

21/11/2022

Contest discussion 2.

- ① Max binary sum.
- ② Cross the wall.
- ③ Students marks.
- ④ Another sequence problem.
- ⑤ Little pony & palindromes.

Start at 7:35 am

→ Any general queries / interview related etc.

① Max binary sum.

- A binary no.
- for bit notation of each no
- B (atmost B operations)
- operation → flip the bits of a no.

Eg 1
~~C = ["11", "01"]~~, A = 2, B = ~~1~~

$$\begin{matrix} & \overbrace{11}^3 \\ C = [& \downarrow \\ & \overbrace{01}^1] \end{matrix} \quad , \quad A = 2, \quad B = \overbrace{1}^{\rightarrow 4}$$

$\rightarrow 11 \rightarrow \underline{00}, \underline{01} \rightarrow \perp (0+1)$

$\rightarrow 01 \rightarrow \underline{10} \rightarrow (3+2) \Rightarrow \underbrace{5}_{\perp} \quad (\underline{101})$

Eg 2 ~~C = ["011", "100", "00"]~~, A = 3, B = 2

$$\begin{matrix} & \overbrace{011}^3 \\ C = [& \downarrow \\ & \overbrace{100}^1; \overbrace{00}^1] \end{matrix}, \quad A = 3, \quad B = 2$$

$100, 100, 100 \rightarrow 4+4+4 = 12 (1100)$

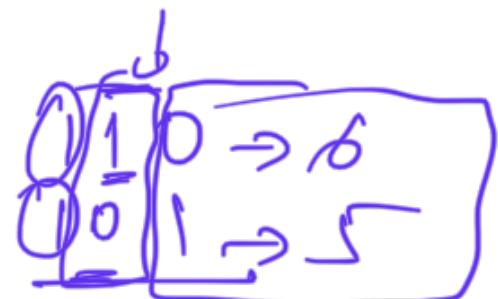
$\overbrace{M=3}$
 $\begin{array}{r} 100 \\ 001 \\ \hline 001 \end{array}$

1, 01, 001, 0001

Observations

$$\textcircled{1} \quad 10 \rightarrow 01 \rightarrow 10$$

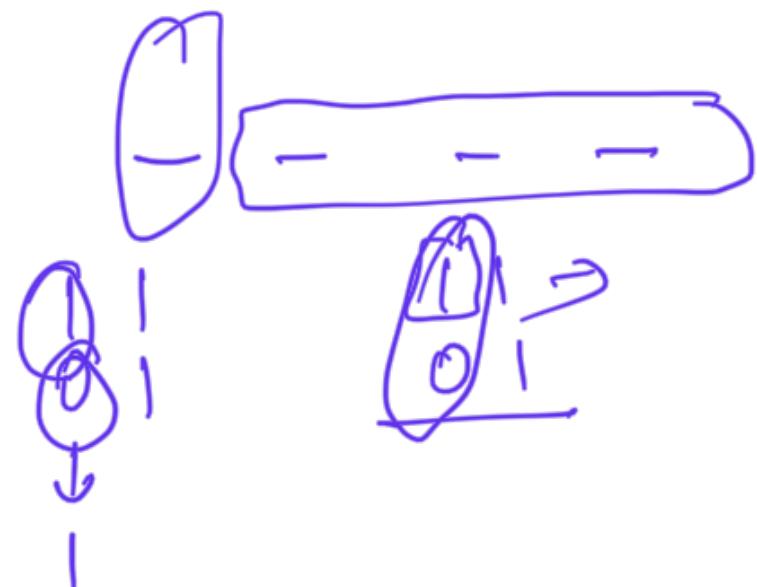
Don't flip a no. more than once.



$$\textcircled{2} \quad \begin{array}{c} 1 \\ \hline 001 \end{array} \rightarrow \begin{array}{c} 6 \\ \hline 110 \end{array}$$

$$\begin{array}{c} 100 \\ \hline 4 \end{array} \rightarrow \begin{array}{c} 011 \\ \hline 3 \end{array}$$

Flip only if no starts with 0.



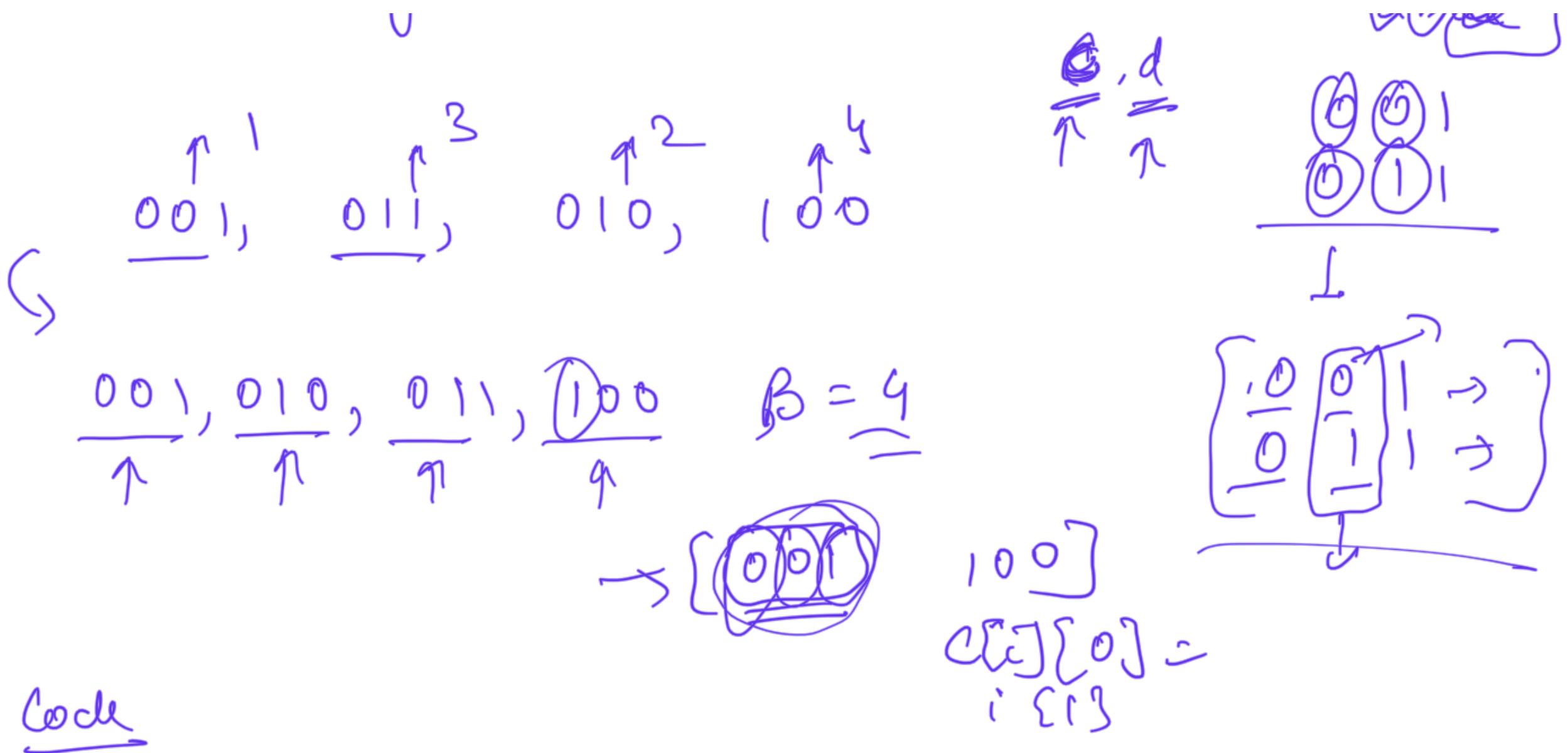
$$\textcircled{3} \quad \begin{array}{c} 001 \\ \hline \underline{\underline{0}} \end{array}, \quad \begin{array}{c} 011 \\ \hline \underline{\underline{0}} \end{array}$$

$$\begin{array}{c} 011 \rightarrow 3 \\ \hline 100 \rightarrow 4 \end{array} \quad \begin{array}{c} 001 \rightarrow 1 \\ \hline 110 \rightarrow 6 \end{array}$$

Prefer flipping smaller nos.

$$3 > 1$$





Code

String solve (int A, int B, String[] C) {

Sort(C); $\rightarrow O(A \lg A)$

int M = C[0].length();

for (int i=0; i < B; i++) {

```

    if ( C[i][j] == '1' ) {
        break;
    }
}

for ( j=0; j<=M; j++ ) {
    C[i][j] = '-' - C[i][j];
}

```

$0 \rightarrow 1$
 $1 - 0 \rightarrow 1$

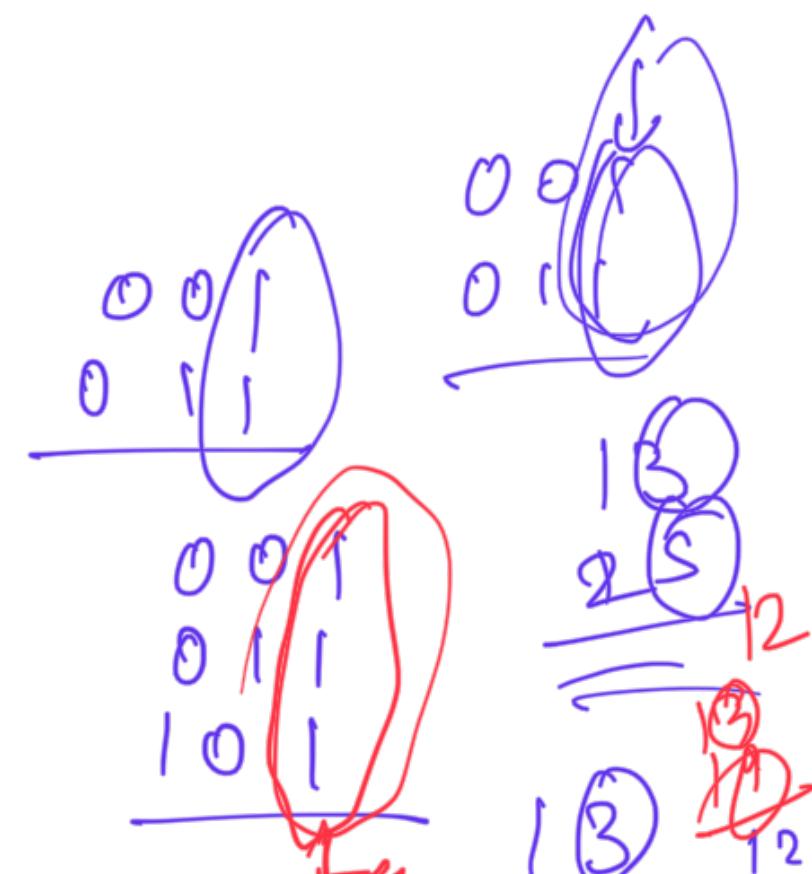
$1 \rightarrow 0$
 $1 - 1 \rightarrow 0$

```

}
}

String ans = " ";
int sum = 0, carry = 0;
for ( int i=M-1; i>=0; i-- ) {
    for ( int j=0; j<=A; j++ ) {

```



$\text{ans} += (\text{sum}[j][i] - '0');$ $\rightarrow \text{ans} = 3$ $19/10$

}

ans = $(\text{sum} \% 2) + \text{ans};$

carry = $\text{sum} / 2;$

sum = carry;

}

while (carry > 0) {

ans =

ans = $(\text{carry} \% 2) + \text{ans};$

carry /= 2;

}

return ans;

}

$n \lceil A \times M \rceil$

.

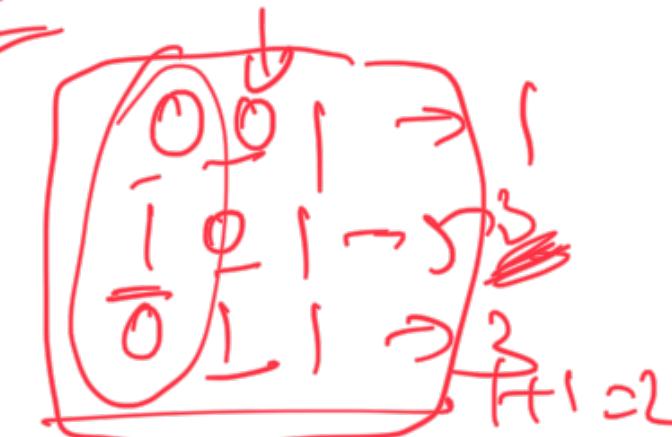
$1+5+3=9$ $\lceil \rfloor \circ |$

1001

152

$2 \% 2 = 01$

001



$\text{ans} = 1;$

$2 \% 2 = 01$

001

19/10

2

$\text{ans} = 1;$ $12/10$

$12/2$

$12/10$

1

99

98

1001

sorting: $O(\text{Alg } A + \min(n, B) \times M + A \times M)$
 flushing addition

$g_C \geq 0(1)$

$n \rightarrow$ nos starting with 0.

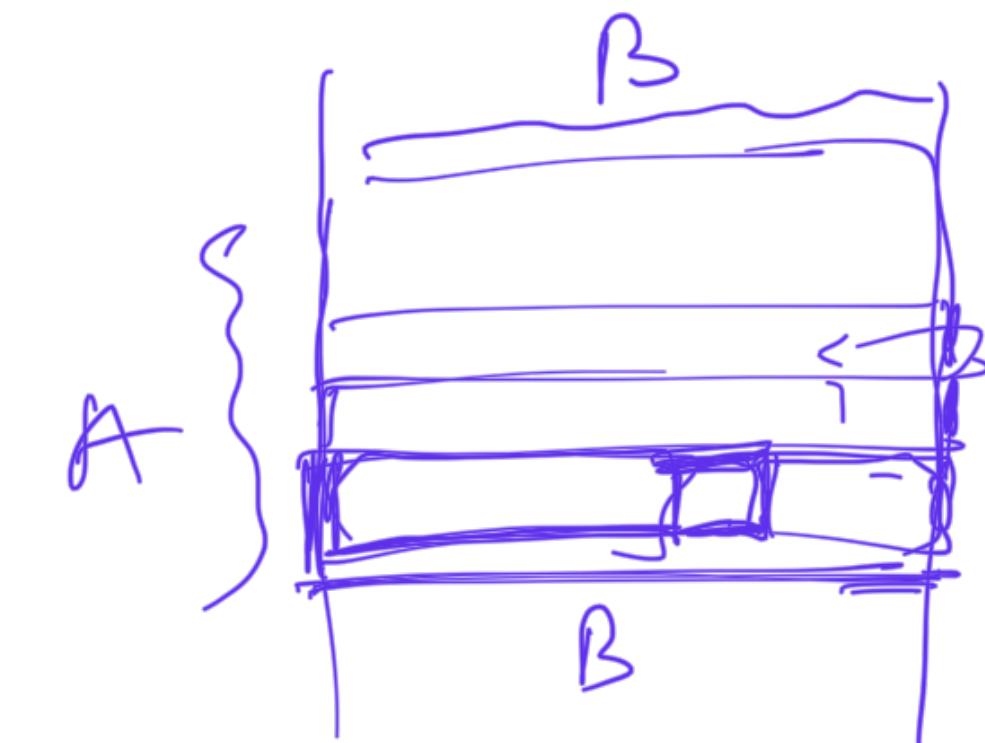
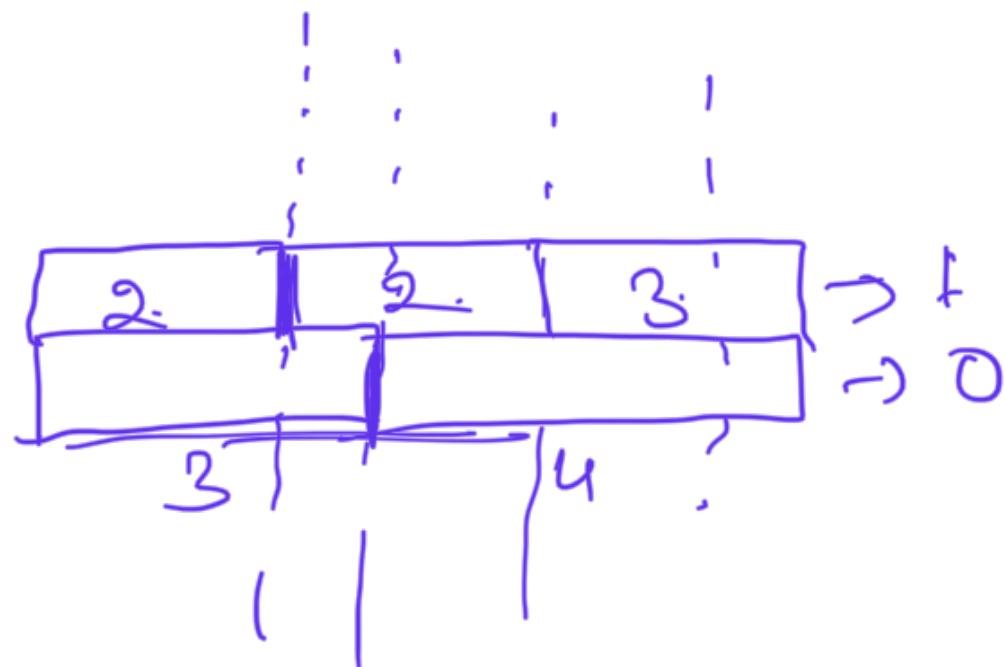
110 10

$$\begin{array}{r} \underline{\underline{3}} \\ \underline{\underline{2}} \end{array} \quad \begin{array}{r} \underline{\underline{5}} \\ \underline{\underline{2}} \end{array}$$

② Cross the wall:

Eg $A = \underline{2}, B = \underline{\underline{7}}$

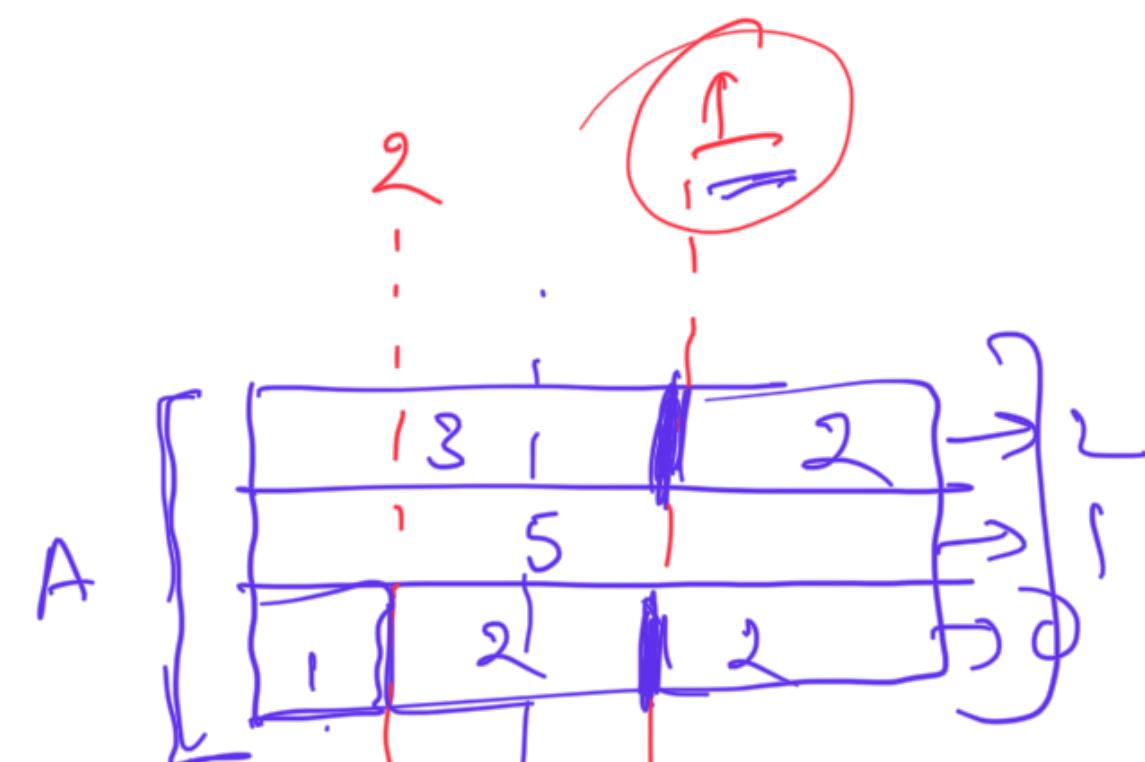
$C = [\underline{\underline{3}}, \underline{4}, \underline{\underline{2}}, \underline{\underline{2}}, \underline{\underline{3}}]$



1

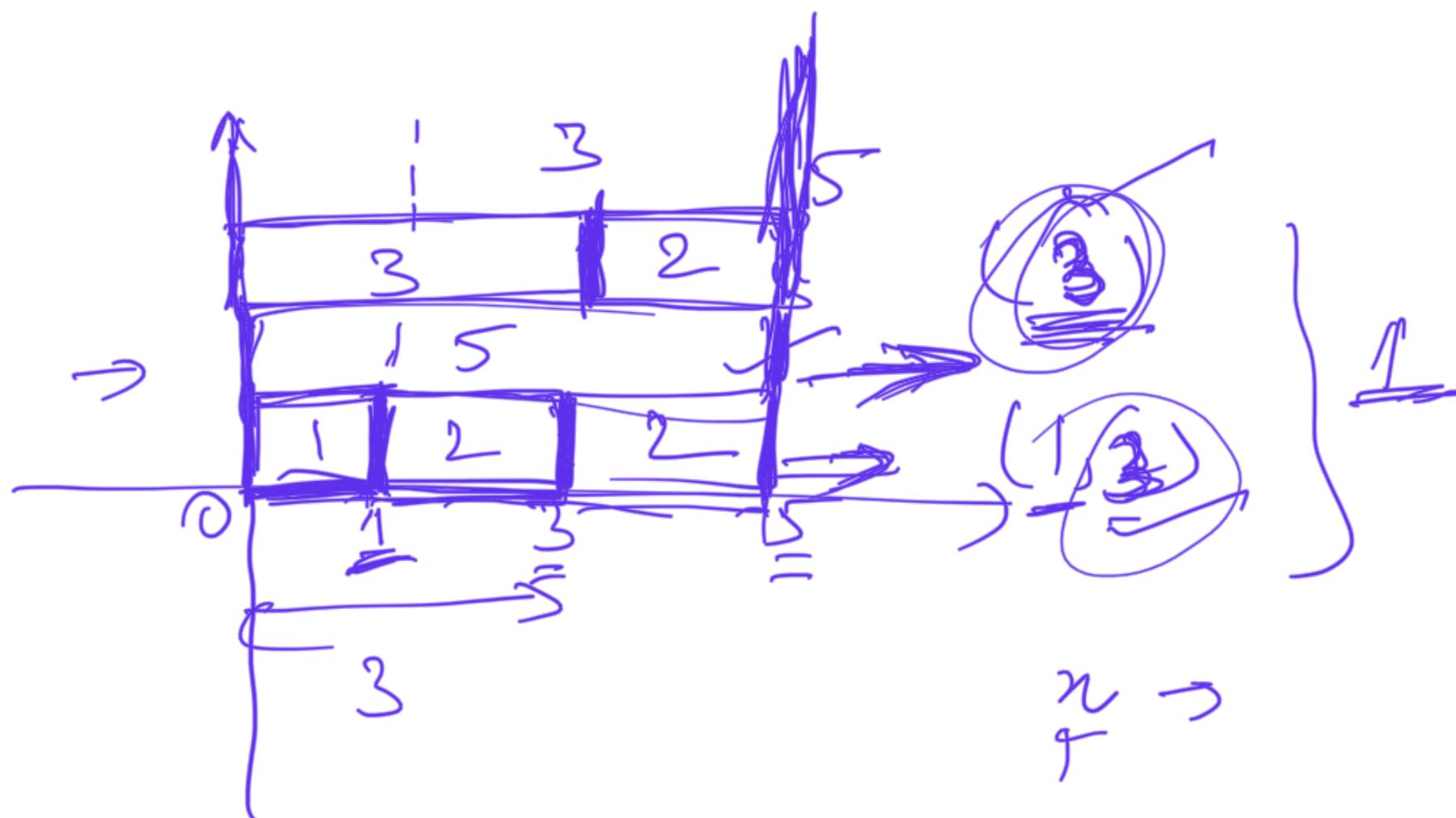
Eg 2 $A = \underline{3}, B = \underline{\underline{5}}$

$C = [\underline{1}, \underline{2}, \underline{2}, \underline{\underline{5}}, \underline{\underline{3}}, \underline{\underline{2}}]$



$\text{ans} = \min_x \text{ no of bricks fully crossed}$

|| |



$$\begin{array}{l} \rightarrow 1 - 1 \\ \rightarrow 3 - 2 \end{array}$$

$$\underline{3-2} \Rightarrow \underline{1}$$

$$\begin{array}{l} 1 \rightarrow \underline{1} \\ 2 \rightarrow \underline{0} \\ \underline{3} \rightarrow \underline{2} \end{array}$$

$A - \max$

olution

Seminar

mit solve (mit A, mit B, mit \sqcup C) {

mit sum = 0; →

mit maxEdge = 0.

Map \sqcup mit, mit edges; // Map
for (i = 0; i < C.length; i++) {

sum \sqcup = C[i];

if (sum \sqcup = B) {

TC \rightarrow O(n)

SC \rightarrow O(no of
distinct
edges)

\rightarrow O(B)

edges[sum] \sqcup +=;

maxEdge \sqcup = max(maxEdge, edges[sum]);

}

else {

sum = 0;

}

}

}

return $\underline{A} - \max \underline{\text{Edge}}$;

}

③ Students marks.

haresh 95, ajay 100, abc 85 (largest to lowest)

A 100, B 100 \rightarrow A 100, B 100

Solution

class Stud {
int marks;
int index;
}

String[] solve (String[] A) {
int n = A.length;

marks \rightarrow
index \rightarrow

String[] ans = new String[n];

list<Student> students;

for (i=0; i<n; i++) {

$O(N + N \lg N + N)$

$O(N \lg n N)$

 int marks = getmarks(AT[i]);

 Student stu = new Student(marks, i);

 students.add(stu);

}

int sort(students, (a, b) => {

 if (a.marks == b.marks) {

 return a.midp - b.midp;

}

a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
q
r
s
t
u
v
w
x
y
z
0
1
2
3
4
5
6
7
8
9

S =

haus(91)

$$\frac{b}{100} \times \frac{a}{q} = \frac{b}{100} a$$

```
    -  
return {  
    b.marks - a.marks;  
}  
} -  $\Rightarrow$ 
```

$$100 - 95 \geq 20$$

-1 → ~~no certainty~~
0 → beth are equal]

1 → Sub the values.

$$\begin{array}{r} 3 \\ - 5 \\ \hline 1 \end{array}$$

```
for (i=0; i<n; i++) {
```

```
int index = student[i].index;
```

ans[i] = A[mides];

}

mit getmarks (string str){

mit marks = 0;

for (i = str.length() - 1; i >= 0; i--) {

if (str[i] is a digit){

marks += (int) str[i] - '0';

} else break;

}

return marks;

}

main(){

59
==

(4)

Another sequence problem:

$$f(A) = f(A-1) + f(A-2) + f(A-3) + A,$$

find A^m term.

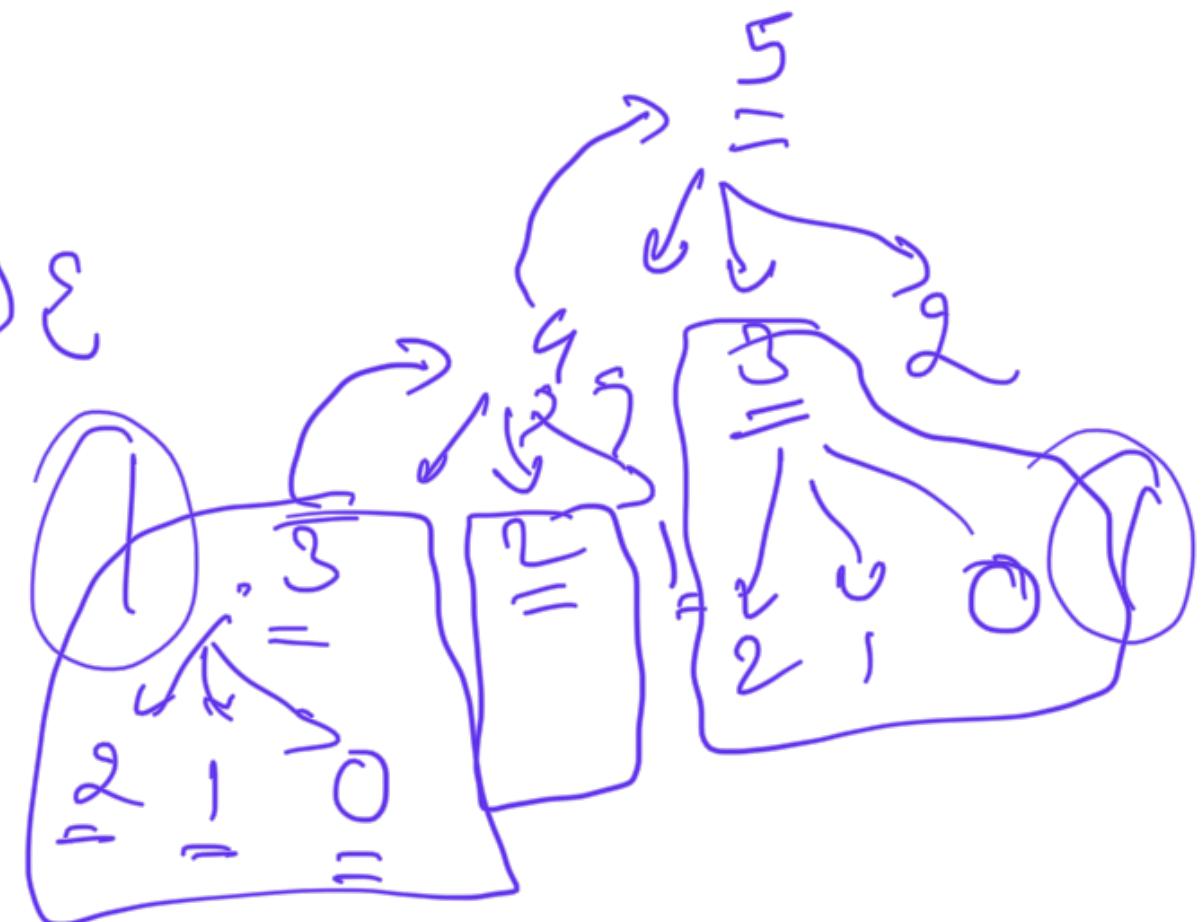
$$f(0) = 1, \quad f(1) = 1, \quad f(2) = 2.$$

uit solve (uit A) {

if (A \leq 1) {
return 1;

}

if (A \leq 2) {
return 2;



return $(\text{sol}(A-1) + \text{sol}(A-2) + \text{sol}(A-3) + A)$

Solve $(A^{-3}) + A$:

}

⑤ little pony & palindromes:

→ given lowercase character string A^n

Eg 1

$$\underline{\underline{aabb}} \rightarrow \begin{matrix} abba \\ b\ aab \end{matrix}$$

$\textcircled{a} \textcircled{a} \textcircled{b} \textcircled{b}$
 $\textcircled{a} \textcircled{b} \textcircled{b} \textcircled{a}$

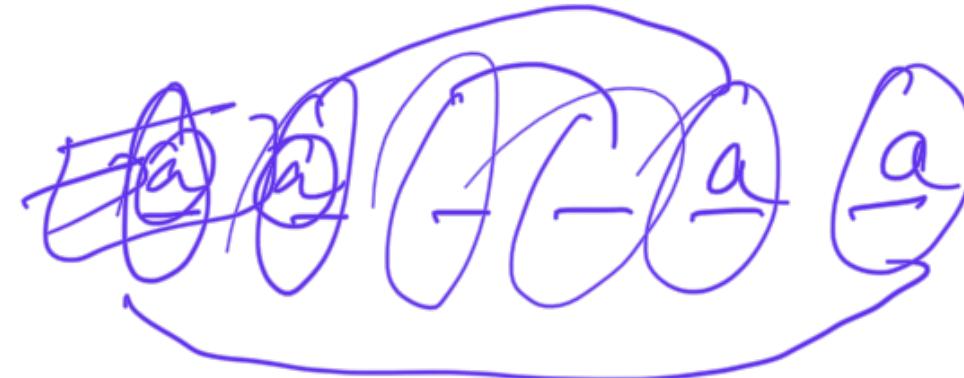
abba

$$\begin{array}{c} \xrightarrow{\hspace{2cm}} \\ \xleftarrow{\hspace{2cm}} \\ aba \rightarrow aba \end{array}$$

$$\underline{\underline{a\ e c l p b}} \rightarrow$$

$$b - \textcircled{e} - \textcircled{c} - \textcircled{l} - \textcircled{p} - b \rightarrow$$

even
odd



a a a
b b b

$$\underline{a} \quad \underline{b} \quad \underline{a \times b} \quad \underline{b} \quad \underline{a}$$



l + pairs $\rightarrow 2n$

($\cancel{2n} \Rightarrow$ odd)

int [] freq = new int [26].

Code

boolean solve (string A) {

map < char, int > map;

for (char ch : A) { }

abc cb da c

} map(ch) + r; }

a \rightarrow 2
b \rightarrow 2
c \rightarrow 2
d \rightarrow 1
e \rightarrow 1

int oddfNoct = 0;

→ for (char a : map) {
 if ((map[a] % 2 != 0)) {
 oddfNoct++;
 if (oddfNoct > 1)
 break
 }
}

return oddfNoct <= 1;

2 ≤ 1

}

T ≤ 1