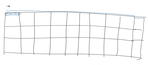
Intro to problem solving

Monday, 19 April 2021 - 10:00

Average

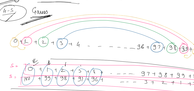
1. Know average in / app → Immediately (10:05)
2. Stack ka → Stack (05)
3. Arithmetic → 05
4. Instant stack work
5. Checked → Correct
6. Delay

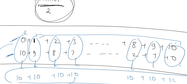
Fixed



Given → $1 + 2 + 3 \ldots\ldots 100$

Q.2 Given





Q. Given a no. Find the sqrt of the no. Print

2a. +ve nos. with exactly 2 divisors → sqrt

2, 3, 5, 7, 11, 13 ....

1 iteration → 1 ms

11. 1 [2 ..... n-1] n

if (n < 2) not prime;

for (i = 2; i ≤ (n-1); i++){

if (n % i == 0){

not prime;

}

}

not prime.

n = 23

[2, (n-1)]

n = 24

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

a b

n = 16

1, 2, 4 | 8, 16

a × b = N

1 N

2 N/2

3 N/3

$\sqrt{N}$

N	
1	1 ms
101	101 ms
10^4	10^4 ms = 10 secs ≈ 1 min
10^{12}	10^{12} ms = 10^9 sec = 31682766.6 years

≈ $\sqrt{N}$

≈ 3 ms

≈ 10 ms

≈ 1000 ms

≈ 1 s

≈ 10^4 s

≈ 11 days

N

1, 2, 3 | N/2, N/3

a × b = N

1 N

2 N/2

3 N/3

24

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

N/a = b

1 2 4 5 | 20 25 50 100

25

1, 2, 3, 4, 5 | 25

Q. Given a no. N. Find the sqrt of N.

floor(√N)

27 ⇒ floor(27) = 2.

floor(100.01) = 100

N = 3 sqrt(3) = 3

N = 10 sqrt(10) = 3

N = 50 sqrt(50) = 7

i = 3 × 1	= 3
2 × 2	= 4
3 × 3	= 9
4 × 4	= 16
5 × 5	= 25
6 × 6	= 36
7 × 7	= 49
8 × 8	= 64
9 × 9	= 81
10 × 10	= 100
11 × 11	= 121

1 sec

sqrt = 1;

for (i = 1; i < n; i++){

if (i × i > n)

not i-1

}

N = 50 sqrt = 1

i = 1	sq = 1
i = 2	sq = 2
i = 3	sq = 3
i = 4	sq = 4
i = 5	sq = 5
i = 6	sq = 6
i = 7	sq = 7
i = 8	sq = 7

1, 2, 3, 4, 5 ... 50 ... 100 ... 200 ... 300 ... 400

1600 > 100

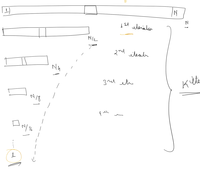
100 × 100 > 400

<400

2^n → $2^n = N$

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 24, 25 ... 30, 31, 50 ... 80 ... 127

500 600 700



1st iteration

2nd iteration

3rd iteration

1st iteration

K iteration

after 1st → N/2

after 2nd → $\frac{N}{2^2}$

3rd → $\frac{N}{2^3}$

4th → $\frac{N}{2^4}$

K^{th} it. → $\frac{N}{2^K}$

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

$N = 2^K$

take $\log_2$ both sides

$\log_2 N = \log_2 2^K$

$\log_2 N = K$

$\log_2 32 = 5$

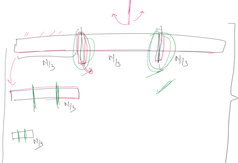
$\log_2 2^5 = 5$

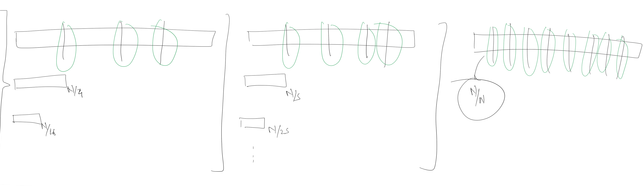
2^{32} $\sqrt{N}$ ⇒ 2^{16} ms

years

$\log_2 2^{16}$ ⇒ 32 ms

Binary Search





Algo.

Data Structure

Search word on this