Problem: Find the sum of all the multiples of 3 or 5 below N

A simple way to do this is to go through all numbers from 1 to N and test whether they are divisible by 3 or 5.

Pseudocode:

```
target = N
sum = 0
for i=1 to target do
If ( i mod 3 = 0) or (i mod 5 = 0 ) then sum:= sum+i
Output sum
```

   Note: In some programming languages the mod operator is written as % (remainder when we divide a/b).

 Simple enough you might say.

But wait a minute: if we asked to do the same for all numbers less than 1,000,000,000 that it is going to take quite a while. Perhaps you would like to try out that first (make sure your sum variable does not overflow).

To get the more efficient solution you could also calculate the sum of the numbers less than N that are divisible by 3, plus the sum of the numbers less than N that are divisible by 5. But as you have summed numbers divisible by 15 twice you could have to subtract the sum of the numbers divisible by 15.

Pseudocode:

```
target = N

Function SumDivisibleBy35(n)
   p = target div n
   return n*(p*(p+1)) div 2
EndFunction

Output SumDivisibleBy35(3) + SumDivsibleBy35(5) - SumDivisibleBy35(15)
```

Note: In many programming languages there exists a separate operator for that: div.

Let's look at the details of our function and take an example n = 3.
For target = 1000
We would like to add:
3+6+9+12+.....+999 = 3*(1+2+3+4+.....+333)
For n = 5 we would get:
5+10+15+20+.....+995 = 5*(1+2+3+4+.....+199)

Now note that 199 = 995/5 but also 999/5 rounded down to the nearest integer.
(995 // 5 = 999 // 5 = 199 ,where // denotes integer division)

We also know that: **1+2+3+4+5+......+n = (n*(n+1)) / 2**. (Sum of n natural numbers)

Code:

Python (3.7.1)

```python
# Solution provided based on the format of the contest problem

def SumDivisibleBy35(n, target):
    """
     Returns the sum of all the multiples of 3 or 5 below N
    """
    if target > 0:
        p = target // n
        return (n*(p*(p+1))) // 2
    else:
        return 0


if __name__ == "__main__":
    test = int(input())
    while test:
        N = int(input())
        target = N - 1
        print(SumDivisibleBy35(3,target) + SumDivisibleBy35(5,target)
        - SumDivisibleBy35(15,target))
        test = test - 1
```

C

```c
#include <stdio.h>

int main(){
    int t;
    printf("Enter Number of Test Cases:\n");
    scanf("%d",&t);

    while(t--)
    {
        unsigned long long N,p=0,sum=0;

        printf("Enter the value of N:\n");
        scanf("%lld",&N);    //Take input of N from user

        p = (N-1)/3;
        sum = ((3*p*(p+1))/2);

        p = (N-1)/5;
        sum = sum + ((5*p*(p+1))/2);

        p = (N-1)/15;
        sum = sum - ((15*p*(p+1))/2);

        printf("%lld\n", sum);//print the sum of all numbers that are multiples of 3&5 below N
    }

    return 0;
}
```