While reading questions

1. **Extract data (Data type – Storage type) -> memory allocation**
2. **Diff data types int / float / Bool / String / List-Array**

TCS NQT Coding Question 2023 – September Day 1 – Slot 1

Problem Statement –

Joseph is learning digital logic subject which will be for his next semester. He usually tries to solve unit assignment problems before the lecture. Today he got one tricky question. The problem statement is "A positive integer has been given as an input. Convert decimal value to binary representation. Toggle all bits of it after the most significant bit including the most significant bit. Print the positive integer value after toggling all bits".

Constrains-

1<=N<=100

Example 1:

Input :

10 -> Integer

Output :

5 -> result- Integer

Explanation:

Binary representation of 10 is 1010. After toggling the bits(1010), will get 0101 which represents "5". Hence output will print "5".

2^7 2^6 2^5 2^4 2^3 2^2 2^1 2^0
128 64 32 16 8 4 2 1
0 0 0 0 1 0 1 0 = 10
0 0 0 0 1 1 1 1 = 15

---

0 0 0 0 0 1 0 1 = 5

1 0 1 0 = 10 => 0 1 0 1 => 5
1 1 1 1 = 15 => 0 0 0 0 => 0
1 1 1 = 7 => 0 0 0 => 0

1 0 0 1 = 9 => 0 1 1 0 => 6
128 64 32 16 8 4 2 1
1 1 0 1 0 1 => 53

Python Solution

```
import math
n=int(input())
k=(1<< int(math.log2(n))+1)-1
print(n^k)
```

C programming solution

```
#include<stdio.h>
#include<math.h>
int main()
{
    int n;
    scanf("%d", &n);
    int k = (1 << (int)(log2(n) + 1)) - 1;
    printf("%d", n ^ k);
    return 0;
}
```

Java Solution

```
import java.util.*;
class Main
{
  public static void main(String[] args)
  {
        Scanner sc=new Scanner(System.in);
        int n=sc.nextInt();
        int z = (1 << (int)(Math.log(n) / Math.log(2)) + 1) - 1;
              System.out.println(n^z);
   }
}
```

TCS NQT Coding Question Day 1 Slot 2 – Question 2

Airport security officials have confiscated several item of the passengers at the security check point. All the items have been dumped into a huge box (array). Each item possesses a certain amount of risk[0,1,2]. Here, the risk severity of the items represent an array[] of N number of integer values. The task here is to sort the items based on their levels of risk in the array. The risk values range from 0 to 2.

Example :

Input :

7 -> Value of N

[1,0,2,0,1,0,2]-> Element of arr[0] to arr[N-1], while input each element is separated by new line.

Output :

0 0 0 1 1 2 2 -> Element after sorting based on risk severity

Example 2:
input : 10 -> Value of N
[2,1,0,2,1,0,0,1,2,0] -> Element of arr[0] to arr[N-1], while input each element is separated by a new line.
Output :
0 0 0 0 1 1 1 2 2 2 ->Elements after sorting based on risk severity.
Explanation:

In the above example, the input is an array of size N consisting of only 0's, 1's and 2s. The output is a sorted array from 0 to 2 based on S severity.

0 1 2 3 4 5 6 7 8 9
[2,1,0,2,1,0,0,1,2,0]

zeroCount = 4 onesCount = 3 towsCount = 3

You can also use predefined Python functions for solutions (Using predefined function may leads to time limit exceeded error for few test cases)

```
n = int(input())
arr = []
for i in range(n):
    arr.append(int(input()))
for i in sorted(arr):
    print(i, end=" ")
```

Use any sorting algorithms like Selection sort, Quick Sort, Merge Sort . . .

```
class HelloWorld {
    public static void sort(int arr[], int n){
        for(int i=0 ; i<n-1 ; i++){
            int minIdx= i;
            for( int j=i+1;j<n;j++){
                if(arr[j]<arr[minIdx])
                  minIdx=j;
            }
            int temp;
            if(minIdx!=i){
                temp=arr[minIdx];
                arr[minIdx]=arr[i];
                arr[i]=temp;
            }
        }
    }

    public static void countSort(int arr[],int n){
        int z=0, o=0, t=0;
        for(int i=0;i<n ;i++){
            if(arr[i]==0){
                z++;
            }
            else if(arr[i]==1){
                o++;
            }
            else{
                t++;
            }
        }
        for(int i=0;i<z;i++){
            System.out.println("0");
        }
        for(int i=0;i<o;i++){
            System.out.println("1");
        }
        for(int i=0;i<t;i++){
            System.out.println("2");
        }
    }

    public static void main(String[] args) {
        int n=10;
        System.out.println("Enter no of items");
        int arr1[]={2,1,0,2,1,0,0,1,2,0};
        countSort(arr1,n);
        int arr2[]={2,1,0,2,1,0,0,1,2,0};
        sort(arr2,n);
        for(int i=0;i<n;i++){
            System.out.println(arr2[i]);
        }
    }
}
```