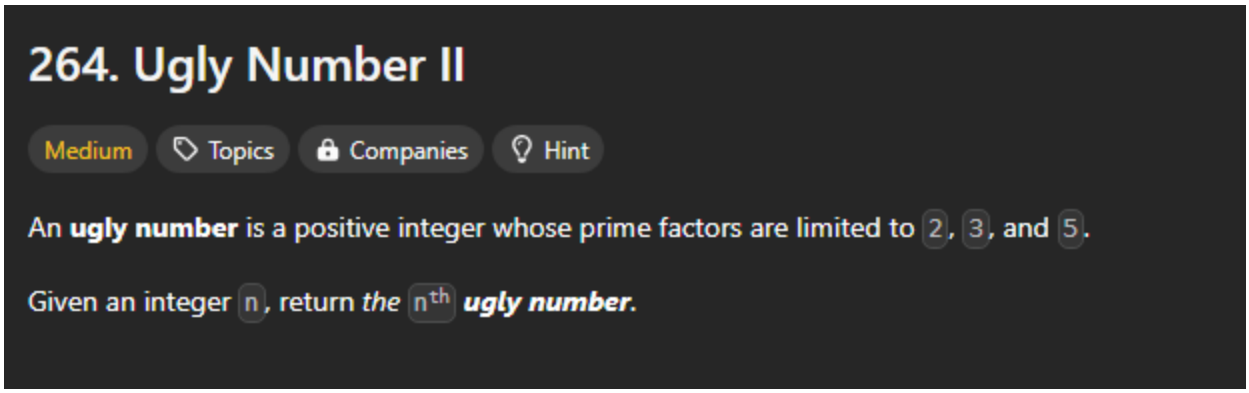
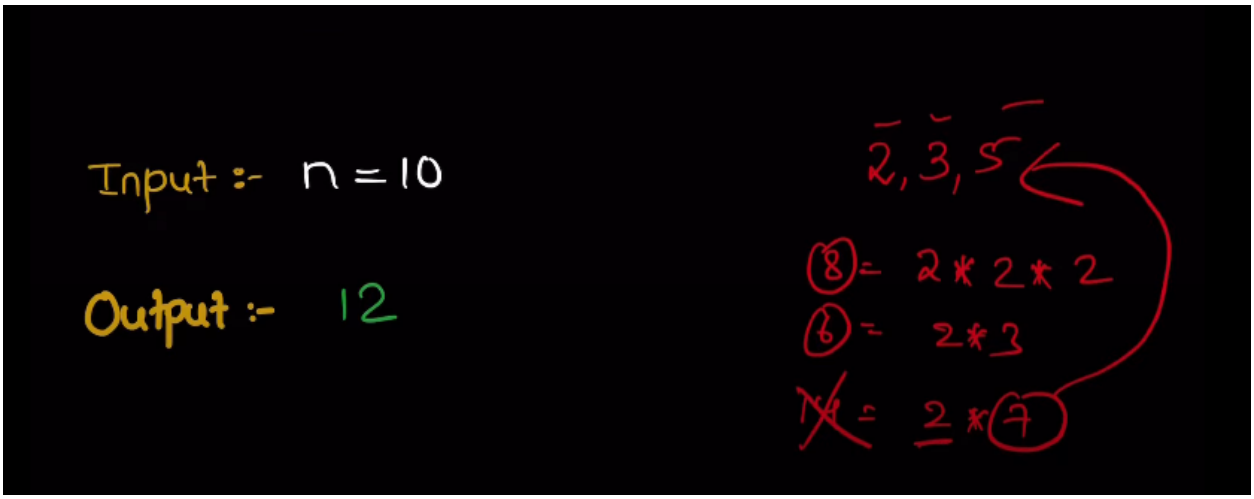
264. Ugly Number II - 18/08/24 -(Medium)



what is ugly number?

Jiska prime factor 2,3,or 5 ho



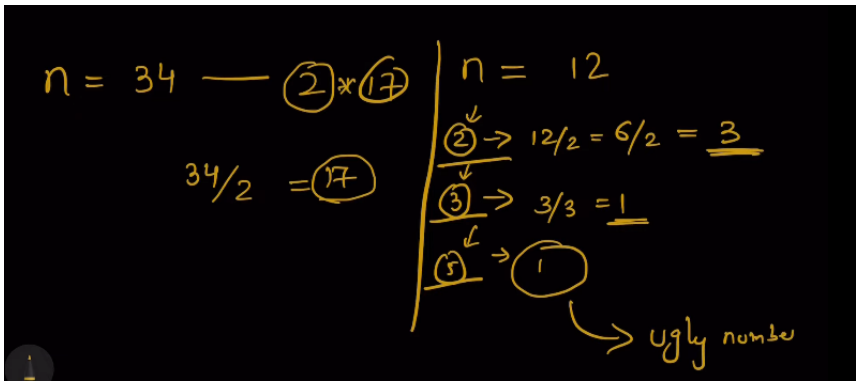
first 10 ugly number

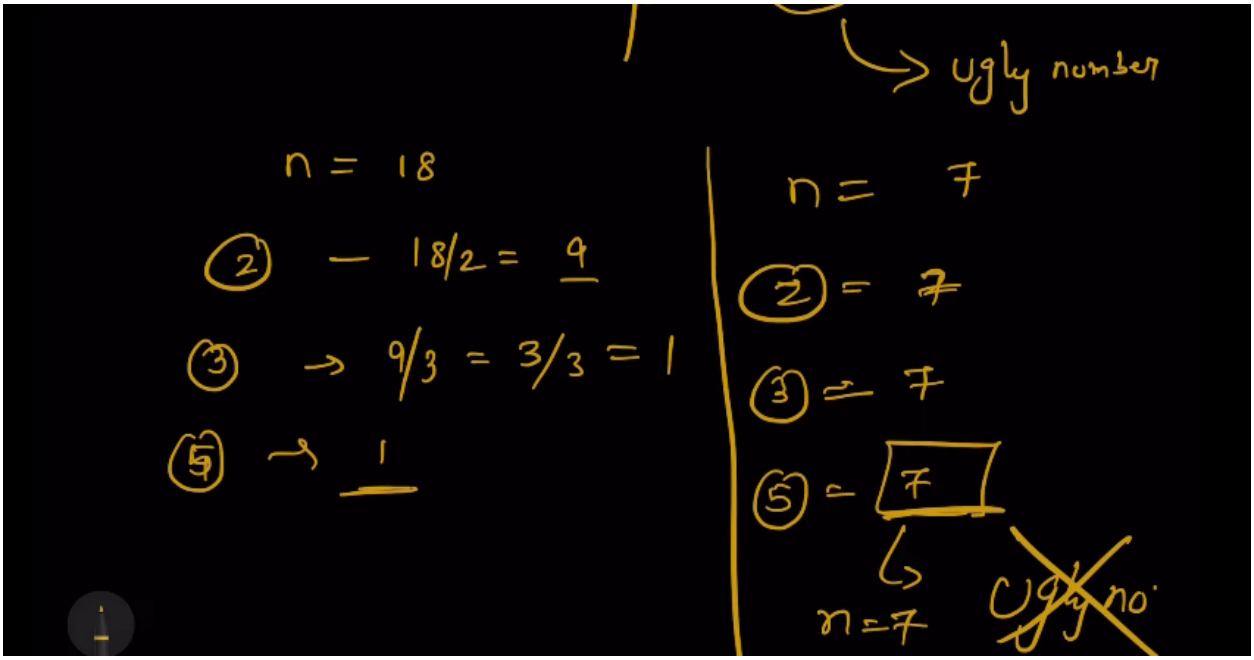
Solve using Brute Force

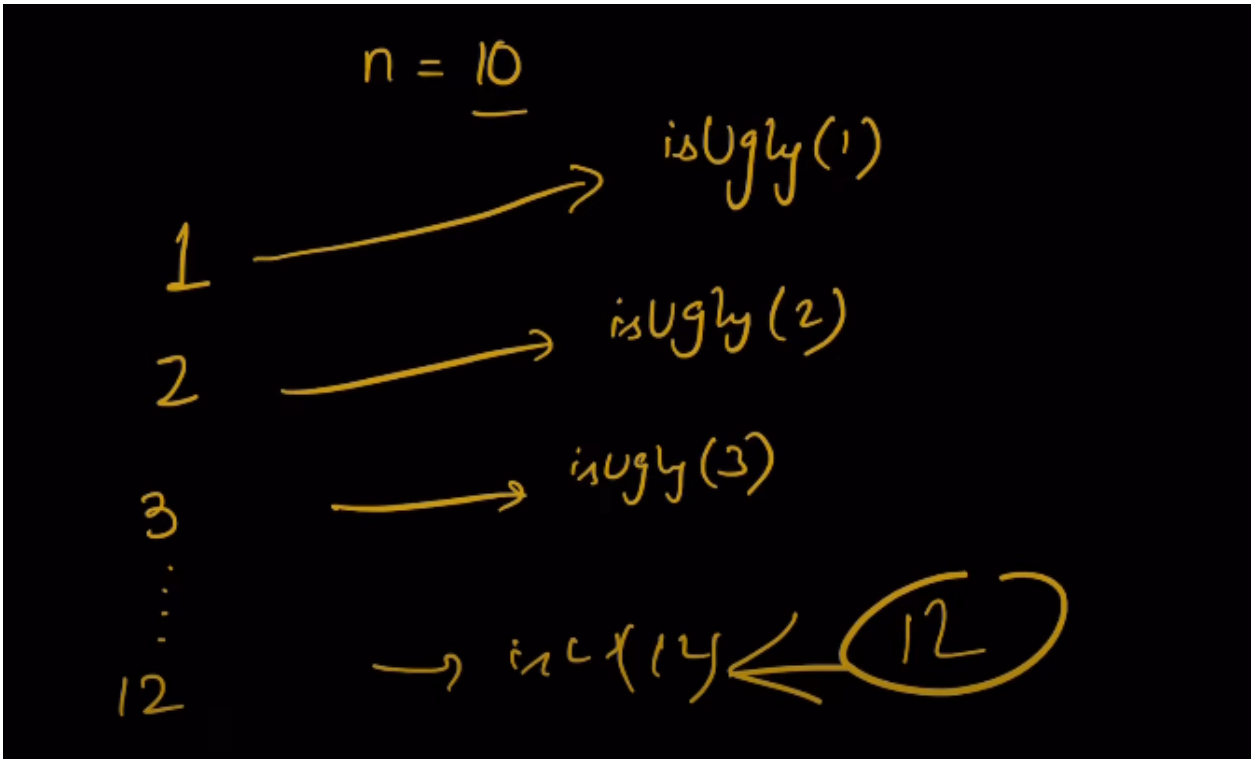
divide the number till we get 1

first by 2

then 3 and at last by 5
if still we don’t get 1 in return then it is not ugly number


n = 34 — 2 * 17
34/2 = 17
n = 12
2 → 12/2 = 6/2 = 3
3 → 3/3 = 1
5 → 1
ugly number

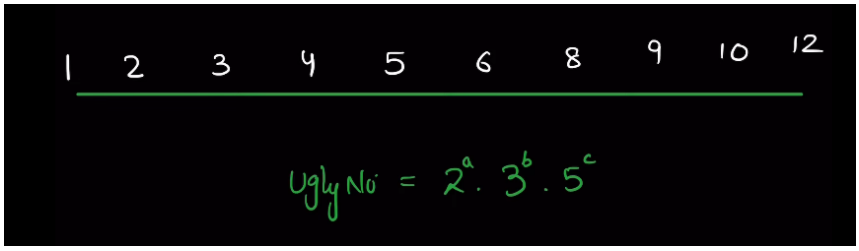

ugly number
n = 18
2 — 18/2 = 9
3 → 9/3 = 3/3 = 1
5 → 1
n = 7
2 = 7
3 = 7
5 = 7
n = 7
Ugly no.

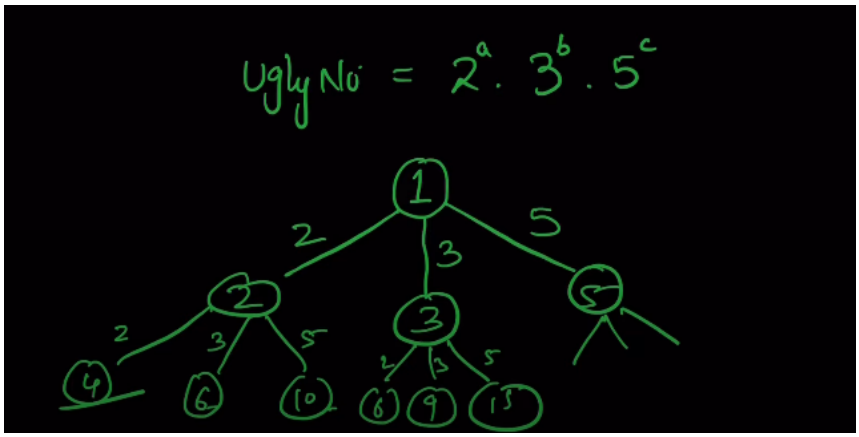


T.C = O(n*log base 2(n))

→ O(n Log (n))

Optimal approach

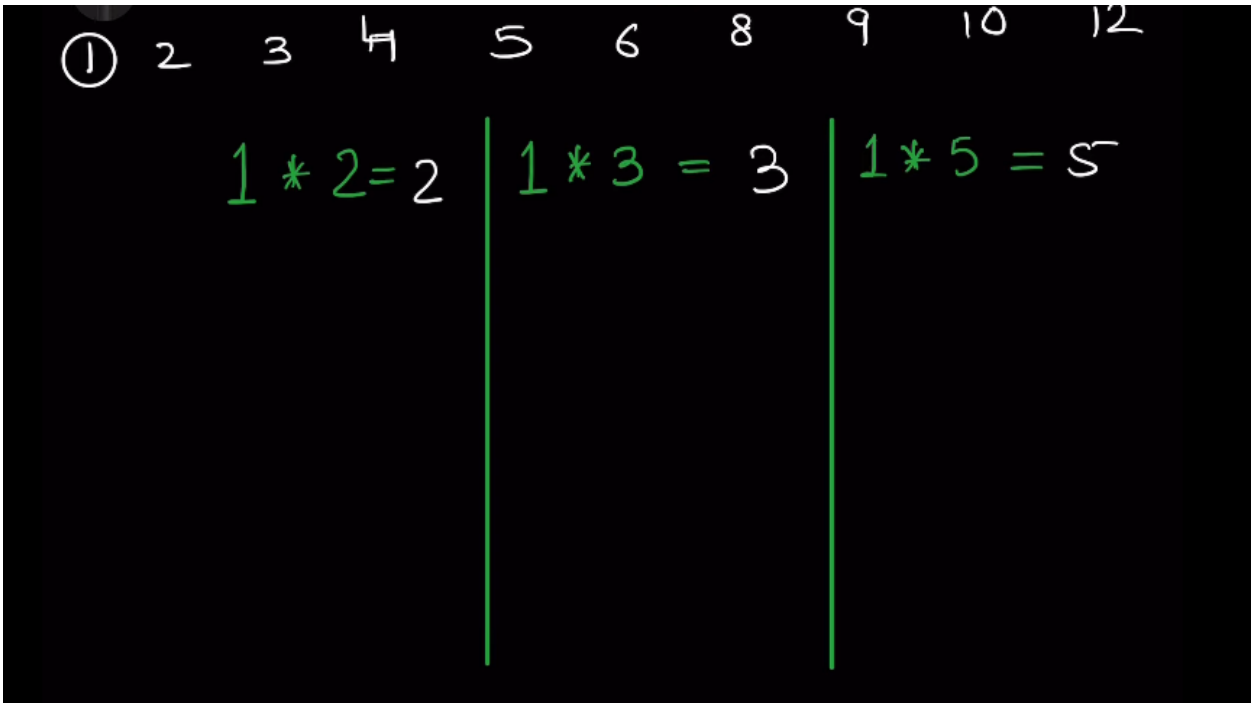




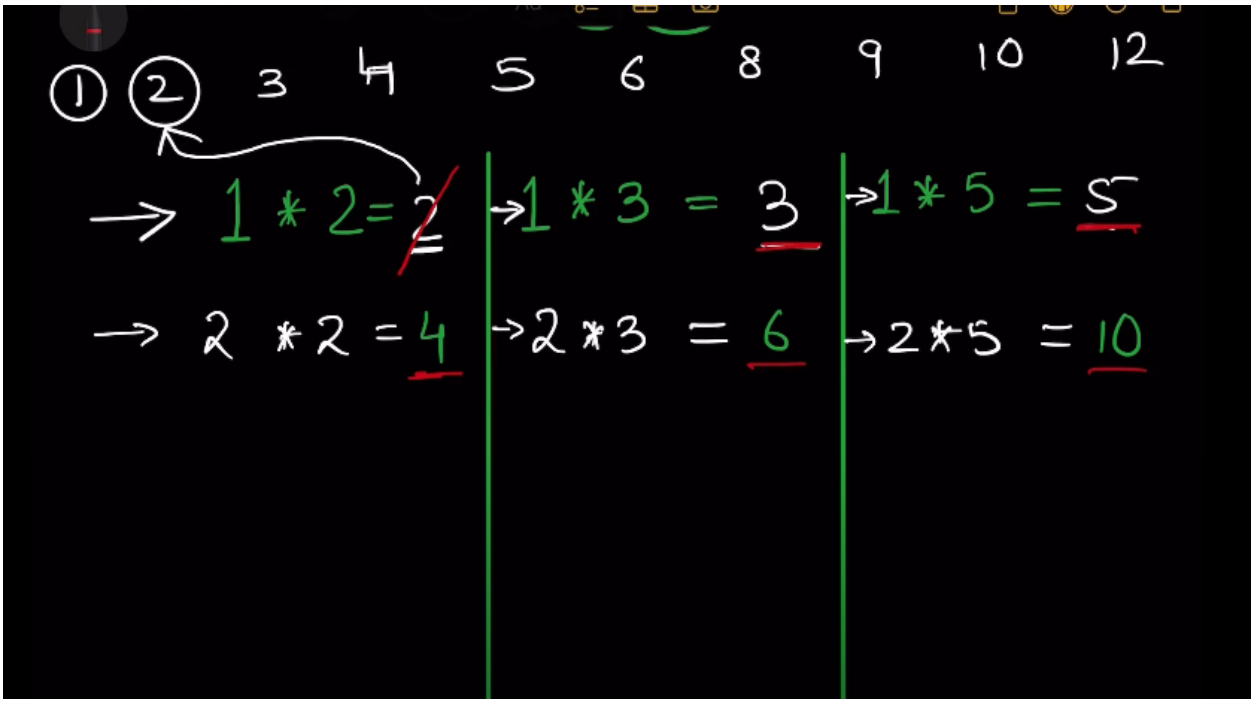
multiply 1 with 2,3,5 we will get 2,3,5 this are ugly numebr

so it is clear that muliply anyhting with 2,3,5 answer we get ugly number

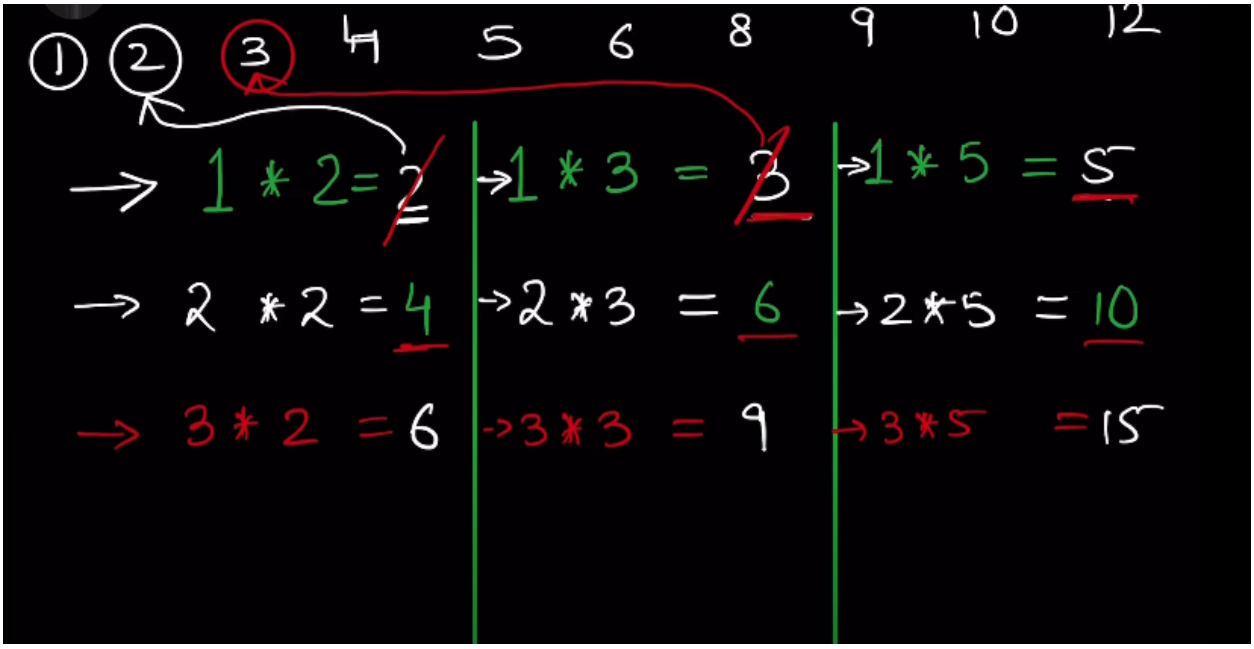
(1)



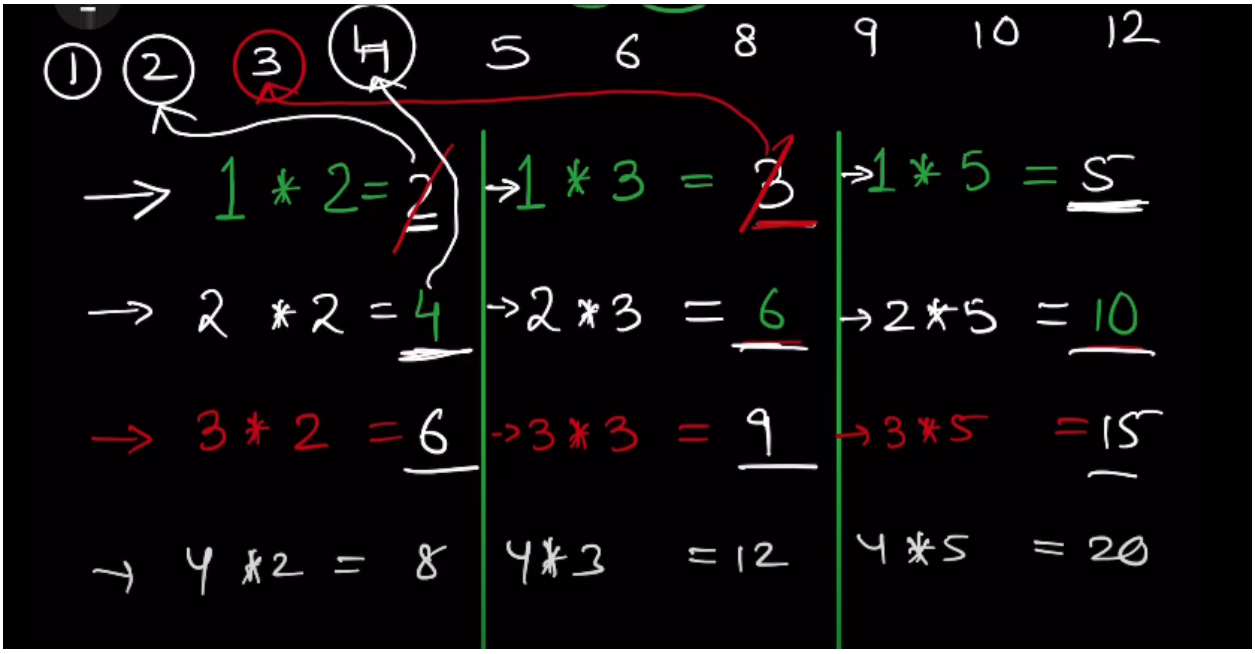
(2)


1 2 3 4 5 6 8 9 10 12
→ 1 * 2 = 2
→ 2 * 2 = 4
→ 1 * 3 = 3
→ 2 * 3 = 6
→ 1 * 5 = 5
→ 2 * 5 = 10

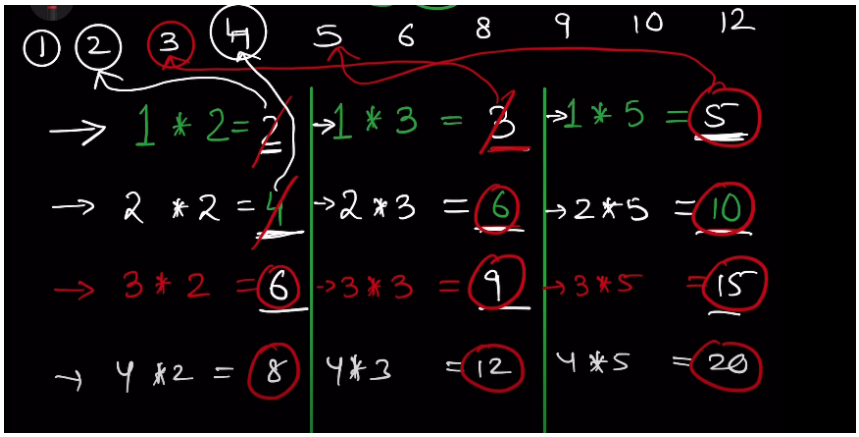
(3)

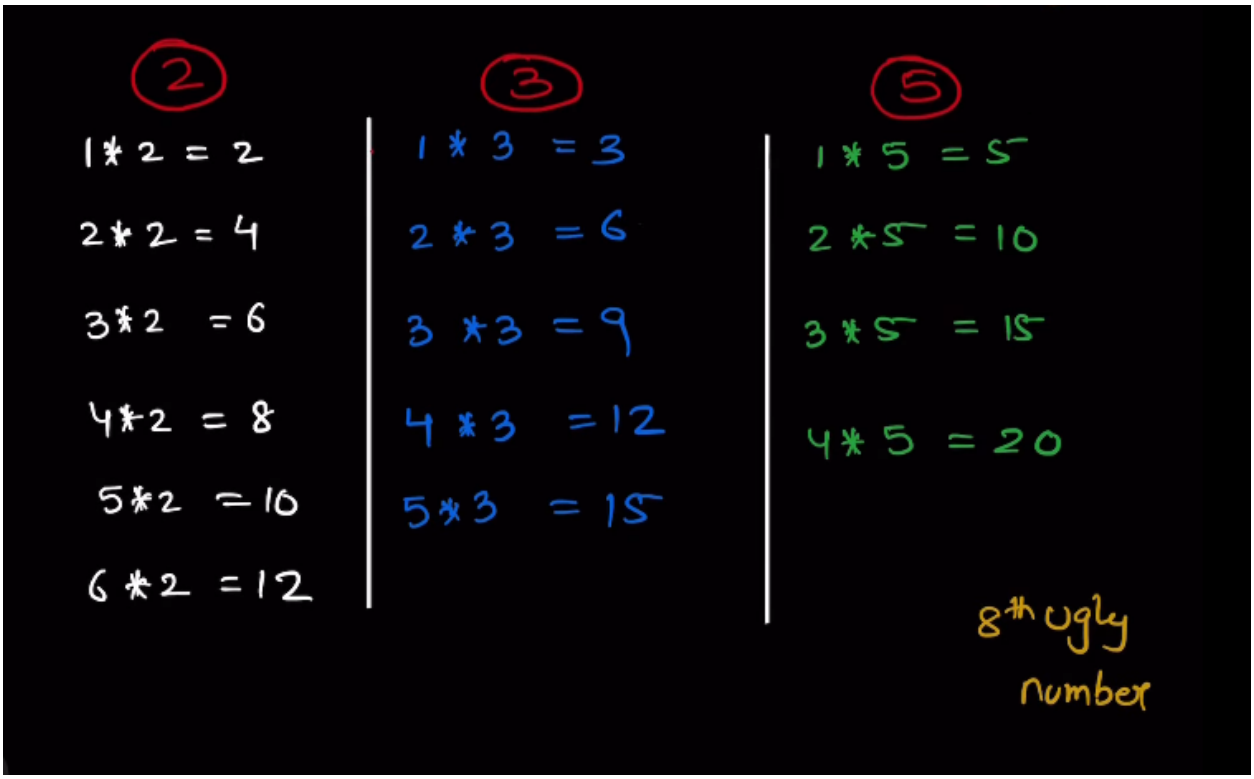

1 2 3 4 5 6 8 9 10 12
→ 1 * 2 = 2
→ 2 * 2 = 4
→ 3 * 2 = 6
→ 1 * 3 = 3
→ 2 * 3 = 6
→ 3 * 3 = 9
→ 1 * 5 = 5
→ 2 * 5 = 10
→ 3 * 5 = 15

(4)

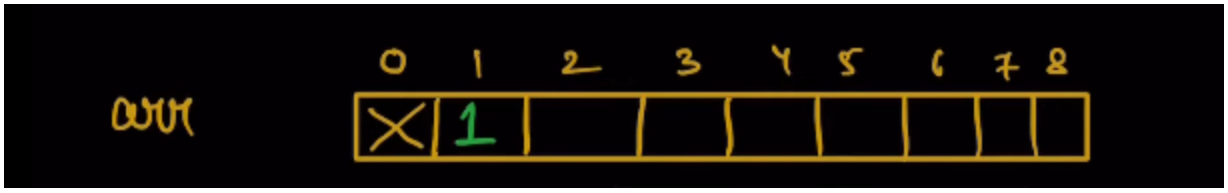

1 2 3 4 5 6 8 9 10 12
→ 1 * 2 = 2 → 1 * 3 = 3 → 1 * 5 = 5
→ 2 * 2 = 4 → 2 * 3 = 6 → 2 * 5 = 10
→ 3 * 2 = 6 → 3 * 3 = 9 → 3 * 5 = 15
→ 4 * 2 = 8 4 * 3 = 12 4 * 5 = 20

(5)

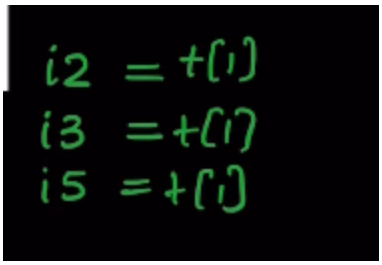

1 2 3 4 5 6 8 9 10 12
→ 1 * 2 = 2 → 1 * 3 = 3 → 1 * 5 = 5
→ 2 * 2 = 4 → 2 * 3 = 6 → 2 * 5 = 10
→ 3 * 2 = 6 → 3 * 3 = 9 → 3 * 5 = 15
→ 4 * 2 = 8 4 * 3 = 12 4 * 5 = 20



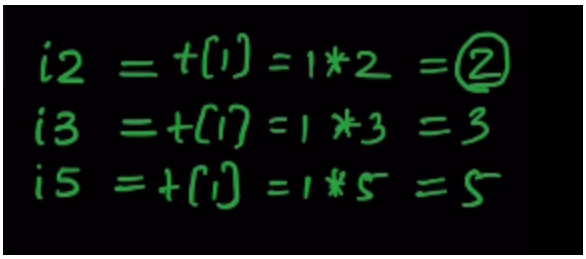
We create an array that store all the ugly number



we create 3 pointer

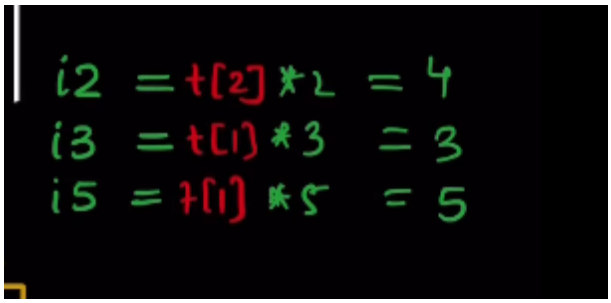


we at 1

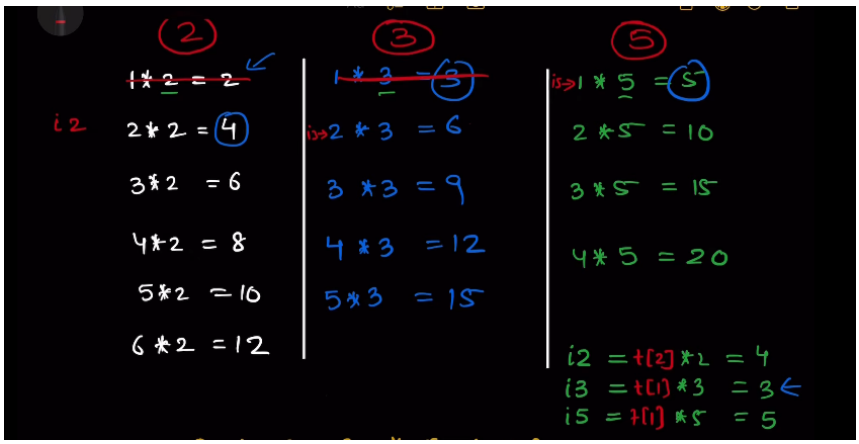


now smallest is 2 so i2++

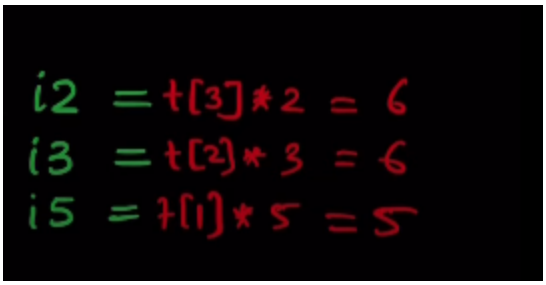
no we at 2

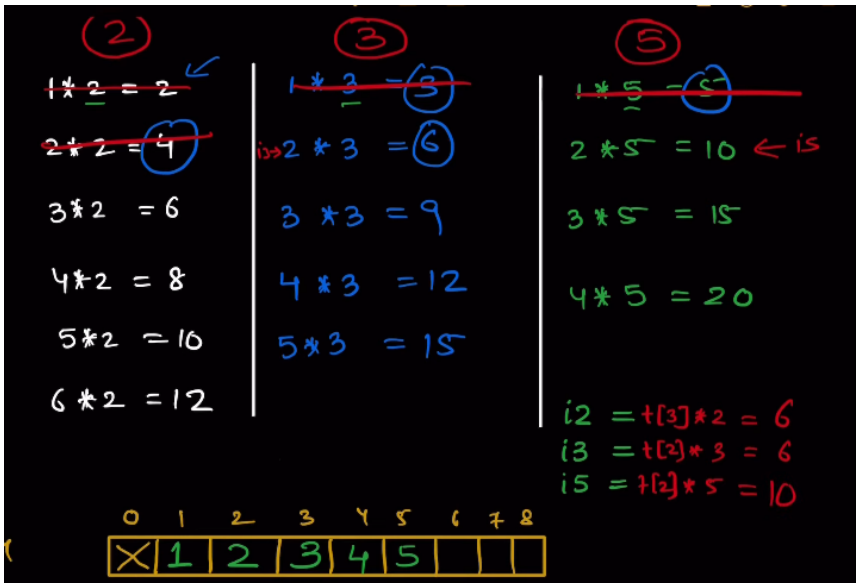


now smallest is 3 so i3++

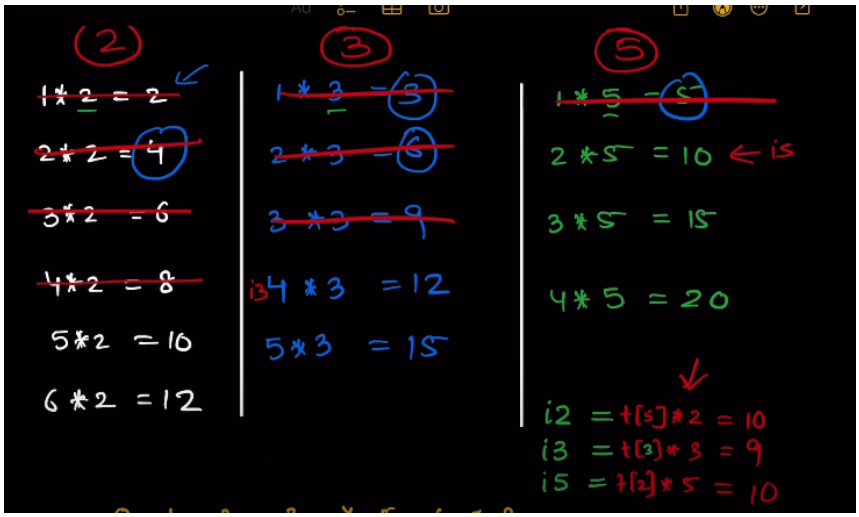


now we at 3





NOW inecrement i2 and i3 becuase both are 6



Solution

```
class Solution {
public:
    int nthUglyNumber(int n) {
        vector<int> arr(n+1);
        int i2;
        int i3;
        int i5;
        i2=i3=i5=1;
        arr[1] = 1;
        for(int i=2;i<=n;i++){
            int i2UglyNum = arr[i2]*2;
            int i3UglyNum = arr[i3]*3;
            int i5UglyNum = arr[i5]*5;

            int mini = min({i2UglyNum,i3UglyNum,i5UglyNum});
            arr[i] = mini;

            if(mini == i2UglyNum)
            i2++;
            if(mini == i3UglyNum)
            i3++;
            if(mini == i5UglyNum)
            i5++;
        }
        return arr[n];
    }
};
```