TATA CONSULTANCY SERVICES

TCS NQT

PREVIOUS YEAR

CODING QUESTIONS

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Question #1: Sweet Seventeen

Given a maximum of four digits to the base 17(10 -> A, 11 -> B, 12 -> C, 16 -> G) as input, output its decimal value.

Input:

23GF

Solution and output:

C++ :

```
#include <iostream>
#include <math.h>
#include <string.h>
using namespace std;
int main(){
  char hex[17];
  long long decimal;
  int i = 0, val, len;
  decimal = 0;
  cin>> hex;
  len = strlen(hex);
  len--;
```

Java :

```
import java.util.*;
class Main
{
	public static void main(String[] args) {
		HashMap<Character,Integer> hmap = new HashMap<Character,Integer>();
		hmap.put('A',10);
		hmap.put('B',11);
		hmap.put('C',12);
		hmap.put('D',13);
		hmap.put('E',14);
		hmap.put('F',15);
		hmap.put('G',16);
		hmap.put('a',10);
		hmap.put('b',11);
		hmap.put('c',12);
		hmap.put('d',13);
		hmap.put('e',14);
		hmap.put('f',15);
```

```
            hmap.put('g',16);
            Scanner sin = new Scanner(System.in);

        String s = sin.nextLine();
            long  num=0;
            int k=0;

        for(int i=s.length()-1;i>=0;i--)
            {
               if((s.charAt(i)>='A'&&s.charAt(i)<='Z')||(s.charAt(i)>='a' &&s.charAt(i)<='z'))
                 {
                    num = num + hmap.get(s.charAt(i))*(int)Math.pow(17,k++);
                 }
               else
                 {
                  num = num+((s.charAt(i)-'0')*(int)Math.pow(17,k++));
            }
            }
            System.out.println(num);
    }
}
```

Python :

```
num = str(input())
print(int(num,17))
```

OUTPUT

10980

Question #2: A Sober Walk

Our hoary culture had several great persons since time immemorial and king Vikramaditya's nava ratnas (nine gems) belongs to this ilk. They are named in the following shloka:

Among these, Varahamihira was an astrologer of eminence and his book Brihat Jataak is recokened as the ultimate authority in astrology. He was once talking with Amarasimha, another gem among the nava ratnas and the author of the Sanskrit thesaurus, Amarakosha. Amarasimha wanted to know the final position of a person, who starts from the origin 0 0 and travels per the following scheme.

- He first turns and travels 10 units of distance
- His second turn is upward for 20 units
- The third turn is to the left for 30 units
- The fourth turn is downward for 40 units
- The fifth turn is to the right(again) for 50 units

… And thus he travels, every time increasing the travel distance by 10 units.

Constraints:

2<=n<=1000

Input:

3

Solution and output:

C++ :

```
#include<iostream>
#include<stdlib.h>
using namespace std;
int main()
{
   int n;
   cin>>n;
   char c = 'R';
   int x = 0, y = 0;
   while(n){
      switch(c){
         case 'R':
            x = abs(x) + 10;
```

```
            y = abs(y);
            c ='U';
            break;
        case 'U':
            y = y + 20;
            c = 'L';
            break;
        case 'L':
            x = -(x + 10);
            c = 'D';
            break;
        case 'D':
            y = -(y);
            c = 'R';
            break;
        }
      n--;
   }
   cout<< x<< " " << y;
}
```

Java :

```
import java.util.*;
import java.lang.*;

class Main {
          public static void main (String[] args) {
             Scanner sc = new Scanner(System.in);
             int n=sc.nextInt();
             char c = 'R';
      int x = 0, y = 0;
      while(n>0){
      switch(c){
         case 'R':
            x = Math.abs(x) + 10;
            y = Math.abs(y);
            c ='U';
            break;
         case 'U':
            y = y + 20;
            c = 'L';
            break;
         case 'L':
            x = -(x + 10);
            c = 'D';
```

```
            break;
          case 'D':
            y = -(y);
            c = 'R';
            break;
          }
        n--;
    }
                    System.out.println(x+" "+y);
          }
}
```

Python :

```
n = int(input())
c = 'R'
x,y=0,0
for i in range(n):
    if c=='R':
        x = abs(x) + 10;
        y = abs(y);
        c ='U';
    elif c=='U':
        y = y + 20;
        c = 'L';
    elif c=='L':
        x = -(x + 10);
        c = 'D';
    elif c=='D':
        y = -(y);
        c = 'R';
print(x,y)
```

OUTPUT

```
-20 20
```

Question #3: Word is the key

One programming language has the following keywords that cannot be used as identifiers:

break, case, continue, default, defer, else, for, func, goto, if, map, range, return, struct, type, var

Write a program to find if the given word is a keyword or not

Input #1:

defer

Output:

defer is a keyword

Input #2:

While

Solution and output:

C++ :

```
#include<iostream>
#include<string.h>
using namespace std;
int main(){
   char str[16][10] = {"break", "case", "continue", "default", "defer", "else","for",
   "func", "goto", "if", "map", "range", "return", "struct", "type", "var"};
   char input[20];
   int flag = 0;
   cin >> input;
   for(int i = 0; i<16;i++){
      if(strcmp(input,str[i]) == 0){
         flag = 1;
         break;
      }
   }
   if(flag==1){
      cout << input << " is a keyword";
   }
   else{
      cout << input << " is not a keyword";
```

```
    }
    return 0;
}
```

Java :

```
import java.util.Scanner;
class Main
{
    public static void main(String args[])
    {

     String str[]= {"break", "case", "continue", "default", "defer", "else","for", "func", "goto",
     "if", "map", "range", "return", "struct", "type", "var"};

    int flag = 0;
    Scanner sc = new Scanner(System.in);
    String input=sc.nextLine();

    for(int i = 0; i<16;i++){

        if(str[i].equals(input)){
            flag = 1;
            break;
        }
    }

    if(flag==1){
        System.out.println(input+" is a keyword");
    }
    else{
        System.out.println(input+" is not a keyword");
    }

}
}
```

Python

```
keyword = {"break", "case", "continue", "default", "defer", "else", "for",
"func", "goto", "if", "map", "range", "return", "struct", "type", "var"}

input_var = input()
if input_var in keyword:
    print(input_var+ " is a keyword")
else:
```

```
print(input_var+ " is not a keyword")
```

OUTPUT

while is not a keyword

Question #4:

Problem Statement –

A chocolate factory is packing chocolates into the packets. The chocolate packets here represent an array of N number of integer values. The task is to find the empty packets(0) of chocolate and push it to the end of the conveyor belt(array).

Example 1 :

N=8 and arr = [4,5,0,1,9,0,5,0].

There are 3 empty packets in the given set. These 3 empty packets represented as O should be pushed towards the end of the array

Input :

8 – Value of N

[4,5,0,1,9,0,5,0] – Element of arr[O] to arr[N-1],While input each element is separated by newline

Output:

4 5 1 9 5 0 0 0

Example 2:

Input:

6 — Value of N.

[6,0,1,8,0,2] – Element of arr[0] to arr[N-1], While input each element is separated by newline

Output:

6 1 8 2 0 0

C++ :

```
#include <bits/stdc++.h>
using namespace std;
int main ()
{
  int n, j = 0;
  cin >> n;
  int a[n] = { 0 };
  for (int i = 0; i < n; i++)
  {
    cin >> a[j];
    if (a[j] != 0)
    {
       j++;
    }
  }
  for (int i = 0; i < n; i++)
  {
     cout << a[i] << " ";
  }
```

Java :

```
import java.util.*;
class Main
{
   public static void main(String[] args)
   {
         Scanner sc=new Scanner(System.in);
         int n=sc.nextInt();
         int arr[]=new int[n];
         for(int i=0;i< n;i++)
              arr[i]=sc.nextInt();
         int count=0;
         for(int i=0;i< n;i++)
            if(arr[i]!=0)
                arr[count++]=arr[i];
          for(int i=count;i < n;i++)
              arr[i]=0;
```

```
        for(int i=0;i< n;i++)
            System.out.print(arr[i]+" ");
    }
}
```

Python

```
n=int(input())
j=0
L=[0 for i in range(n)]
for i in range(n):
    a=int(input())
    if a!=0:
        L[j]=a
        j+=1
for i in L:
    print(i,end=" ")
```

OUTPUT

4 5 1 9 5 0 0 0

Question #5:

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”.

C++ :

```
#include<bits/stdc++.h>
using namespace std;
int main ()
{
  int n;
  cin >> n;
  int k = (1 << (int) floor (log2 (n)) + 1) - 1;
  cout << (n ^ k);
}
```

Java :

```
import java.util.*;
class Main
{
  public static void main(String[] args)
  {
        Scanner sc=new Scanner(System.in);
        int no=sc.nextInt();
         String bin="";

         while(no!=0)
         {
               bin=(no&1)+bin;
               no=no>>1;
         }
          bin=bin.replaceAll("1","2");
          bin=bin.replaceAll("0","1");
          bin=bin.replaceAll("2","0");
          int res=Integer.parseInt(bin,2);
         System.out.println(res);
   }
}
```

Python :

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

OUTPUT

5 -> result- Integer

Question #6:

Jack is always excited about sunday. It is favourite day, when he gets to play all day. And goes to cycling with his friends.

So every time when the months starts he counts the number of sundays he will get to enjoy. Considering the month can start with any day, be it Sunday, Monday…. Or so on.

Count the number of Sunday jack will get within n number of days.

Example 1:

Input

mon-> input String denoting the start of the month.

13 -> input integer denoting the number of days from the start of the month.

Output :

2 -> number of days within 13 days.

Explanation:

The month start with mon(Monday). So the upcoming sunday will arrive in next 6 days. And then next Sunday in next 7 days and so on.

Now total number of days are 13. It means 6 days to first sunday and then remaining 7 days will end up in another sunday. Total 2 sundays may fall within 13 days.

C++ :

```
#include <bits/stdc++.h>
using namespace std;
int main()
{
   string s; cin>>s;
   int a,ans=0;
   cin>>a;
   unordered_map< string,int > m;
   m["mon"]=6;m["tue"]=5;m["wed"]=4;
   m["thu"]=3;m["fri"]=2;m["sat"]=1;
```

```
    m["sun"]=0;
    if(a-m[s.substr(0,3)] >=1) ans=1+(a-m[s.substr(0,3)])/7;
    cout<< ans;
}
```

Java :

```
import java.util.*;
class Main
{
public static void main(String[] args)
{
        Scanner sc=new Scanner(System.in);
        String str=sc.next();
        int n=sc.nextInt();
        String arr[]={"mon","tue,","wed","thu","fri","sat","sun"};
        int i=0;
        for(i=0;i< arr.length;i++) if(arr[i].equals(str)) break; int res=1; int rem=6-i; n=n-rem; if(n >0)
          res+=n/7;
        System.out.println(res);

}
}
```

Python :

```
def main():
    s = input()
    a = int(input())
    m = {
        "mon": 6, "tue": 5, "wed": 4,
        "thu": 3, "fri": 2, "sat": 1,
        "sun": 0
    }
    ans = 0
    if a - m[s[:3]] >= 1:
        ans = 1 + (a - m[s[:3]]) // 7
    print(ans)
if __name__ == "__main__":
    main()
```

OUTPUT

5 -> result- Integer

Question #7:

Jack is always excited about sunday. It is favourite day, when he gets to play all day. And goes to cycling with his friends.

So every time when the months starts he counts the number of sundays he will get to enjoy. Considering the month can start with any day, be it Sunday, Monday…. Or so on.

Count the number of Sunday jack will get within n number of days.

Example 1:

Input

mon-> input String denoting the start of the month.

13 -> input integer denoting the number of days from the start of the month.

Output :

2 -> number of days within 13 days.

Explanation:

The month start with mon(Monday). So the upcoming sunday will arrive in next 6 days. And then next Sunday in next 7 days and so on.

Now total number of days are 13. It means 6 days to first sunday and then remaining 7 days will end up in another sunday. Total 2 sundays may fall within 13 days.

C++ :

```
#include <bits/stdc++.h>
using namespace std;
```

```
int main()
{
   string s; cin>>s;
   int a,ans=0;
   cin>>a;
   unordered_map< string,int > m;
   m["mon"]=6;m["tue"]=5;m["wed"]=4;
   m["thu"]=3;m["fri"]=2;m["sat"]=1;
   m["sun"]=0;
   if(a-m[s.substr(0,3)] >=1) ans=1+(a-m[s.substr(0,3)])/7;
   cout<< ans;
}
```

Java :

```
import java.util.*;
class Main
{
public static void main(String[] args)
{
      Scanner sc=new Scanner(System.in);
      String str=sc.next();
      int n=sc.nextInt();
      String arr[]={"mon","tue,","wed","thu","fri","sat","sun"};
      int i=0;
      for(i=0;i< arr.length;i++) if(arr[i].equals(str)) break; int res=1; int rem=6-i; n=n-rem; if(n >0)
        res+=n/7;
      System.out.println(res);

}
}
```

Python :

```
def main():
   s = input()
   a = int(input())
   m = {
      "mon": 6, "tue": 5, "wed": 4,
      "thu": 3, "fri": 2, "sat": 1,
      "sun": 0
   }
   ans = 0
   if a - m[s[:3]] >= 1:
      ans = 1 + (a - m[s[:3]]) // 7
```

```
    print(ans)

if __name__ == "__main__":
    main()
```

OUTPUT

2 -> number of days within 13 days.

Question #8:

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 risk severity.

C++ :

```
#include <bits/stdc++.h>
using namespace std;
int main()
{
   int n; cin>>n;
   int a[n];
   for(int i=0;i< n;i++) cin>>a[i];
   int l=0,m=0,h=n-1;
   while(m<=h)
   {
      if(a[m]==0) swap(a[l++],a[m++]);
      else if(a[m]==1) m++;
      else swap(a[m],a[h--]);
   }
   for(int i=0;i< n;i++) cout<< a[i]<<" ";
}
```

Java :

```
import java.util.*;
class Main
{
   public static void main(String[] args)
   {
       Scanner sc=new Scanner(System.in);
        int n=sc.nextInt();
        int arr[]=new int[n];
        for(int i=0;i< n;i++)
             arr[i]=sc.nextInt();
         int countZero=0,countOne=0,countTwo=0;
         for(int i=0;i< n;i++) { if(arr[i]==0) countZero++; else if(arr[i]==1) countOne++; else if(arr[i]==2)
countTwo++; } int j =0; while(countZero >0)
          {
```

```
                arr[j++]=0;
                countZero--;
            }
            while(countOne >0)
            {
                arr[j++]=1;
                countOne--;
             }

             while(countTwo >0)
             {
                arr[j++]=2;
                countTwo--;
              }

             for(int i=0;i < n;i++)
                 System.out.print(arr[i]+" ");
    }
}
```

Python :

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

OUTPUT

```
0 0 0 0 1 1 1 2 2 2
```

Question #9:

Given an integer array Arr of size N the task is to find the count of elements whose value is greater than all of its prior elements.

Note : 1st element of the array should be considered in the count of the result.

For example,

Arr[]={7,4,8,2,9}

As 7 is the first element, it will consider in the result.

8 and 9 are also the elements that are greater than all of its previous elements.

Since total of 3 elements is present in the array that meets the condition.

Hence the output = 3.

Example 1:

Input

5 -> Value of N, represents size of Arr

7-> Value of Arr[0]

4 -> Value of Arr[1]

8-> Value of Arr[2]

2-> Value of Arr[3]

9-> Value of Arr[4]

Output :

3

Example 2:

5 -> Value of N, represents size of Arr

3 -> Value of Arr[0]

4 -> Value of Arr[1]

5 -> Value of Arr[2]

8 -> Value of Arr[3]

9 -> Value of Arr[4]

Output :

5

Constraints

1<=N<=20

1<=Arr[i]<=10000

C++ :

```
#include <bits/stdc++.h>
using namespace std;
int main()
{
   int n,c=0,a,m=INT_MIN;
   cin>>n;
   while(n--)
   {
      cin>>a;
      if(a>m)
      {
         m=a;
         c++;
      }
   }
   cout << c;
}
```

Java :

```
import java.util.*;
class Main
{
  public static void main(String[] args)
  {
        Scanner sc=new Scanner(System.in);
        int n=sc.nextInt();
        int arr[]=new int[n];
        for(int i=0;i< n;i++)
              arr[i]=sc.nextInt();
        int max=Integer.MIN_VALUE;

        int count=0;
        for(int i=0;i< n;i++) { if(arr[i]>max)
```

```
        {
            max=arr[i];
            count++;
         }
      }
      System.out.println(count);
}
}
```

Python :

```
import sys
n=int(input())
c=0
m=-sys.maxsize-1
while n:
   n-=1
   a=int(input())
   if a>m:
      m=a
      c+=1
print(c)
```

OUTPUT

5

Question #10:

A supermarket maintains a pricing format for all its products. A value N is printed on each product. When the scanner reads the value N on the item, the product of all the digits in the value N is the price of the item. The task here is to design the software such that given the code of any item N the product (multiplication) of all the digits of value should be computed(price).

Example 1:

Input :

5244 -> Value of N

Output :

160 -> Price

Explanation:

From the input above

Product of the digits 5,2,4,4

5*2*4*4= 160

Hence, output is 160.

C++ :

```
#include <bits/stdc++.h>
using namespace std;
int main()
{
   string s;
   cin>>s;
   int p=1;
   for(auto i:s)
      p*=(i-'0');
   cout<< p;
}
```

Java :

```
import java.util.*;
class Main
{
```

```
   public static void main(String[] args)
   {
        Scanner sc=new Scanner(System.in);
        int n=sc.nextInt();
        int res=1;
        while(n>0)
        {
            res=res*(n%10);
            n=n/10;
         }
          System.out.println(res);
   }
}
```

Python :

```
n=input()
p=1
for i in n:
   p*=int(i)
print(p)
```

OUTPUT

160 -> Price