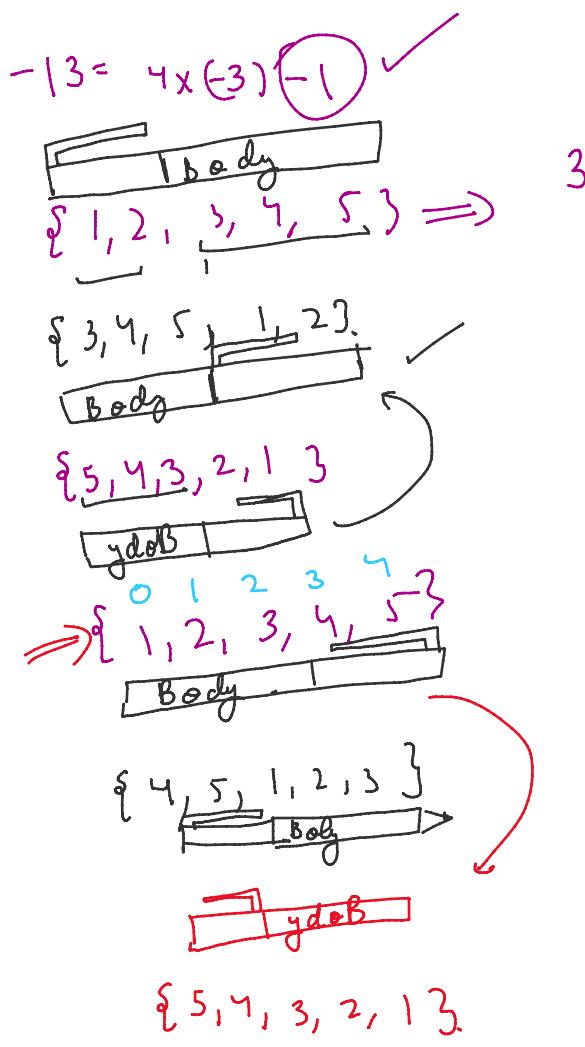


$$13 \% 4 = 1$$

$$13 = 4 \times 3 + 1$$



$\{ \underline{2}, 4, 3, 1, 0 \} \leftarrow \text{arr.}$

$na \Rightarrow \{ \underline{2}, 4, 3, 1, 0 \} \leftarrow \text{copy}$

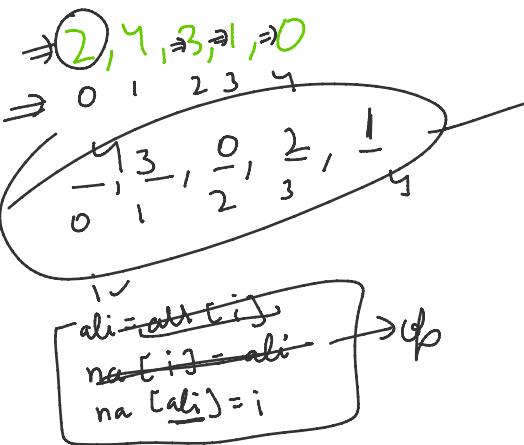
$na[0] = arr[0]$

$na[1] = arr[1]$

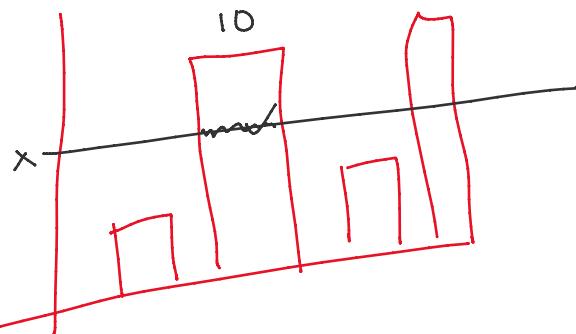
$na[2] = arr[2]$

$na[3] = arr[3]$

$na[4] = arr[4]$



$\begin{pmatrix} 2 \\ 0 \end{pmatrix}, \begin{pmatrix} 3 \\ 1 \end{pmatrix}, \begin{pmatrix} 0 \\ 2 \end{pmatrix}, \begin{pmatrix} 2 \\ 3 \end{pmatrix}, 0, 4$



Subarray \rightarrow subset, seq, contiguous

$\{ 10, 20, 30, 40, 0 \}$

$0, 0 \quad 10$
 $0, 1 \quad 10, 20$
 $0, 2 \quad 10, 20, 30$

$20, 1, 1$
 $20, 30, 1, 2$
 $20, 30, 40, 1, 3$

$30, 2, 2$
 $30, 40, 2, 3$

$40, 3, 3$

$0, 1 \quad 10, 20$
 $0, 2 \quad 10, 20, 30$
 $0, 5 \quad 10, 20, 30, 40$

EDTH

$$\{ A \cdot \begin{matrix} n \\ B \end{matrix} \dots \begin{matrix} 1 \\ z \end{matrix} \}$$

$$n+n-1 + n-2 + \dots + 1 = \frac{n \cdot (n+1)}{2}$$

20, 30, 40, 50

$$S \rightarrow O$$
$$e \rightarrow O + e^+ e^-$$

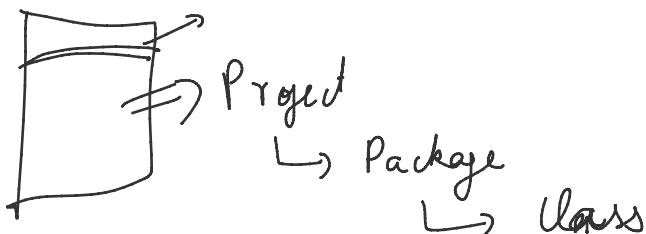
$$s \rightarrow 1$$

$$e \rightarrow 1 \text{ to } 3$$

$s \xrightarrow{e} z \xrightarrow{e} 2 \text{ to } 3$

$$S \rightarrow^3$$

$$\begin{array}{l} S \rightarrow O + O_3 \\ e \rightarrow s + O_2 \end{array}$$



$$x = 10$$

int x = 0;

$$\underline{1000} = A$$

$$10\% = R$$

$$1) \Rightarrow 100$$

$$5) \Rightarrow 500$$

$$10 \Rightarrow 1000$$

, 10 = 1

α
 β/α

α , b/a , $b\%a$

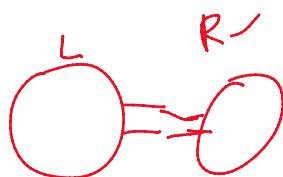
Quotient

num =
Q 13 →

if (condition is true) { remainder
 work }

"Odd"

"Even"



} else {

work 2

}

?

Report Card

$$A \rightarrow 90 \leq m \leq 100$$

$$B \rightarrow 80 \leq m < 90$$

$$C \rightarrow 70 \leq m < 80$$

$$D \rightarrow 60 \leq m < 70$$

$$E \rightarrow 50 \leq m < 60$$

$$F \rightarrow 50 \leq m < 60$$

} if (cond 1) {

w1

} else if (cond 2) {

w2

} else if (cond 3) {

w3

} else {

w4

}

$$70 \leq \text{marks} < 80 \Rightarrow C \text{ grade}$$

$$70 \leq \text{marks} \quad \parallel \quad \text{marks} < 80$$

```

1 int marks = 64;
2 if (marks >= 100) {
3     System.out.println("A");
4 } else if (marks >= 80) {
5     System.out.println("B");
6 } else if (marks >= 70) {
7     System.out.println("C");
8 } else if (marks >= 60) {
9     System.out.println("D");
10} else if (marks >= 50) {
11    System.out.println("E");
12} else {
13    System.out.println("F");
}

```

Bhai	\$(s1)\$	Bhai
F	F	F
F	T	T
T	F	T
T	T	T

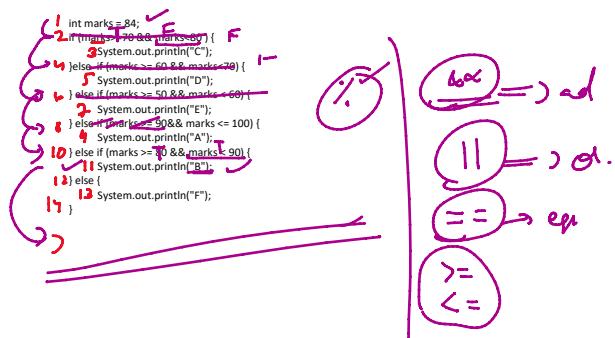
$$\Rightarrow \text{Bhai} = \text{Bhai} \oplus \$\$$$

Car on	Green Light	??
F	F	F
F	T	F

Car Bhagji = Car on \wedge Green Light

F	T	F
T	F	F
T	T	T

Car Bhagaji = Car of And mean
Logic
logic gate

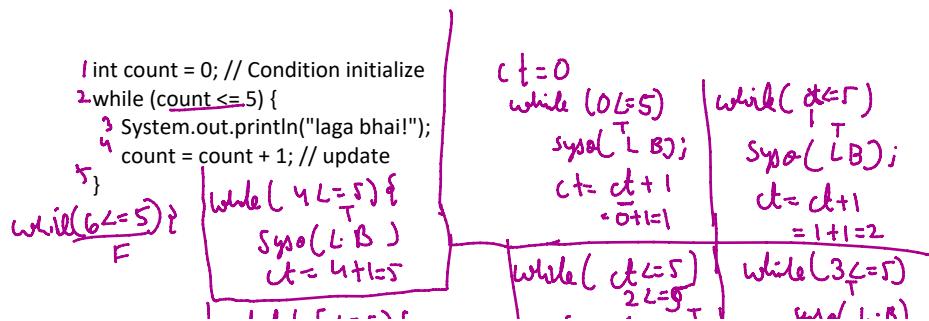


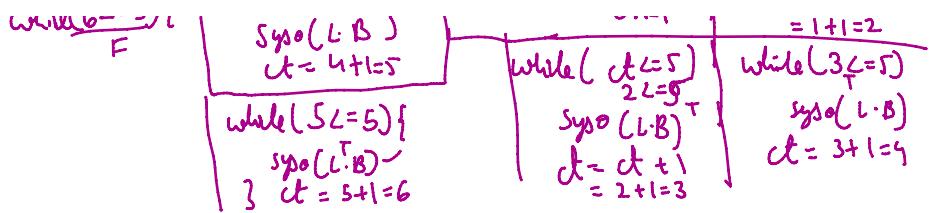
Java, loop
⇒ condition Initialize
while (condition) {
Chabard

2

$$\begin{aligned}
 1 \text{ MHz} &\rightarrow 1000 \text{ kHz} \\
 1000 \text{ kHz} &\rightarrow 1 \text{ kHz} \\
 1 \text{ kHz} & \\
 1 \text{ GHz} &\rightarrow 1000 \text{ MHz} \\
 10^3 \times 10^6 \text{ Hz} &= 10^9 \text{ Hz}
 \end{aligned}$$

Initialize
while (condition) {
 // work
 ⇒ Cond Update
}





(Q1) $1 \rightarrow 10$

(Q2) $n = 10$
 $1 + 2 + 3 + \dots + 10$
 $\underline{55}$

{ 2, 4, 6, 10, -23,, 107, 6, }

2,

6

12

22

~~22~~

~~22~~

~~22~~

~~22~~

~~22~~

~~22~~

~~22~~

~~22~~

~~22~~

~~22~~

~~22~~

~~22~~

~~22~~

~~22~~

~~22~~

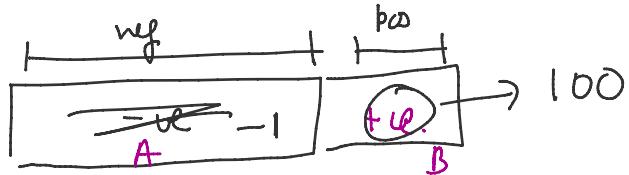
~~22~~

~~22~~

~~22~~

~~22~~

~~22~~



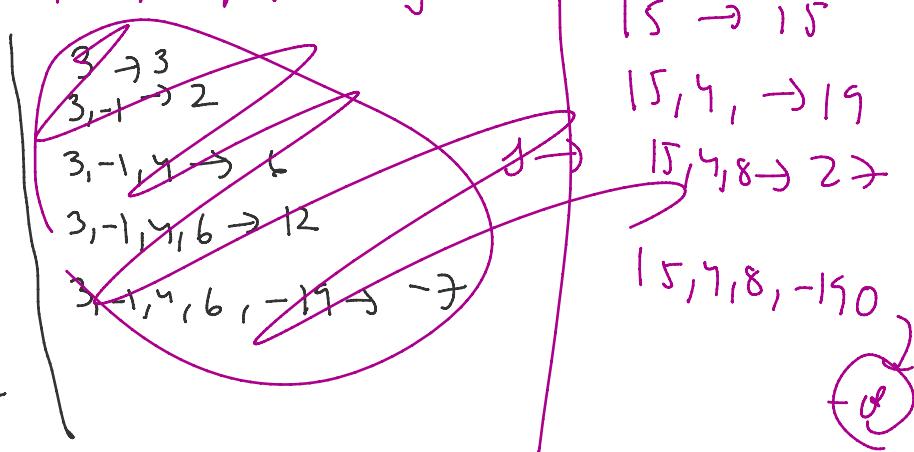
$$A + B < B$$

~~ans = -10 * \$ & HT + 5~~
~~sum = 0~~
~~\$ = 27~~
~~0~~

1) endig \rightarrow sum < 0 looks.

{ 2, 3, -1, 4, 6, -19, 15, 4, 8, -190 }

2 \rightarrow 2
~~2, 3 \rightarrow 5~~
~~2, 3, -1 \rightarrow 4~~
~~2, 3, -1, 4 \rightarrow 8~~
~~2, 3, -1, 4, 6 \rightarrow 14~~
~~2, 3, -1, 4, 6, -19 \rightarrow -5~~



Arr = {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 31, 33, 35, 40, 45, 55, 58, 66, 71}
 find El:

18. public static boolean find(int[] arr, int ali) {

Arr = {5, 7, 11, 12, 15, 20, 31, 33, 35, 40, 45, 55, 58, 66, 71}

Find 55

18

```
public static boolean find(int[] arr, int ali) {
    int s = 0;
    int e = arr.length - 1;
    while (true) {
        int mid = (s + e) / 2;
        if (ali == arr[mid]) {
            return true;
        } else if (ali > arr[mid]) {
            s = mid + 1;
        } else {
            e = mid - 1;
        }
    }
    return true;
}
```

comp	size
x	n
1	$n/2$
2	$n/2^2$
3	$n/2^3$
K	$n/2^K$

$\frac{n}{2^K} = 1$

$n = 2^K$

$K = \lg n$

$n=5$

G G G G B
 G G G B B
 G G B B B B
 B B B B B B

$f^n(v) \Rightarrow T$ Bad
 $\Rightarrow F$ ~~Good~~

F F F F

{ F F F F ... F T ... TT }

n

$$\frac{2a + b - a}{2} = \frac{2a - a + b}{2}$$

~~$\frac{a+b}{2}$~~

$$\frac{s+e}{2} + \frac{v-u}{2} - \frac{v-u}{2} = \frac{s}{2}$$

$$\begin{aligned} \text{mid} &= \frac{s+e}{2} \\ &= s + \frac{e-s}{2} \\ &= e + \left(\frac{s-e}{2} \right) \end{aligned}$$

~~Sorting~~

~~50, 40, 30, 20, 10~~

Bubble sort:

{ 40, 50, 30, 20, 10 }

{ 40, 30, 50, 20, 10 }

{ 40, 30, 20, 50, 10 }

{ 40, 30, 20, 10, 50 }

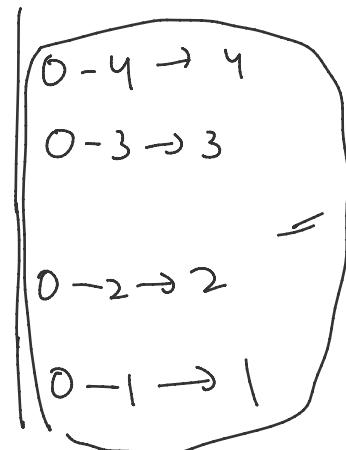
selected

{ 50, 40, 30, 20, 10 }

{ 10, 40, 30, 20, 50 }

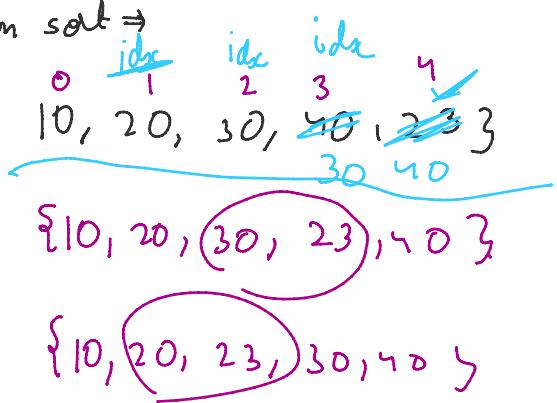
{ 10, 20, 30, 40, 50 }

{ 10, 20, 30, 40, 50 }



Inversion sort \Rightarrow $\underset{0}{\text{idc}_1}, \underset{1}{\text{idc}_2}, \underset{2}{\text{idc}_3}, \underset{3}{\text{idc}_4}$

Inertion sort \Rightarrow



$$\{ \underline{50, 40}, 30, 20, 10 \}$$
$$\{ \underline{40, 50}, \underline{30}, 20, 10 \}$$

$\xrightarrow{0} \{ \underline{30, 40, 50}, \underline{20}, 10 \}$

$$\{ \underline{20, 30, 40, 50}, \underline{10} \}$$

$\Rightarrow \{ 10, 20, 30, 40, 50 \}$