MISSING NUMBER IN AN ARRAY

GEEKS FOR GEEKS:MISSING NUMBER
LEETCODE:MISSING NUMBER
APPROACH-1:
USING THE MATHEMATICAL FORMULA BY COMPUTING **N*(N+1)/2**
this will give sum of n sized elements in array.
and step 2:
i will calculate the sum of array elements using a simple formula and store that answer in the other variable..
when i subtract (1)-(2) i will get the missing number in the array.

```
int MissingNumber(vector<int>& array, int n) {

        int sum=0;
        for(int i=0;i<n-1;i++){
            sum=sum+array[i];
            }
        int p=n*(n+1)/2;
        return (p-sum);

    }
```

TIME COMPLEXITY =O(N)
APPROACH-2:
USING XOR THE DISADVANTAGE FOR THE ABOVE PROCESS IS IF WE PROCEED TO MUCH FOR THE INPUT SIZE N
THE COST OF COMPUTING FOR N*N+1 IS VERY HEAVY THAT THE VARIABLE STORING ITS RESULT COULDNT RESIST AS ITS LIMIT WOULD BE EASILY CROSSED.....
XOR IS LIKE FIRST PERFOM THE XOR FOR N SIZED NATURAL ELEMENTS ...
PERFORM XOR ON ARRAY ELEMENTS...
NOW PERFROM XOR ON THE COMBINED RESLUTS AND RETURN THE ANSWER...
NO ADDITIONAL HEADACHE IS OBSERVERD HERE..

```
**USING XOR OPERATION **
THE MAIN THEME HERE IS FIRST PERFORM XOR ON N SIZED NATURAL CONSECUTIVE ELEMENTS.
NEXT PERFORM XOR ON COMPLETE GIVEN ARRAY.
```

```
class Solution {
public:
    int missingNumber(vector<int>& nums) {
        int n= nums.size();
        int res1=0, res2=0;
        for(int i=0;i<n;i++){
            res1=res1^nums[i];


        }
        for(int i=0;i<=n;i++){
            res2=res2^i;


        }
        return res1^res2;

    }
};
```