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23 BCES 21938
KRCB IB

competitive coding

Ans: Input
n, a, b integers
const: 10^2 10^4 10^4

Find nth largest no.

→ Brute force

$i = 1$

while (true) {

if ($i > a == 0 \text{ or } i > b == 0$)

count++;

if (count == n) break;

return i;

→ TC = ~~O(n)~~ linear
SC = $O(1)$

→ Efficient way

if ($n == 1$) ~~process~~

return math.max(a, b);

if ($n == 2$)

return Math.max(a, b);

$n -= 2$;

int A = a; B = b;

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

```
A += a;  
if (A * b == 0 && n != 0) A >= B) {  
    while (A * b != 0)  
        }  
    else {  
        n--;  
    }  
    if (n == 0) return A;  
}
```

```
B += b; n--;  
if (n == 0)  
    return B
```

```
}
```

```
return -1;
```

TC: $O(n)$
SC: $O(1)$

$n = 6 \times 8^2$
 $a = 1$
 $b = 3$
 $A = KAB$
 $B = KB$
 $\boxed{\text{Dry Run}}$
 2 2 4 5 ⑥ 7 8 ⑨

$i = 1 \text{ to } n$
 $A += a_j$
 $B += b_j$
 $n--$
 $(\text{return } A)$
 $(\text{return } B)$

$A += a_j$
 $\text{if } (A < 0) \text{ or } (B >= A)$
 $n--$
 $\text{if } (n == 0) \text{ return } A_j$

3.

$B += b_j$
 $\text{if } (n == 0)$
 $\text{return } B_j$

$n = 6 \times 8 \times 2 \times 0$
 $a = 2$
 $b = 3$
 $A = KAB$
 $B = KB$

$\checkmark n > 2$

~~for~~ ($i = 1$; $i < n$; $i++$)

Approach 3
Binary search

```
int gcd(a, b) {  
    if (a == 0) return b;  
    return (a % b) / gcd(a, b);  
}
```

```
int lcm(a, b) {  
    return (a * b) / gcd(a, b);  
}
```

int func(a, b, n) {

lcm = lcm(a, b);

low = 1;

high = n * min(a, b);

while (low <= high) {

mid = high - (high - low) / 2;

count = $\frac{a}{mid} + \frac{b}{mid} - \frac{nab}{lcm}$;

if count < n)

low = mid + 1;

else

high = mid;

return low;

}.