Thursday, 26 August 2021 8:11 PM

Q Given a value (x), tell if (x) is a square of an integer or not.

16 → true

20 → False

10,000 →

(x) → $(\text{int})^2$

① find the sqrt of x

② check if sqrt no. is integer or not.

(x) → (sqrt) → int

sqrt → 0 → x

monotonic function

0 — 1 — 2 — x

→ Binary search over the range (0 → x)

① low = ~~0~~ 1, high = ~~x~~ 2

② mid = $\frac{0+2}{2}$ = 8 $\frac{0+7}{2}$ = 4 x → 16

③ mid → good or not

good (mid)

mid = 8, 8*8 = 64 mid*mid == x

sqrt of x

20

sqrt range, $\frac{1+20}{2}$ = 3, $\frac{3+5}{2}$ = 4

mid = 2 + 4

2*4 = 8 8*8 = 64 10 × 10 = 100

8*3 → 9 100 < 400

l = 0

h = x → 16

while (l ≤ h) {

mid = $\frac{l+h}{2}$

if (mid * mid == x) return true

else if (good (mid)) l = mid + 1

else h = mid − 1

}

return false;

good (mid) {

return mid * mid == x;

}

mid = 8 → 16

l, h, 3, 4, 8, 16

$\frac{0+7}{2}$ = 3 $\frac{4+7}{2}$ = 5

3*3 = 9 < 16

mid

n more copies

1 copy, n copy

min time

n × y

(1) → 2

c1 (3) (3)

c2 (3)

0 — 1c

1 — 2c

2 — 4c

3

4

1 copy, n copy → 2 → 4 → 8

1c, 2c, 3c, 5c, 4c

min time it takes n make the copies.

① binary search

low, high

mid

② Range

mid → $\frac{l+r}{2}$

③ good (l, r, mid)

n copies

mid, left, right

sqrt range

cols

r, g, b

map no of cols that you can fill

n r g b

4 ~~r~~ ans → 3

r	r	r	
b	b	b	
g	g	g	

② n r g b ans → 3

r	r		
b	b	b	
g	r	b	

③ n r g b ans → 2

r	r		
b	b	b	
g	r	b	

① Range

low → high

min (n, r, b)

map

① n r g b

100 100 100 100 → 3

② n r g b → min (n, r, b) → ans → 1

③ n r g b

100 100 100 100 → ans → 2

n 100, r 100, b 100, g 100

mid

left, right

green +

(end − mid) +

(start − mid)