Question: https://leetcode.com/problems/number-of-digit-one/

Lets think about it

between 0-9 there will be 1 occurence of 1.

0-99 there will be 10 ones for 10-19 at ten's place and 10 ones for 01,11,21,.....91 att one's place.

So we will see for 1's place 1

for 10's place 20

for 1000's place 300

for 1000's place 4000.

We can also write it as

0-9: 1

0-99: 20

0-999: 300

00-9999: 4000

and so on

thus for 10^(n)th place we will have n\*10^(n-1) occurence of 1.

Now lets deep dive into how can we use this information:

let's asume we have a number 23.

So we can calculate number of 1's occured till 20 + number of 1's occured till 3 as the solution.

So let's see:

for 20 we will have 2 sets of 0-9. Thus 2x1 number of ones + 10 extra for 10,11,12,13...19.

and for 3 we will have 1 occurence of 1.

Thus answer=10+2+1=13

Let's take another example 12305

5:1 occurence

0:0 occurence

300: 3\*(0-99 occuernce, i.e., 20) + 100(for 100,101,102,103....199)=160

2000:2\*(0-999 occurence, i.e., 300) +1000(for 1000, 1001, 1002,...1999)=1600

10000:1\*(0-9999 occurence, i.e., 4000) + 2306(for 10000, 10001,...12305)=6306

Thus answer is 8067.

Code:

class Solution {

public int countDigitOne(int n) {

if (n <= 0) return 0;

int q = n, c = 0, p=1, ans = 0;

while(q>0){

int d = q%10;

if(d!=0){

if(d>1){

int prev=(d\*c\*((int)Math.pow(10,c-1)));

ans+=prev;

ans+=p;

}

if(d==1){

int prev=(d\*c\*((int)Math.pow(10,c-1)));

ans+=((n%p)+1);

ans+=prev;

}

}

q=q/10;

p\*=10;

c++;

}

return ans;

}

}

Github Link :<https://lnkd.in/ecwtJeaz>