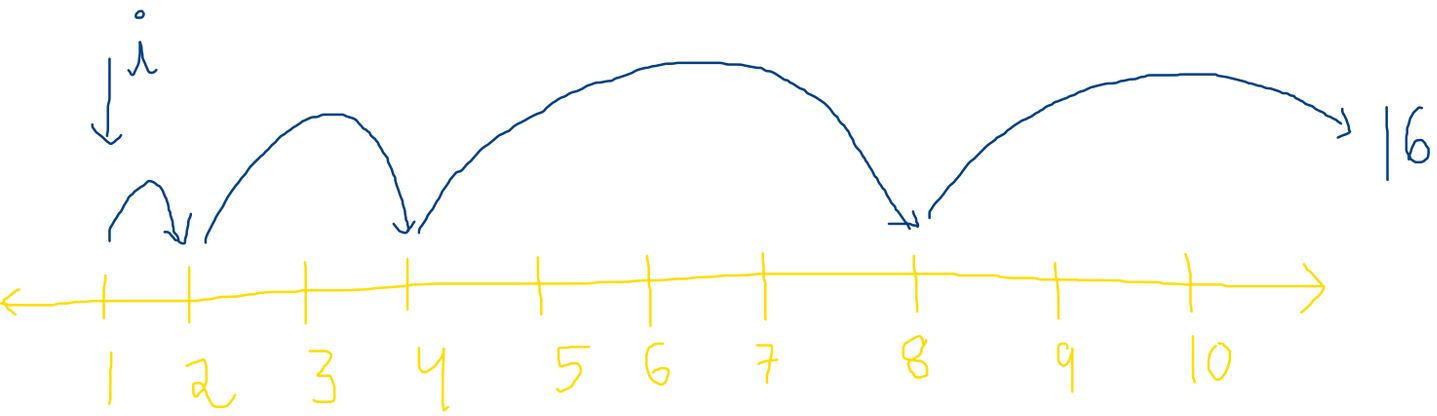
```
for(int i=1; i< n; i = i*3)
{

}
```



(2^1)

$\longrightarrow 2^2$

$\longrightarrow 2^3$

$=$

$i >= n$

$2^k >= n$

$\log_2 2$

$\log_2 2^k >= \log_2 n$

$k * \log_2 2 >= \log_2 n$

$k >= \log_2 n$

Space Complexity
- Data structure (1D array, stack, queue, 2D array, arraylist, vector)
- Number of elements stored in data structure affect the space complexity
- Constants are not included in space complexity as well

Time Complexity
- Number of operations

```
for(int i=1; i<=m; i++)
{

}
```

Space → 1

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

}
```

max(n, m)

Time Complexity - O(N+M)

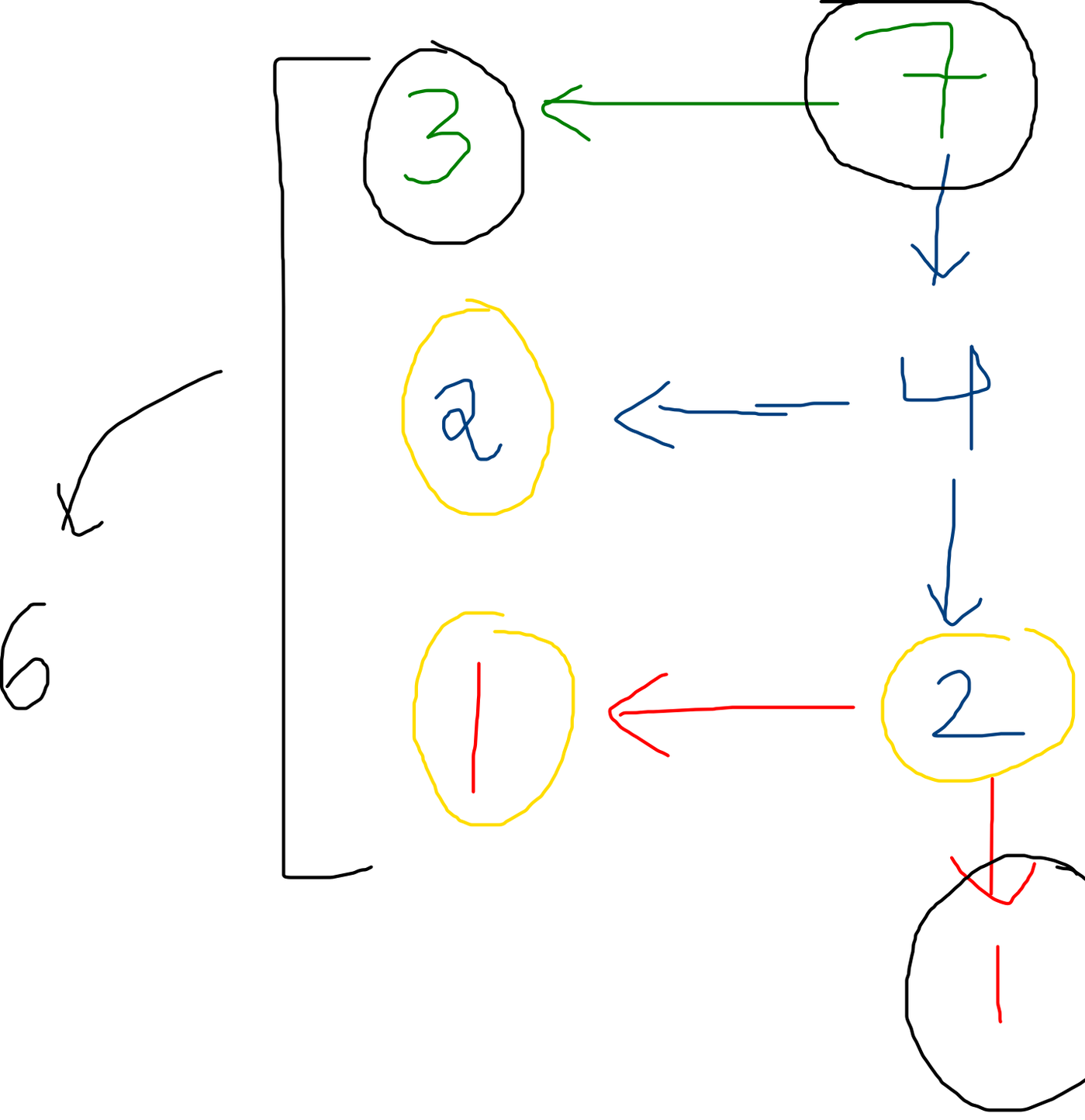
O(n) + O(m)

$\log n * \log n$

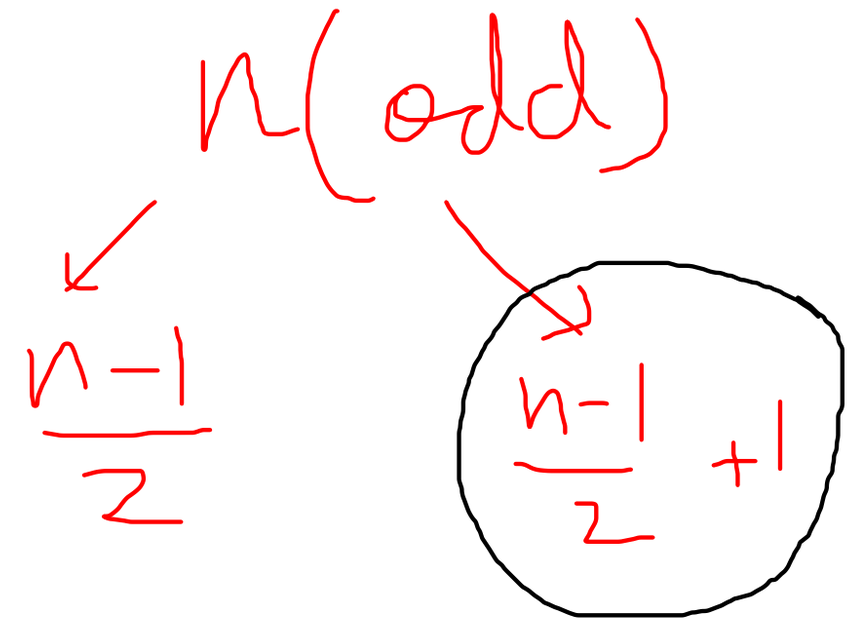
$(\log n)^2$

$\log n^2$

$2 \log n$


7
3
4
2
2
1
1
6


n (even)
n/2
n/2


n(odd)
n-1/2
n-1/2 +1

n-1

4 → 2

↓

2 → 1

↓

1

3

$$\frac{n}{2} + \frac{n}{4} + \frac{n}{8} + \frac{n}{16} - - - -$$

n-1

n → 16

16 → 8

↓

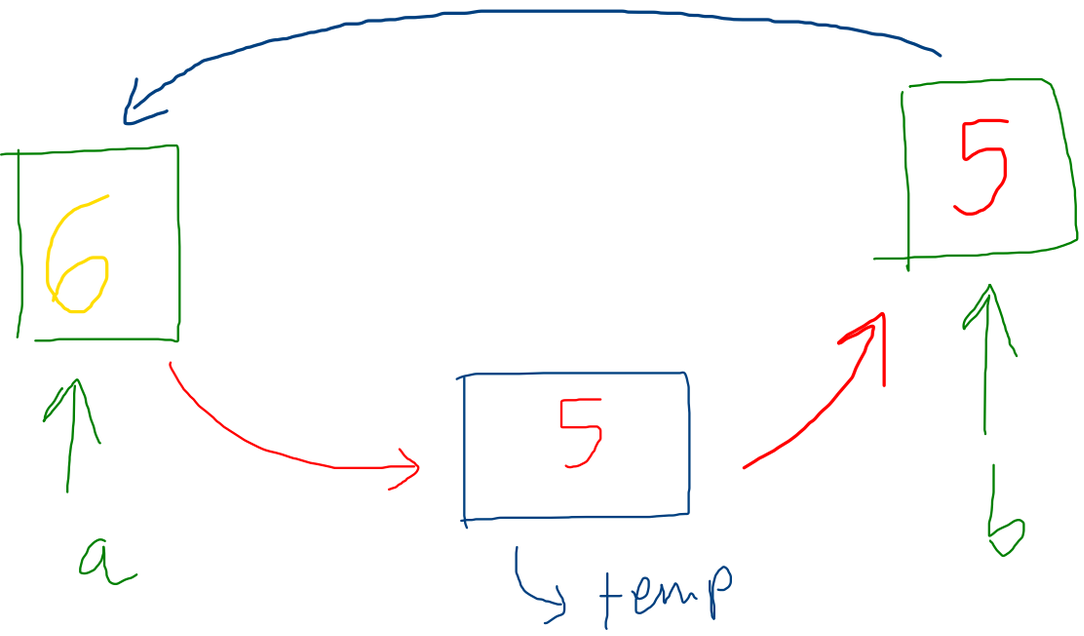
8 → 4

↓

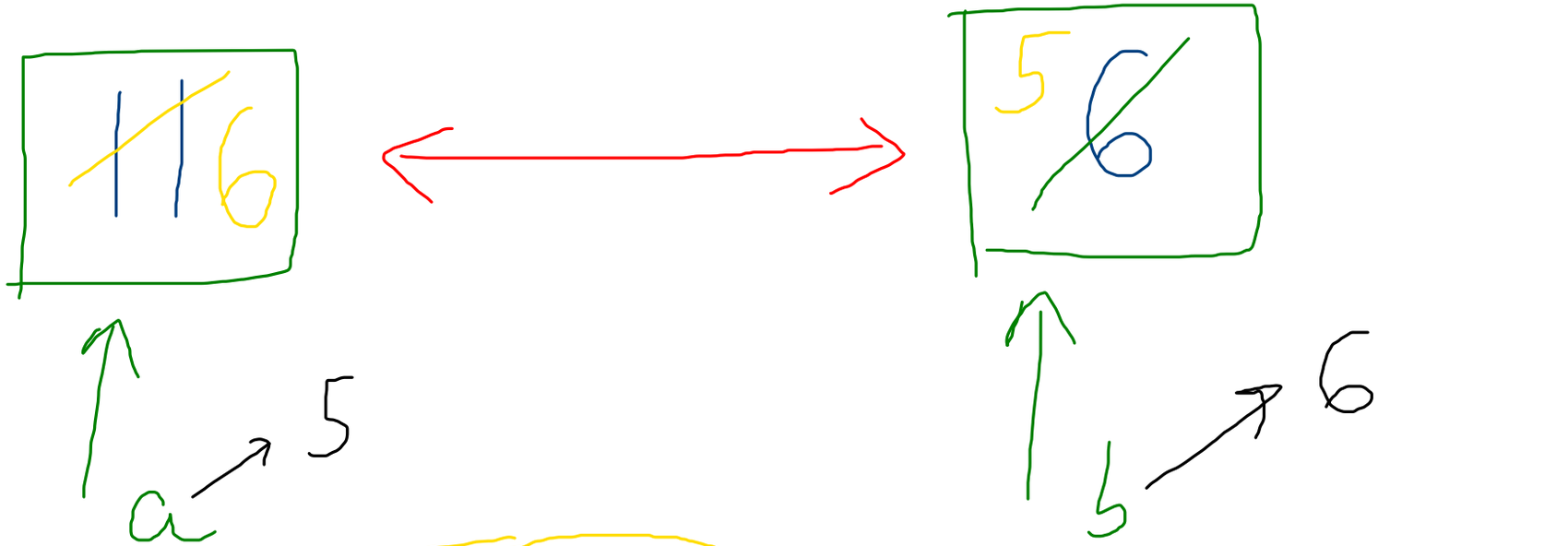
4 → 2

↓

2 → 1



temp = a
a = b
b = temp



$a = a + b$

$b = a - b$

$a = a - b$

0, 1, 2, ... n

n + 1

n * (n + 1)

2

6

[3, 0, 1]

3 + 0 + 1

4

Total

sum − sum of array

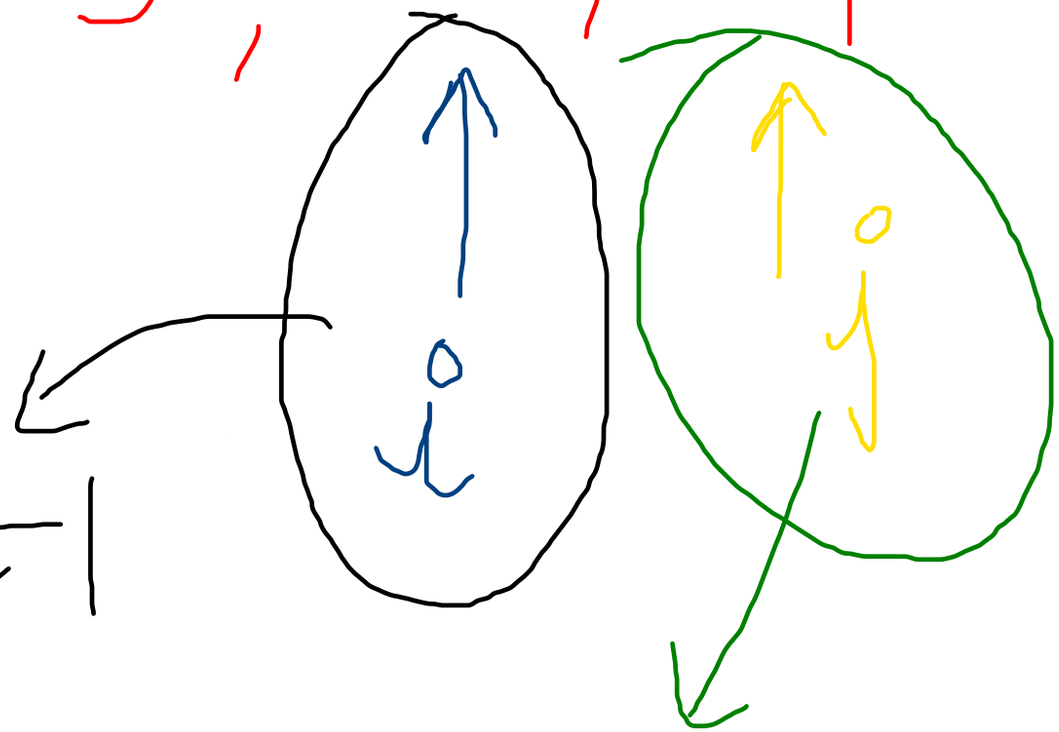
12 8 min(a,b)

1, 2, 3, 4, 5, 6, 7, 8, 9...

✓ ✓ X ✓ X X X X

1 _ _ _ _ min(a, b)

$1^0, 2^1, 3^2, 1^3, 1^4, 3^5$



4

0 _ _ n-1

0

i+1 _ _ n-1

1+1

+1+1

n

↳ digits

121

↳ 2