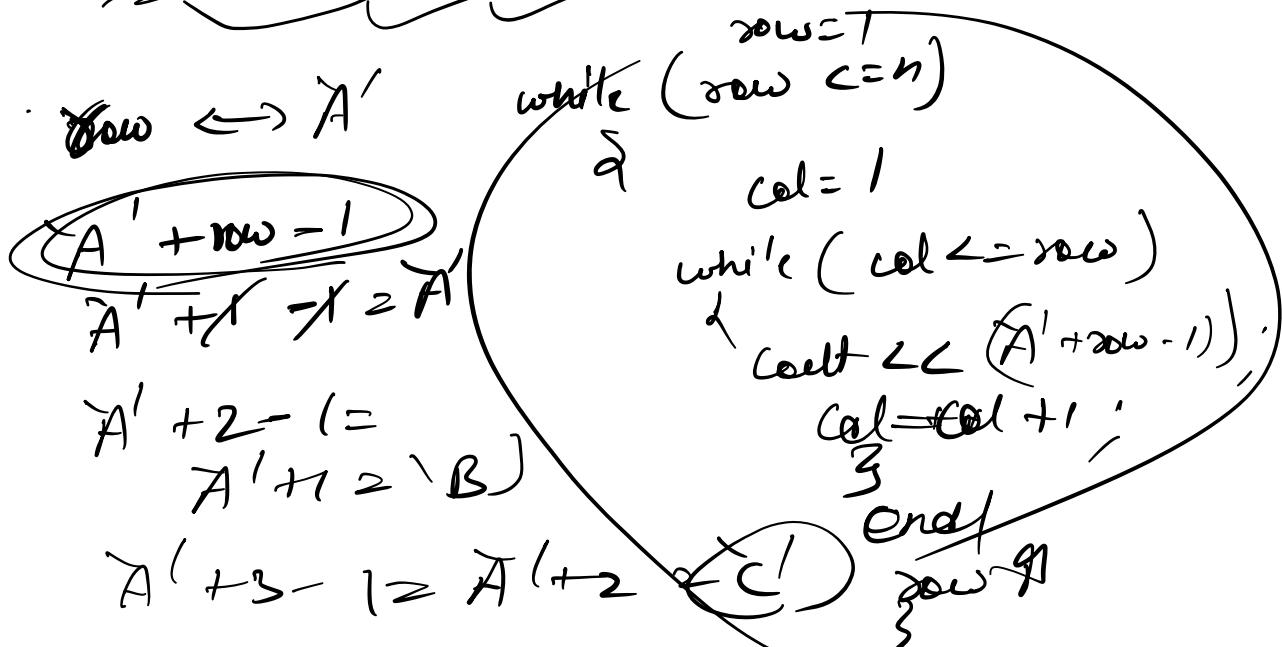
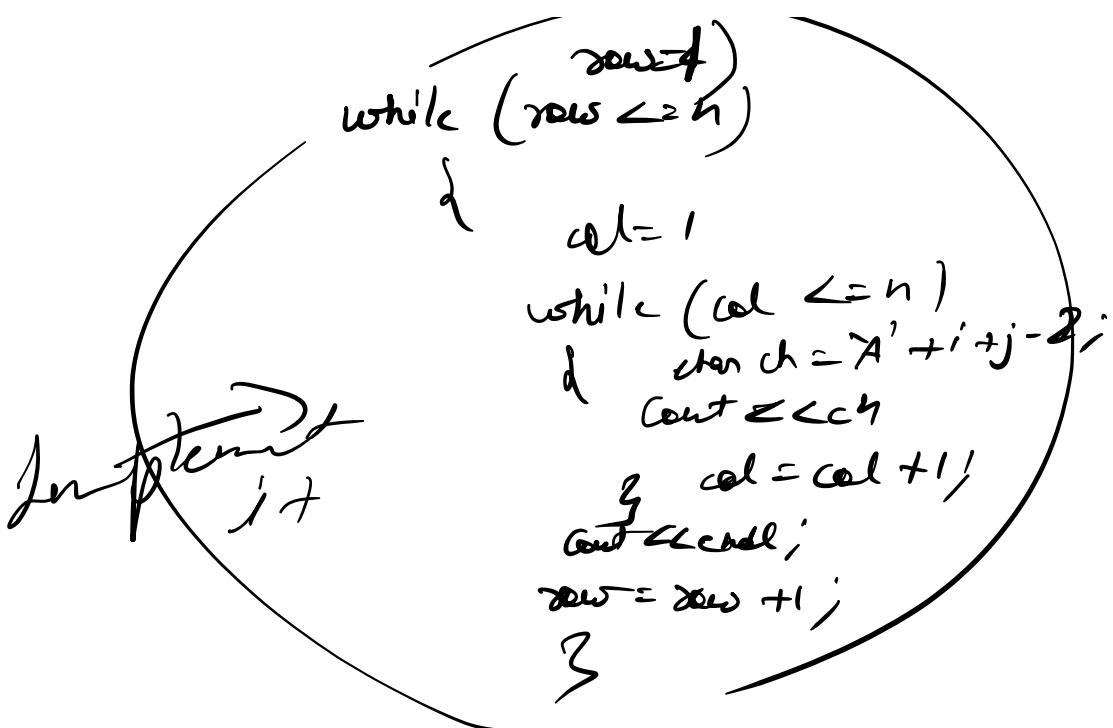
$$A + \cancel{\text{row}} - 1$$

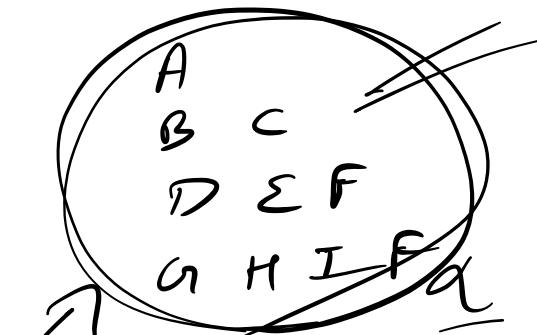




$$\begin{aligned}
 i+j-1 &= 1 \rightarrow A & 1+2-1 &= 2 \rightarrow B \\
 3-2+1 &= 2 \rightarrow C & 1+3-1 &= 3 \rightarrow D \\
 i+j-1 &= 1 \rightarrow E & 2+1-1 &= 2 \rightarrow E
 \end{aligned}$$

$$\begin{aligned}
 \text{Add} &= A' - 1 \\
 i+j-1 + A' - 1 &= 1 + A' - 1 \quad / \quad i+j-1 = A' \\
 A' + i+j-2 &= A' \\
 &\xrightarrow{\text{formula}}
 \end{aligned}$$

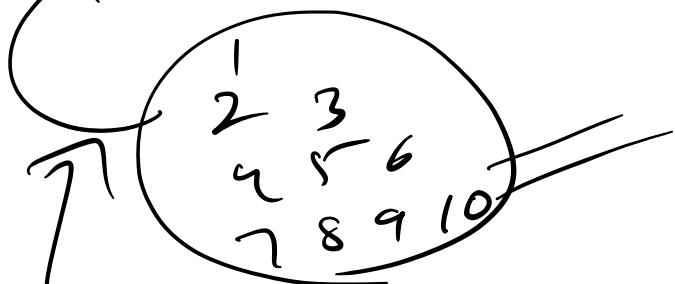




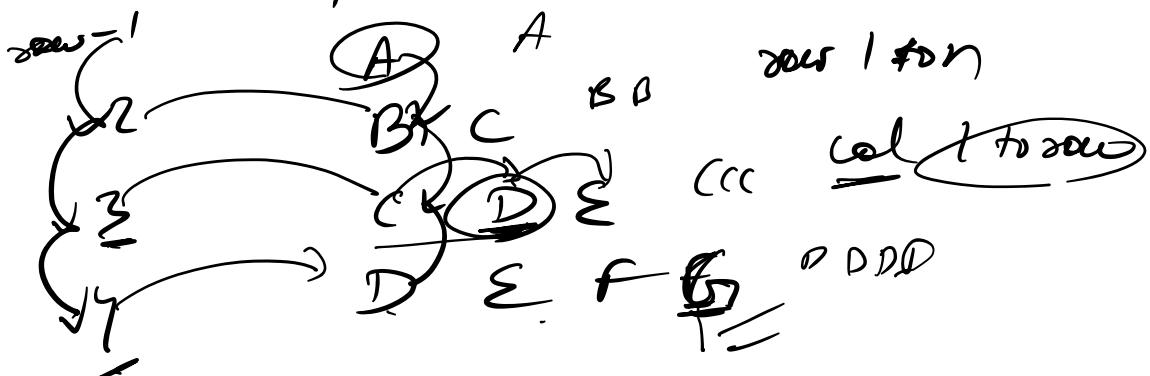
value = 'A'

cont == value

value = value + 1



col / 5 + 2 = 3 +



$$A' + \text{row} - 1 = A' + 1 - 1 = A'$$

$$A' + 3 - 1 = A' + 2 = C'$$

1 - - -

$$\overbrace{A' + \text{row} + \text{col} - 2}^F$$

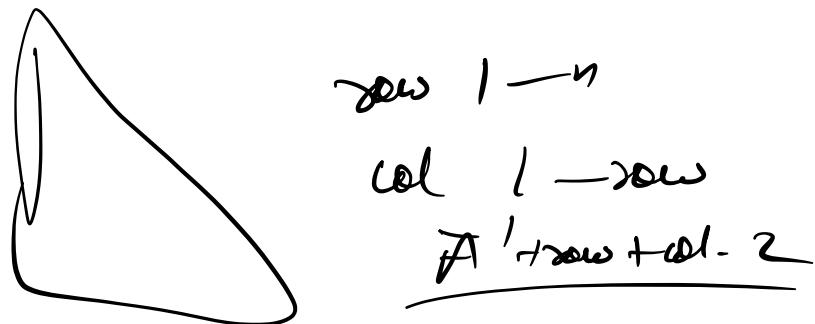
$$A' + 3 + 2 - 2 = A' + 3$$

$\cancel{2}$

$$A' + 4 + 4 - 2$$

$$= A' + 6$$

$\cancel{6}$



$$\frac{\text{col}/\text{row}}{j+1 \geq i \geq j}$$

i/row

1
 2
 3
 4

$i+j+1$

$A' +$

$n - i - j + 1$

$A' + n - i$

$A' + 4 - 1$
 $\cancel{A' + 3}$

$A' + 4 - 1 - i + 1$

$= 3$

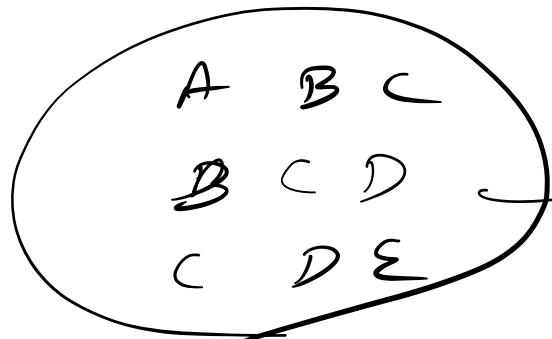
$$A^1 + 4 - 2 \\ \text{, } \approx \textcircled{c1}$$

$$A^1 + n - i - j + 1 \cancel{\times} \\ A^1 + 4 - 2 - 2 + 1$$

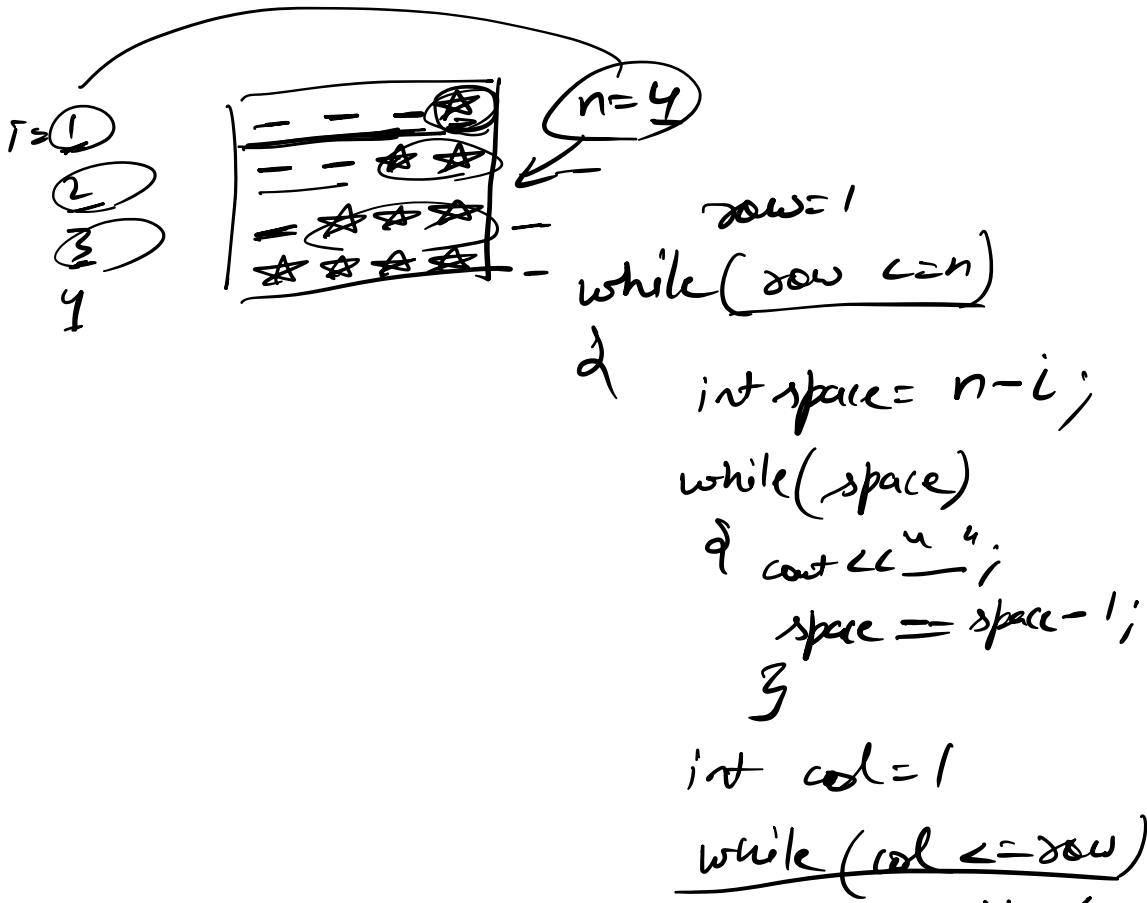
$$A^1 + 1 = B \times$$

row \rightarrow startch \rightarrow $A^1 + n - i$

\hookrightarrow increment



easy way?

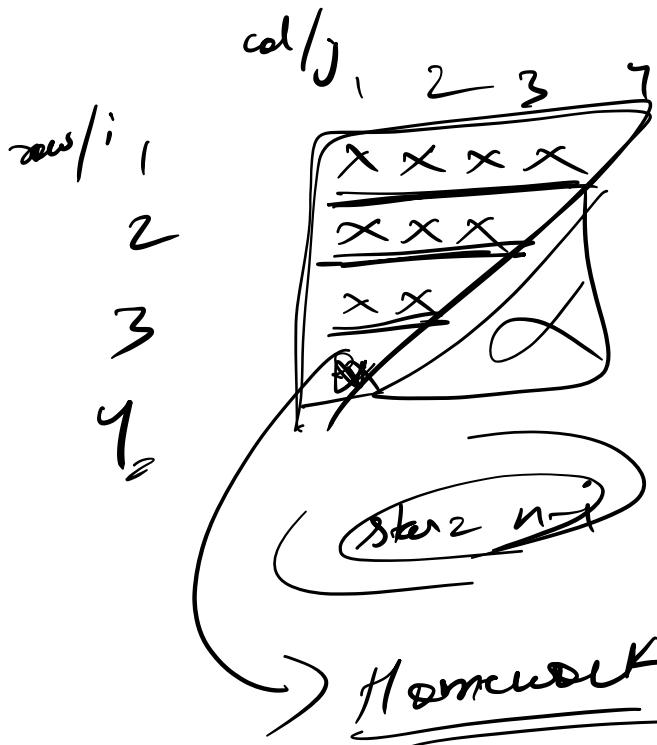


~~d cont <= col~~
~~col++~~ col + 1;

3

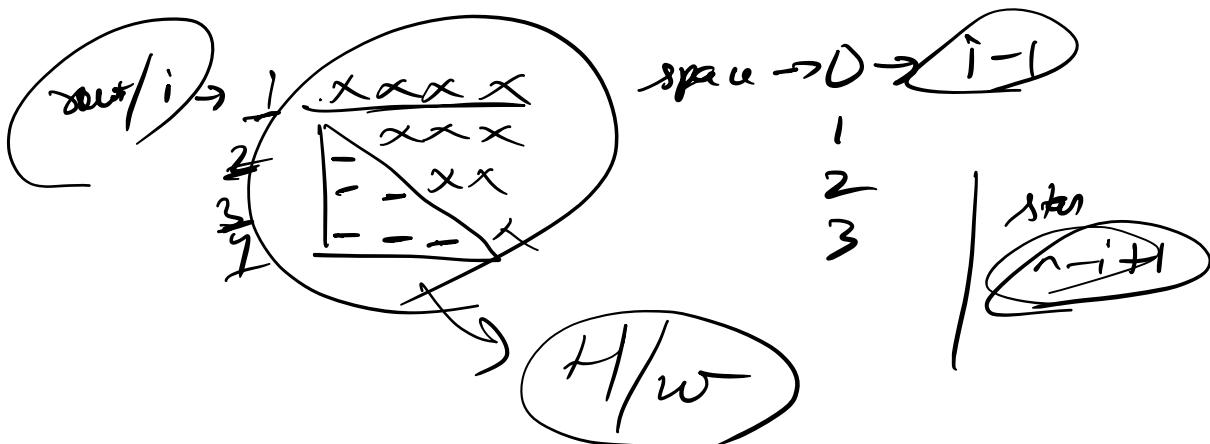
cont <= col

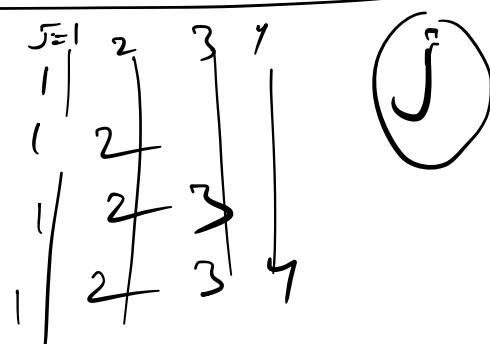
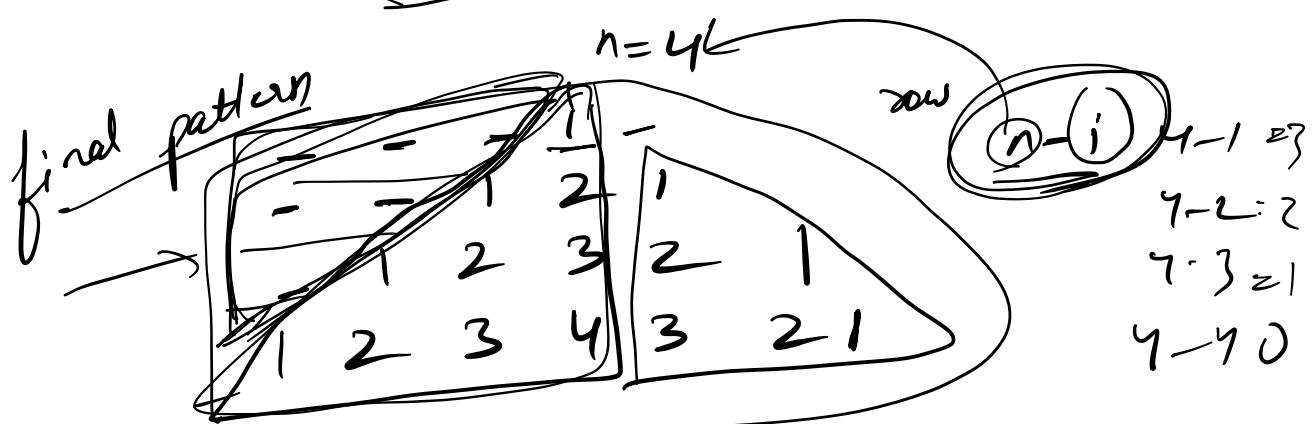
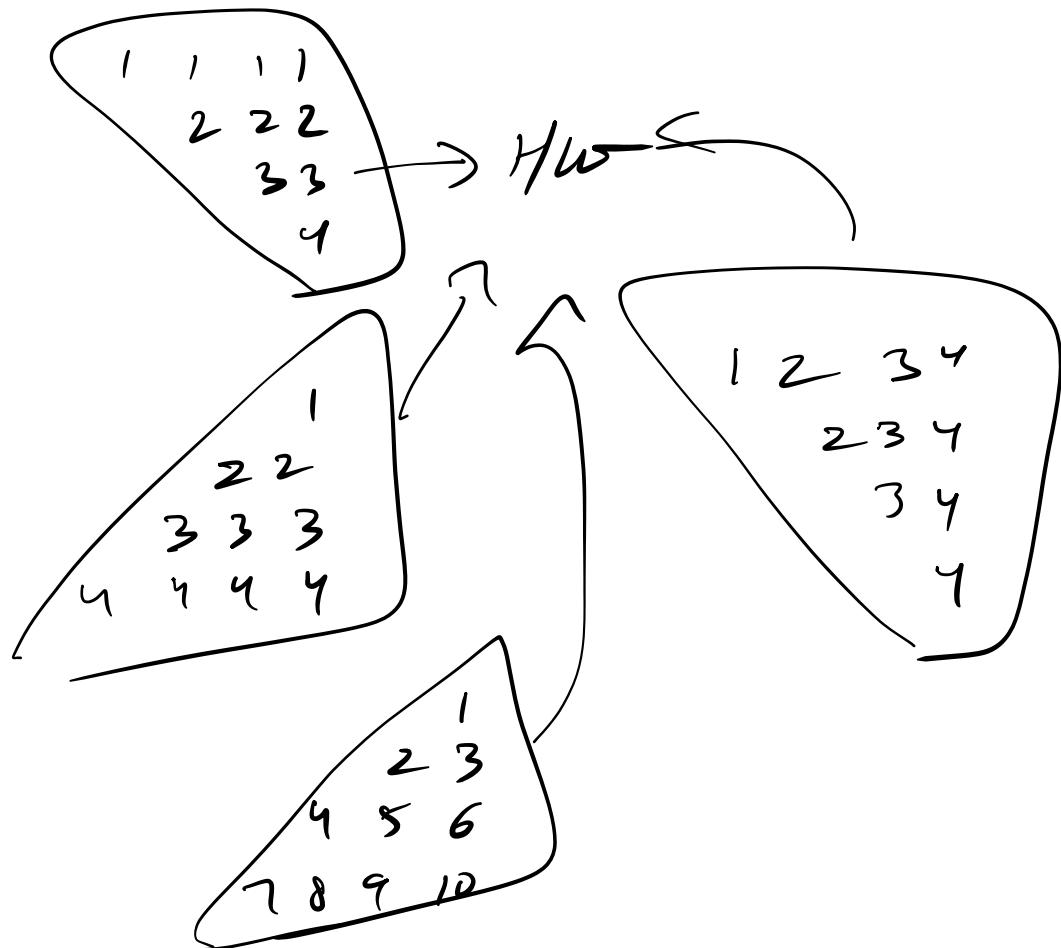
3 row = row + 1



$$\begin{aligned}n-1+1 &= 4 \\n-2+1 &= 3 \\n-3+1 &= 2 \\n-4+1 &= 1\end{aligned}$$

4
3
2
1





down / $i \rightarrow 1$

start = $i-1$

$$n=5$$

Dabangg

1 2 3 4 5 5 4 3 2 1
1 2 3 4 * * 4 3 2 1
1 2 3 * * * * 3 2 1
1 2 * * * * * 2 1
1 * * * * * * 1