Q:) Given the eq^n

$C \rightarrow$ real number

$$x^2 + \sqrt{x} = C$$

given the value of C, find x.

$$1 \leq C \leq 10^{10}$$

Ex $C = 2 \rightarrow$ ans $\rightarrow x = 1$

$C = 15.6$

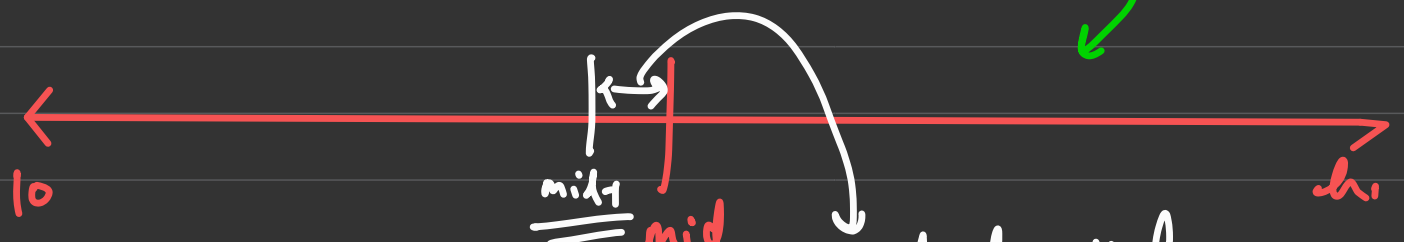
$\hookrightarrow$ ans $\rightarrow 3.698232\ldots$

6 decimal precision

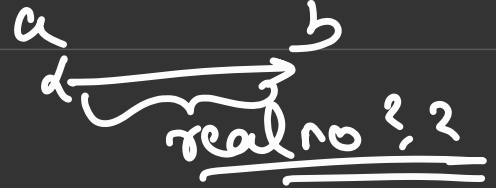
generally in binary search, we remove half of the search space by either doing

lo = mid + 1 or hi = mid - 1

Can we do hi = mid - 1 ??



infinite values that you ignore & which was possible ans



→ our goal is to discard half search span

lo = mid
hi = mid

while (lo <= hi) → will it converge??

→ while (lo < hi)

lo = 4.5 ——— hi = 5.8

↳ infinite mid

for treating real no.'s →

we want some precision → ϵ · (10^{-6})

while (lo < hi)

↓

while (hi - lo > 0)

while (hi - lo > ϵ)

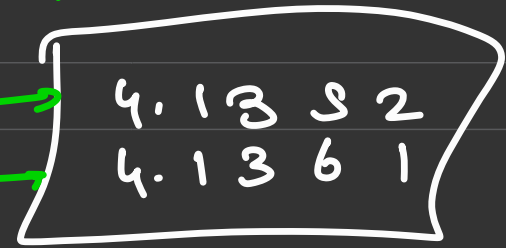
How can help us

is there any issue??

normal int bS

a - b > ϵ

↳ precision



while (hi - lo > 0)

$hi \approx 10^9$

$\log_2 10^9 \rightarrow 30$ iterations

while (hi - lo - ϵ > 0)

$hi \approx 10^{18} \approx 60$

$hi \approx 10^{30} \approx 100$ iterations

$hi \rightarrow 10^9$

$10 \rightarrow 1$

$\epsilon \rightarrow 10^{-9}$

150 iterations

$10^9 - 1 - 10^{-9}$

$\approx 10^9$

$10^9 - 1 - \frac{1}{10}$

→ they execute some exact no. of iteration

```
for i = 1 .... 150 :
{
    BS logic
```

Q. There are n ropes, you need to cut them, into k smaller ropes, of equal length. find the max length of ropes you can get:

n = 4, k = 11

802
743
457
539

ans ⇒ 200.5

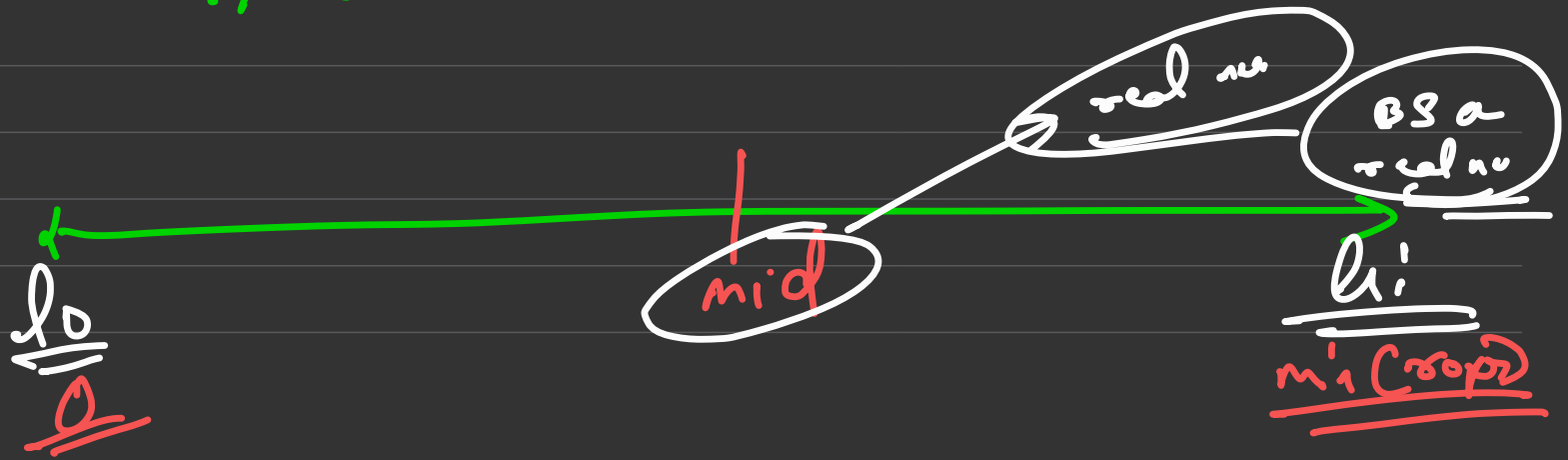
↳ 800/2005 → 4

743/200.5 → 3

487/200.5 → 2

559/200.5 → 2

→ 11



mid denotes the length of cut with which you get exactly k pieces.

10/2 → 5

$\left(\sum a_i // mid\right) \geq k$

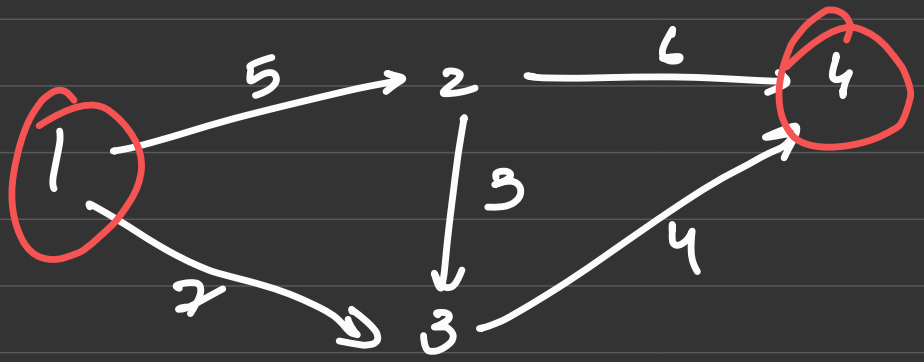
↳ true

else ↳ false

Q: A road network has n junctions & m one-way roads. Each road leading to a lower numbered junc^n to a higher numbered junc^n. Each road has a no. Your task is to find a path from junc^n 1 to junction n, consisting of at most d roads on which maximum of the numbers corresponding to the road is minimum.

BS

$d = 2$



2 roads

1 → 2 → 4

10

↓

min-wt

R:

↓

max_wt

a path with d edges and max edge wt as mid