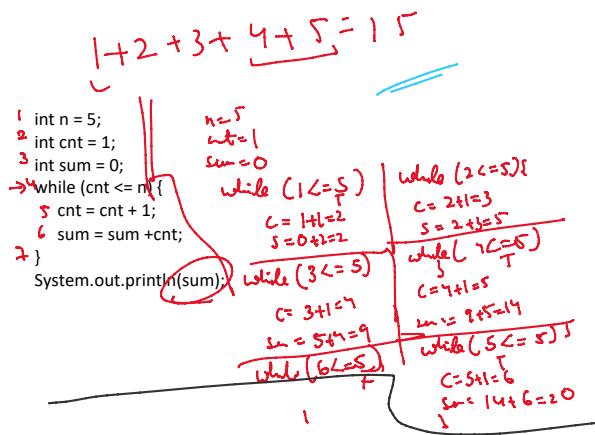
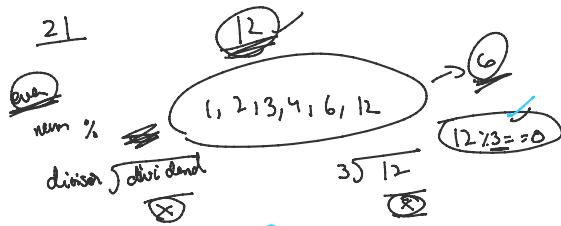


Q n



Prime → 1 and num



$$\begin{array}{r} 3 \\ \times 4 \\ \hline 12 \\ 12 \\ \hline 3 \end{array}$$

6

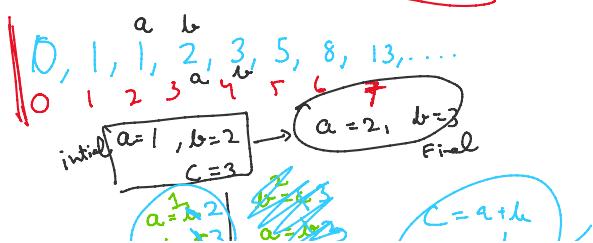
```

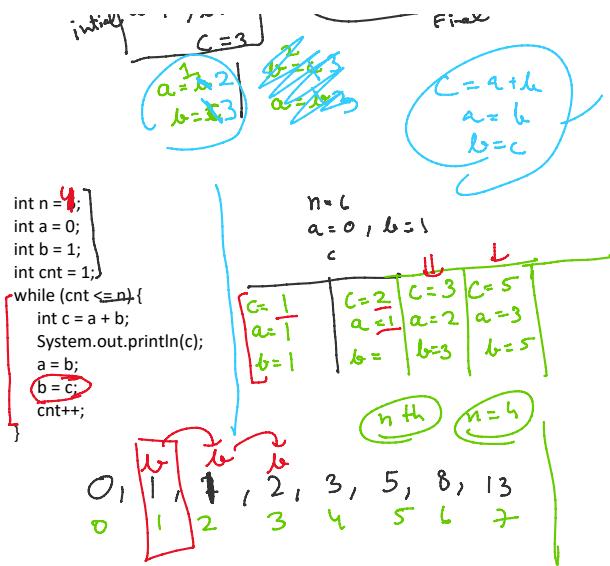
int num = 6;
int div = 1;
int fac = 0;
while (div <= num) {
    int rem = num % div;
    if (rem == 0) {
        fac = fac + 1;
    }
    System.out.println(div + " - " + rem);
    div++;
}
System.out.println(fac);
    
```

```

1 int num = 6;
2 int div = 1;
3 int fac = 0;
4 while (div <= num) {
5     int rem = num % div;
6     if (rem == 0) {
7         fac = fac + 1;
8         div = div + 1;
9     }
10    System.out.println(div + " - " + rem);
11}
12 System.out.println(fac);
    
```

$n^{th}$  Fibonacci





$\Rightarrow$

L.C.M and H.C.F

$$8, 6 \rightarrow 2^4 \parallel$$

$$\begin{array}{c} 1 \times 2 \times 2 \times 2 \\ \parallel \\ 2 \end{array} \quad \begin{array}{c} 1 \times 2 \times 3 \\ \parallel \\ 3 \end{array}$$

$$\begin{array}{c} 18 \\ | \\ 2 \times 3 \times 2 \\ \parallel \\ 18 \end{array} \quad \begin{array}{c} 2^5 \\ | \\ 18 \\ | \\ 14 \\ | \\ 4 \\ | \\ 12 \\ | \\ 4 \\ | \\ 0 \end{array}$$

$$2^4 \overline{) 96}$$

$$\begin{array}{r} 2^4 \\ \times \\ 96 \\ \hline x \end{array}$$

$$\begin{array}{r} 2^4 \\ \times \\ 9 \\ \hline 72 \\ 2^4 \end{array}$$

division dividend

$$2^4 \overline{) 94}$$

$$\begin{array}{r} 2^4 \\ \times \\ 2 \\ \hline 2^2 \\ 2^2 \end{array}$$

$$\begin{array}{r} 2^4 \\ \times \\ 2 \\ \hline 2^2 \\ 2^2 \end{array}$$

Quotient

$$\frac{\text{divisor}}{\text{dividend}}$$

$$\frac{\text{Rem}}{\text{divisor}}$$

$$94 \overline{) 2^4}$$

$$\begin{array}{r} 0 \\ 2^4 \overline{) 94} \end{array}$$

divisor = 24  
dividend = 94  
rem = dividend % divisor  
 $= 2^4 \mod 2^4 = 0$

dividend = 22, divisor = 24

dividend = 22, divisor = 22

```

int a = 24;
int b = 94;

int divisor = a;
int dividend = b;

while (true) {
    int rem = dividend % divisor;
    dividend = divisor;
    divisor = rem;
}

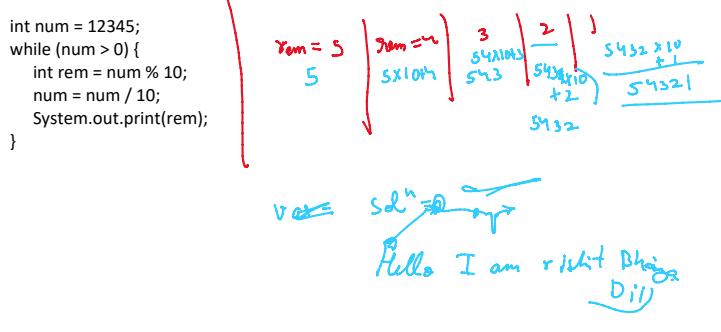
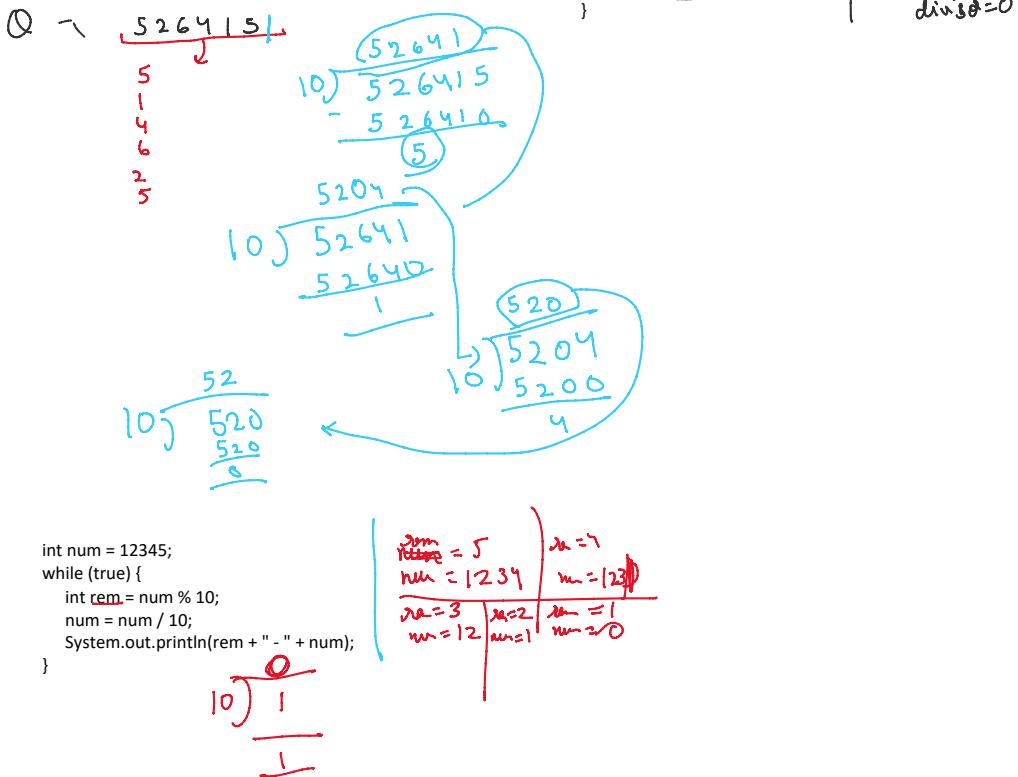
```

divisor = 24	dividend = 94
rem = 22	dividend = 24
divisor = 24	divisor = 2
rem = 0	dividend = 2
divisor = 0	divisor = 0

Q - 5264151

$$5 \overline{) 5264151}$$

$$10 \overline{) 5264151}$$



n = 5

Star Pattern

$\star \star \star \star \star$     $\circ$     $1$     $2$     $3$     $4$     $5$     $-$   
 $y=1$     $\star \star \star \star \star$   
 $y=2$     $\star \star \star \star \star$   
 $y=3$     $\star \star \star \star \star$   
 $y=4$     $\star \star \star \star \star$   
 $y=5$     $\star \star \star \star \star$   
 $y=6$     $-$

```

1 int n = 5;
2 int row = 1;
3 while (row <= n) {
4     int cnt_st = 0;
5     while (cnt_st < n) {
6         System.out.print("* ");
7         cnt_st++;
8     }
9     row++;
10 System.out.println();
11}

```

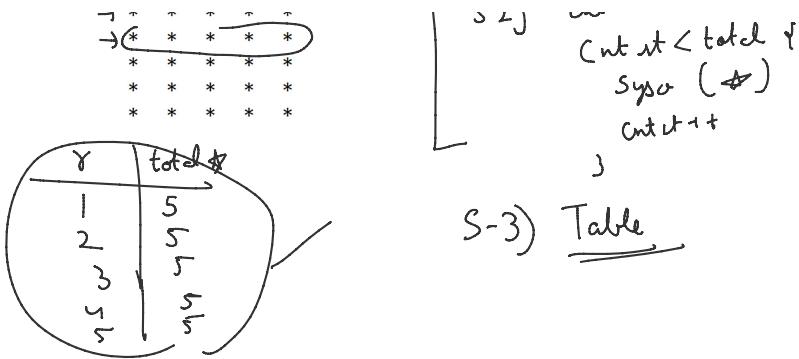
S-1) No. of row w.r.t n

$\lceil \frac{\text{row}}{1+n} \rceil$   
 $\text{row}++$   
 $\lfloor \frac{\text{row}}{n} \rfloor$

n = 5

$\begin{array}{ccccc} * & * & * & * & * \\ * & * & * & * & * \\ * & * & * & * & * \\ * & * & * & * & * \\ * & * & * & * & * \end{array}$

S1) no. of row's loop  
S2)  $\text{cnt\_st} = 0$   
 $\text{cnt\_st} < \text{total}$  {  
 $\text{System.out}(\star)$



S-3) Table

$n = 5$

r	total
1	5
2	5
3	5
4	5
5	5

r	total
1	5
2	4
3	3
4	2
5	1

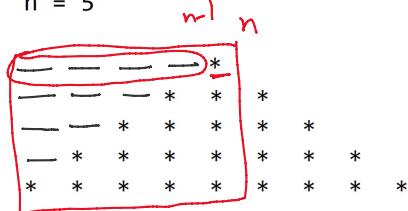
$n = 5$

r	total	total
1	4	1
2	3	2
3	2	3
4	1	4
5	0	5

r	total	total
1	0	5
2	2	4
3	4	3
4	6	2
5	8	1

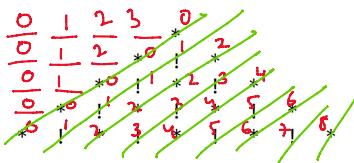
Ques 9:

$n = 5$



Ques 12:

$n = 5$



Ques 13:

$n = 5$

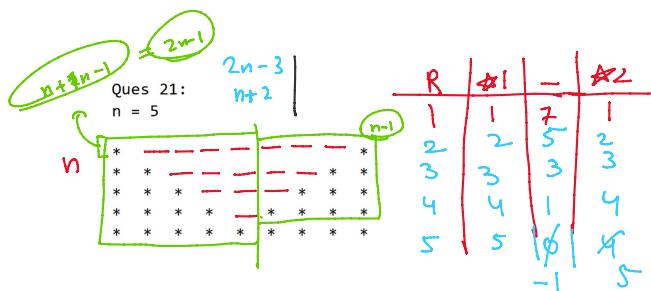
R	Y
1	1
2	2
3	3
4	4
5	5
6	4
7	3
8	2
9	1

$\leftarrow$   
 $\begin{array}{l} \text{++ } i; 2, 3, 4, 5 \\ -- j; 6, 7, 8 \end{array}$

```

int n = 5;
int row = 1;
int total_st = 1;
while (row <= 2 * n - 1) {
    int cnt_st = 0;
    while (cnt_st < total_st) {
        System.out.print("* ");
        cnt_st++;
    }
    row++;
    if (row < n) {
        total_st++;
    } else {
        total_st--;
    }
}
System.out.println();
}

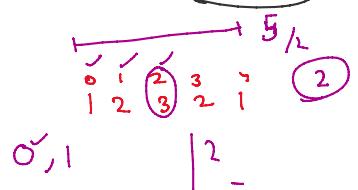
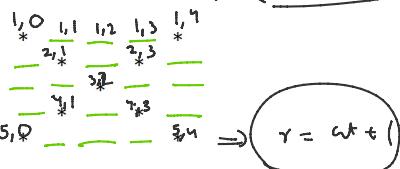
```



Ques 8:

$n = 5$

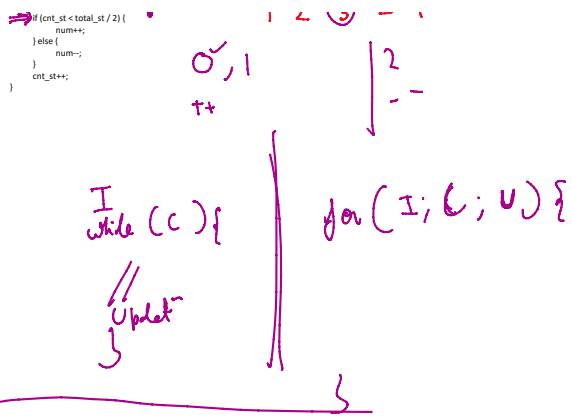
$\leftarrow 10 + at = n$



```

while (cnt_st < total_st) {
    System.out.print(num + " ");
    if (cnt_st < total_st / 2) {
        num++;
    } else {
        num--;
    }
    cnt_st++;
}

```



Java Numeric

<u>Integers</u>	$\text{byte} \rightarrow 1 \text{ byte}$ $16 \text{ bit} \rightarrow 2^8 \rightarrow 2^{31} \text{ to } 1\text{-}7$ $\text{short} \rightarrow 2 \text{ bytes}$ $16 \text{ bit} \rightarrow 2^{16} \rightarrow 2^{31} \text{ to } -1 \rightarrow 32,000 \text{ to } -32,000$ $\text{int} \rightarrow 4 \text{ bytes}$ $32 \text{ bit} \rightarrow 2^{31} \text{ to } 2^{31} - 1 \rightarrow 2 \times 10^9 \text{ to } 2 \times 10^9$ $\text{long} \rightarrow 8 \text{ bytes}$ $64 \text{ bit} \rightarrow 2^{63} \text{ to } f - 1$
-----------------	--

$2^{63} = 2^3 \cdot 2^{60}$   
 $= 8 \cdot (2^{10})^3$   
 $= 8 \cdot 10^{3.6}$   
 $= \underline{\underline{8 \cdot 10^{18}}}$

$( )_{10}$	<u>Binary</u>	$2,147,483,648$
0 0-9	0,1	$\underline{\underline{2 \times 10^9}}$
1	$0 \rightarrow 0$	$2^{31} = 2 \times 2^{30} = 2 \times (\underline{\underline{2^{10}}})^3$
2	$1 \rightarrow 1$	$= 2 \times (10^3)^3$
3	$10 \rightarrow 2$	$= \underline{\underline{2 \times 10^9}}$
4	$11 \rightarrow 3$	$10^2 \quad 10^0$
5	$100 \rightarrow 4$	$10^3 \quad 10^0$
6	$101 \rightarrow 5$	$10^2 \quad 10^0$
7	$110 \rightarrow 6$	$10^3 \quad 10^0$
8	$111 \rightarrow 7$	$2^5 \times 1 + 0 \times 2^4 + 2^3 \times 1$
9	$1000 \rightarrow 8$	$+ 0 \times 2^2 + 0 \times 2^1 + 2^0 \times 1$
10	$1001 \rightarrow 9$	$\underline{\underline{1111}}$

$\sum_{n=0}^{\infty} 2^n = 1 + 2 + 2^2 + 2^3 + \dots = \frac{1}{1-2} = \underline{\underline{2^{\infty}}}$

$$S_n = 2^0 + 2^1 + 2^2 + 2^3 + \dots + 2^n = \underline{\underline{2^{n+1}-1}}$$

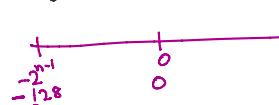
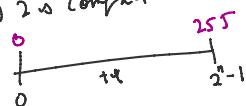
Q-Q

$$S_n = 2^0 + 2^1 + 2^2 + 2^3 + \dots + 2^n = \underline{\underline{2^{n+1}-1}}$$

$$\sum_{n=0}^{\infty} 2^n = 1 + 2 + 2^2 + 2^3 + \dots = \underline{\underline{2^{\infty}}}$$

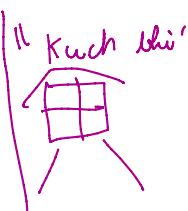


$2^8 \text{ comfort}$



float 4 byte

Symbols.



"Kuch bhi"

<del>float</del>	4 bytes
double	8 bytes

Symbols.

char → 2 bytes.

char → 2 bytes → 16 bits  
 $0 \text{ to } 2^{16}-1$

symbol	value
1	49
2	50
3	51
4	52
5	53
6	54
7	55
8	56
9	57
a	

0

Take 3 input :

Min F : 0

Max F : 100

Step : 20

For each F = 0, 20, 40, 60, 80, 100 on a scale, convert them into Celsius

$$C = (5/9) * (F - 32)$$

F	C
<del>Output : with 4 spaces " \t "</del>	
0	-17
20	-6
40	4
60	15
80	26
100	37

$$\begin{array}{l} n = 12345 \\ r_1 5 | 1234 \\ r_2 4 | 5123 \\ r_3 3 | 4512 \\ r_4 2 | 3451 \\ r_5 1 | 2345 \\ \hline \text{divisor} ) \text{dividend} \\ \hline \text{Rm.} \end{array}$$

$\overbrace{\quad\quad\quad}^{\text{rat} = 7} \quad \overbrace{\quad\quad\quad}^{12345} \quad \overbrace{\quad\quad\quad}^{0|1234} \\ 5 \times 10^4 + 1234 \quad \overbrace{\quad\quad\quad}^{50000} \\ \underline{51234} \quad \overbrace{\quad\quad\quad}^{51234}$

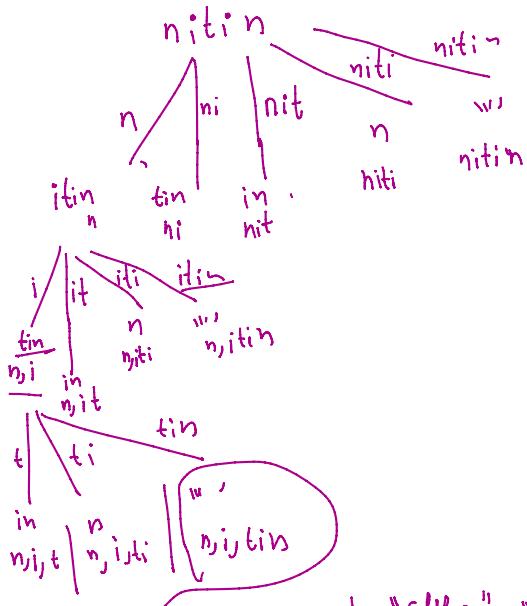
$$\boxed{\text{rat} = 5 \times i + \text{rem}}$$

Palindrome Partitioning .

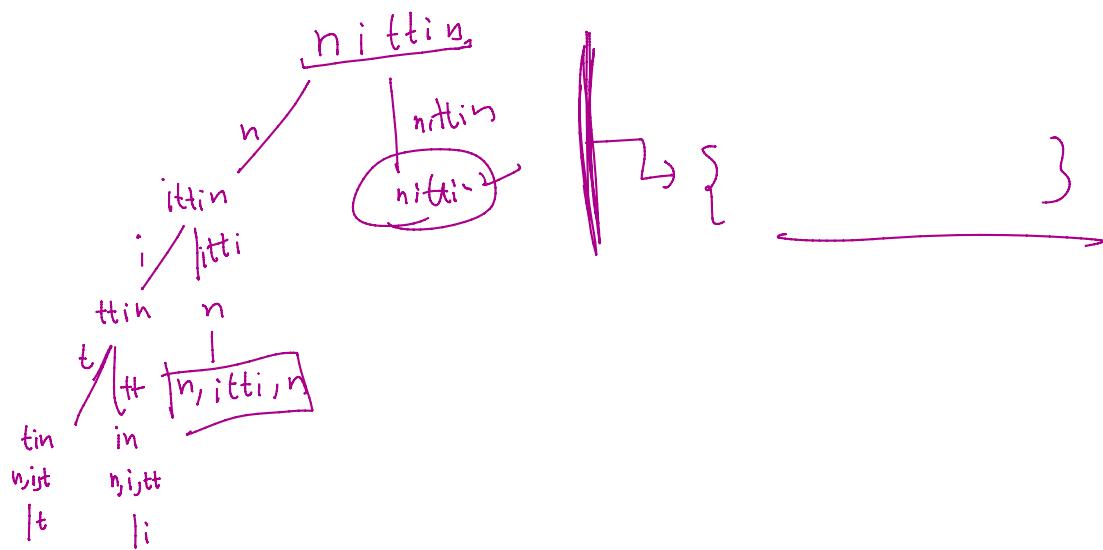
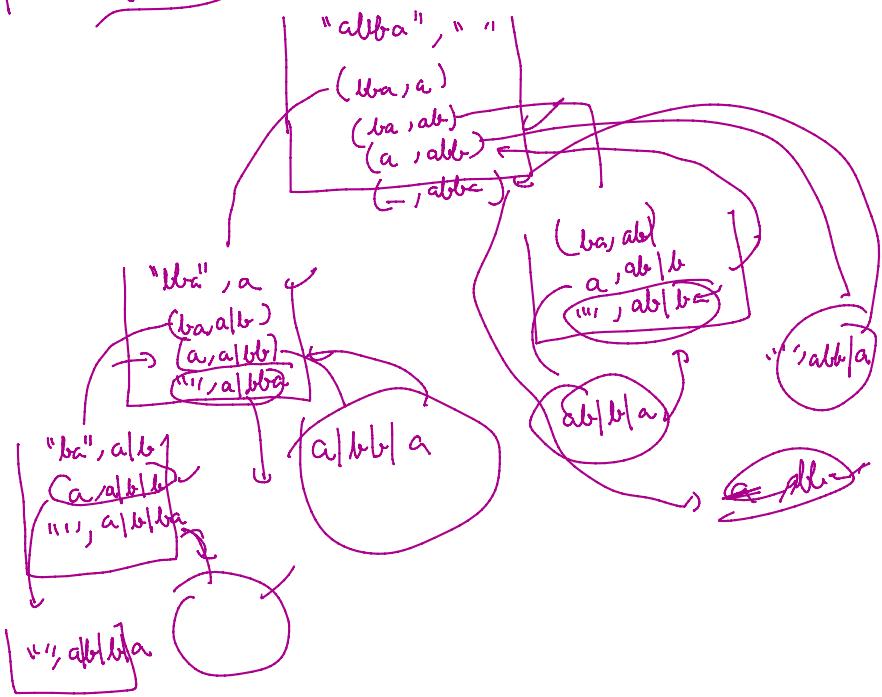
... 1 ...

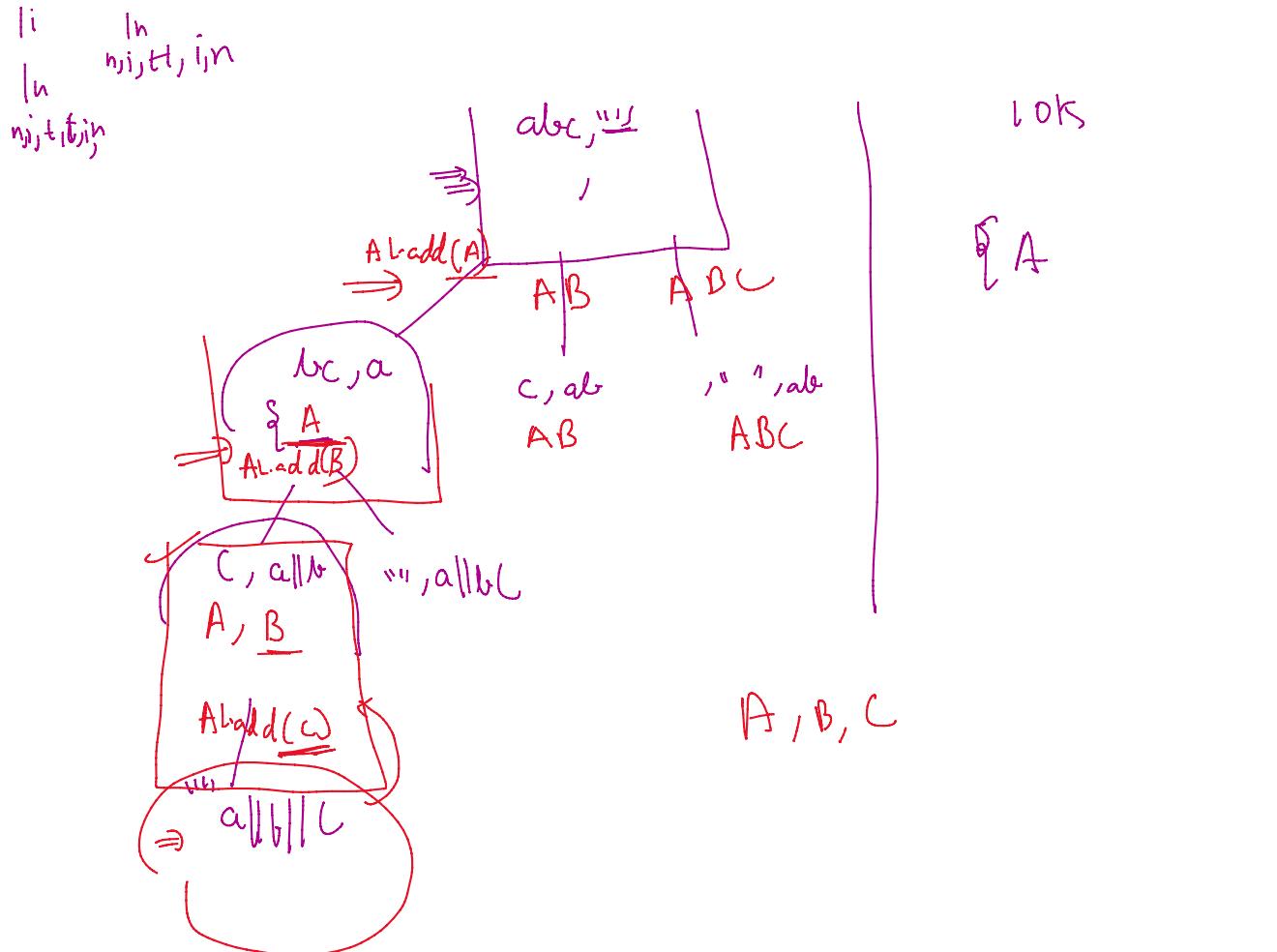
→ Project  
 → Ready  
 → Time ??

Palindrome Recursion.



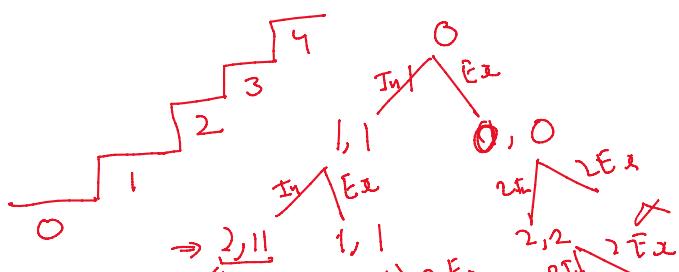
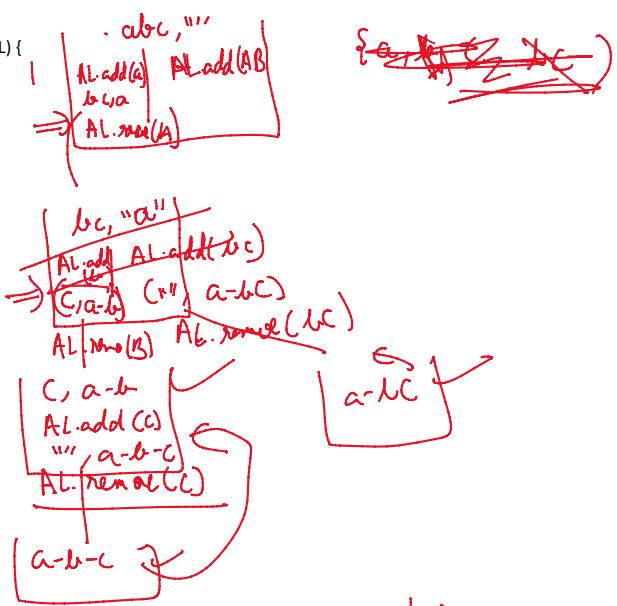
→ Recur  
→ Time ??  
→ Code + extra ??  
→ Online  
→ Recursion add.

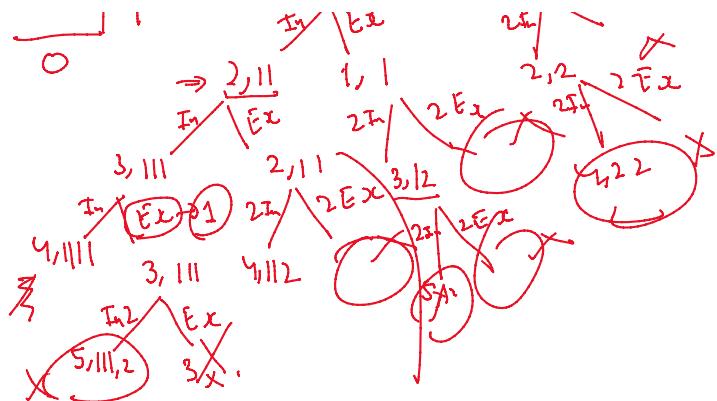




```

public static void caat(String table, String bag, List<String> AL) {
    if (table.isEmpty()) {
        System.out.println(bag);
        System.out.println(AL);
        System.out.println("=====");
    }
    for (int chakku = 1; chakku <= table.length(); chakku++) {
        String piece = table.substring(0, chakku);
        String remain = table.substring(chakku);
        AL.add(piece); // prep
        caat(remain, bag + piece + " || ", AL);
        AL.remove(AL.size() - 1); // undo
    }
}
    
```





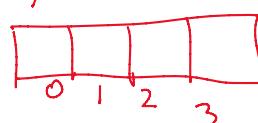
2 Ques  $\rightarrow$  4 seeds, such that all 4 of the ques do not match

$q_0 q_1$        $q_1 q_2$        $q_2 q_3$

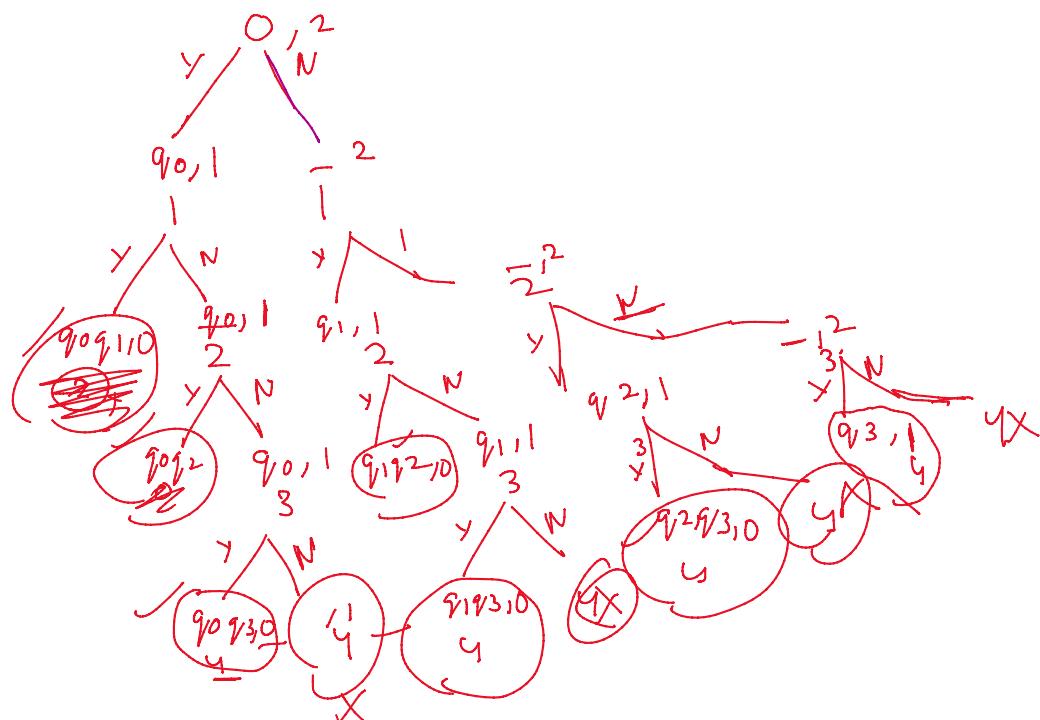
$q_0 q_2$

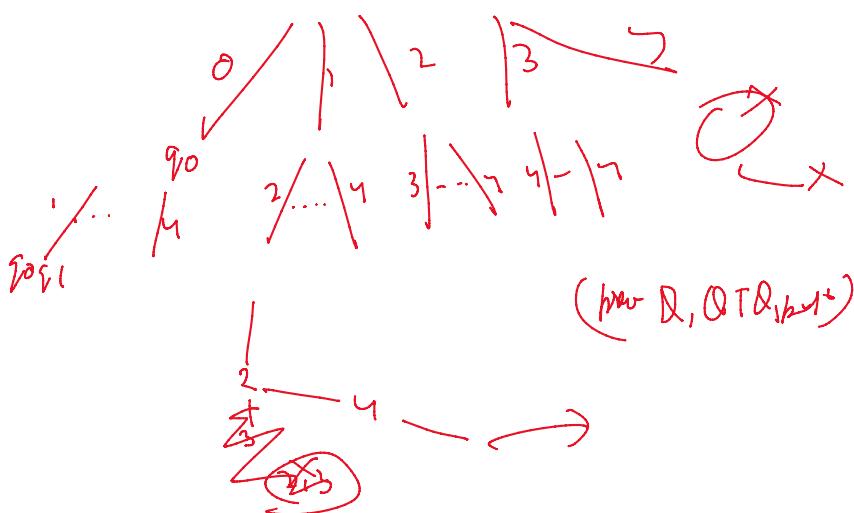
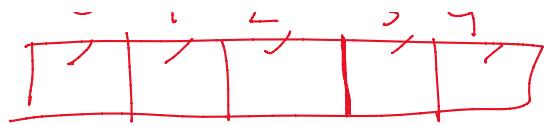
$q_1 q_3$

5 min



$q_0$





$(\text{new } Q, Q \cup Q_{\text{bad}})$

