Hello Dear friends :)

Welcome everyone
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→ Few smell questions
→ 11:00 − 11:30   sylabus discussion

FAQs
→ Notes will be uploaded
→ 9PM − 11:30 PM + Doubt sesion
                        ↓
              Atendance not counted

Q1) Count of factors

$$6 \rightarrow 1, 2, 3, 6$$
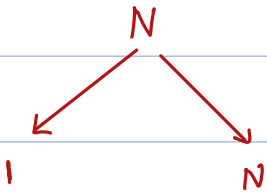
3 divides 6 completely

$$6 \% 3 = 0$$

x is a factor A:

$$A \% x = 0$$

factors of 24:

$$1, 2, 3, 4, 6, 8, 12, 24$$

8 factors

```
int countfactors (int N){
    int count = 0
    for (int i = 1 ; i <= N; i++){
        if (N % i == 0){
            count ++
        } 3
    } 3
    return count
} 3
```
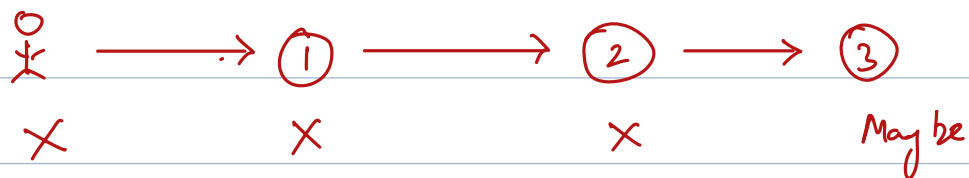
N	# iterations	time
10	10	
100	100	
10^8	10^8	1 second
10^9	10^9	10 seconds
10^{18}	10^{18}	10^{10} seconds $\approx$ 317 years

10^8 iterations take 1 secon time

1 iteration takes $\dfrac{1}{10^8}$ second

$$\dfrac{10^9}{10^8} = 10$$

10^{18} iteration will take $\dfrac{10^{18}}{10^8} = 10^{10}$

$\cancel{0} \longrightarrow \textcircled{1} \longrightarrow \textcircled{2} \longrightarrow \textcircled{3}$

$\times$ $\times$ $\times$ May be

OPTIMISE

count of factors

$$a \times b = N \qquad\qquad b = \dfrac{N}{a}$$

a and b are factors of N

a and $\dfrac{N}{a}$ are factors of N

N = 24

i	N/i	factors
1	24	+2
2	12	+2
3	8	+2
4	6	+2
6	4	8 factors
8	3	
12	2	
24	1	

N = 100

i	N/i	factors
1	100	+2
2	50	+2
4	25	+2
5	20	+2
10	10	+1
20	5	✗
25	4	
50	2	
100	1	

$<$ $>$ $\leq$ $>=$

$$i <= \frac{N}{i}$$

$$i^2 \leq N$$

$$\boxed{i \leq \sqrt{N}}$$

```
int   count factors (int N){          N=100
    count=0
    for(i=1; i<= sqrt(N); i++){
        if (N%i ==0){
            if (i== N/i){
                count +=1
            }
            else{
                count +=2
            }
        }
    }
    return count
}
```

N	# iterations	time
100	10	
10^{18}	$\sqrt{10^{18}} = 10^9$	10 seconds
		317 years $\longrightarrow$ 10 seconds

Q3) Given a number, check if it is prime or not?

if (count of factors (N) == 2) {
    |
    3   prime

$3 \rightarrow 1, 3$

$2 \rightarrow 1, 2$

$7 \rightarrow 1, 7$

Prime number: Number having exactly 2 factors

77

if (count factor (77) > 2)
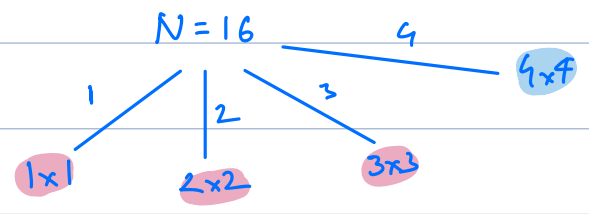   Not prime

if (count factor (N) == 2) {
    |
        prime
    3

Break (10:07 - 10:17)

Q5) Given a ==perfect square==, find its square root?

N = 100   output : 10

N = 49   out : 7

N = 16   4

1   2   3   4×4

1×1   2×2   3×3

N = 25

```
int perfectsquare (N) {

    for (i=1; i<=N; i++) {
        if (i*i == N) {
            return i
        }
    }
}
```

iteration : $\sqrt{N}$

3

3

3

N = 25

i	i*i == 25
1	F
2	F
3	F
4	F
5	T

$$\frac{7}{2} = ③5 \qquad\qquad \frac{2}{3} = 0$$

$$\frac{7}{2} = 3 \qquad\qquad \frac{7}{3} = 2$$

floor $(7.34) = 7$ $\qquad$ only int part

floor $\left(\frac{8}{3}\right) = 2$

Q3) find floor of square root of a number

floor $(\sqrt{N})$

26 →	5
34 →	5
71 →	8
64 →	8
99 →	9

26

i	i * i == 26
1	F
2	F
3	F
4	f
5	F
6	F (36)

5 — 6   floor's

9 9

i = 1, 2 ...   10

⌈9, 10⌉   floor : 9

25

i	i * i	
1	1	
2	4	
3	9	
4	16	
5	25	

```
i = 1
while (i*i < N) {
    |        i++
    3
}

if (i*i == N)
    return i
if (i*i > N)
    return i-1
```

Log basics

$2^3 = $	8	what power of 2 is 8 = 3	$\log_2 8 = 3$
$2^4 = $	16	what power of 2 is 16 = 4	$\log_2 16 = 4$
$3^3 = $	27	what power of 3 is 27 = 3	$\log_3 27 = 3$
$4^3 = $	64	what power of 4 is 64 = 3	$\log_4 64 = 3$
$5^2 = $	25	what power of 5 is 25 = 2	$\log_5 25 = 2$

$$\log_2 32 = 5 \qquad \log_a a^n = n$$

$$\log_{10} 100 = 2$$

$$\log_3 81 = 4$$

$$\log_2 10 = 3.... = 3$$

2^1	2^2	2^3	2^4	2^5	2^6	2^7
2	4	8	16	32	64	128

$$\log_2 100 = 6$$

HW

Q5) Given positive number N, how many times we need to divide it by 2 until it reaches 1.

N = 8	N = 16	N = 127	N = 32
$\downarrow$ /2	$\downarrow$ /2	$\downarrow$ /2	Ans: 5
4	8	63	
$\downarrow$ /2	$\downarrow$ /2	$\downarrow$ /2	
2	4	31	
$\downarrow$ /2	$\downarrow$ /2	$\downarrow$ /2	
1	2	15	
= 3	$\downarrow$ /2	$\downarrow$ /2	
	1	7	
	4	$\downarrow$ /2	
		3	
		$\downarrow$ /2	
		1	

6 division

Done!

if / else   while / for

Any   programing   language

AP (Arithmatic Progresion)
GP (Geometric   progression)
exponents

9:00 →   9:05 (sharp)
      Randon   9:15 , 9:30

9 — 11:30 +   Doubts session

Doubt
  ① ② ...

2:30 hours

Do   not skip lectures

Recordings

Assignments   + HW
          ↓   ↓
                   Extra question

① Debug   (30 mins)

② Hint

③ TA

7-8 question in   1 class

20 - 25 question

HW (unlocked)

Sylabus (DSA)

Introduction to RS

TC — 2   1-1·5 months

Arrays — 6

3 contests

Interview question (2)

viras

string — 1

↳ Mock interview

sortiy — 1

LL — 1

BM — 1

Subsets & sub sq (1)

Advance   4·5 monts

1) Deliver lecture

2) Notes, bookmarks in all recordings

AMA (15 mins)

$$\boxed{\dfrac{1}{a^b}} \leftarrow \text{fast exponentiation}$$

$$a^b = a^{b/2} \times a^{b/2}$$

int x = (int) Math.sqrt(N)