DEPARTMENT OF
COMPUTER SCIENCE & ENGINEERING
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IT SKILLS (Domain Camp)
WORKSHEET – 1

Student Name : HARSHAL JAIN	**UID : 20BCS7902**
Branch : CSE	**Section/Group : DWWC-43**
Submitted to : Natasha Sharma	**Date of submission : 03/01/2023**
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1. Aim:

1. MoEngage noticed that some users are not aware of the practice page on CodeChef, and some others are not aware of the rated contests on CodeChef. So, MoEngage wants to send an email to the users depending on which of the following groups they fall into:

If the user has never submitted on the practice page then send an email with the text:

```
https://www.codechef.com/practice
```

If the user has submitted on the practice page, but never participated in a contest then send an email with the text:

```
https://www.codechef.com/contests
```

If the user has submitted on the practice page as well as participated in a contest then send an email with the text:

```
https://discuss.codechef.com
```

so that they may discuss with other members of the community.

Code:-

```
#include <iostream>
using namespace std;
int main() {
int a,b;
cin>>a>>b;
if(a==0){
```

```
cout<<"https://www.codechef.com/practice";
}
else if(a==1 && b==0 ){
cout<<"https://www.codechef.com/contests";
}
else{
cout<<"https://discuss.codechef.com";
}
return 0;
}
```

2. Kingdom Of Fire and Ice

There is a kingdom in land of fire and ice known as westros. The kingdom is ruled by mad king Amen Targareyan. Further more Westros is divided into two territories. One territory known as ice because it is always snowing and other Fire beacuse of volcano near by area. There is rebellion to overthrow the mad king to bring peace to Westros. There is a secret attack on red fort by rebellion force lead by Luke Skywalker. There is snitch in rebellion force. He trades the secret attack plan to mad king. However mad king has superpower to sense disturbance in the force. He sends out his best knights to scout the rebellion force. He got to know that rebel force outmatch city guards one to hundred. Moreover he came to know that Luke is last jedi who can detroy him.In order to win this battle against rebels, the mad king decided to use N common folks as soldiers. He select a bunch of people from a territory and train them .Now king can only select odd number of people from land of fire and from land of ice in one go. He cannot select bunch of people consecutively from either territory.In how may ways the mad king could assemble his army to battle against rebel forces ? Note: The number of people in each territory is infinte

CODE:-

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

string add(string &a,string &b){
   string res="";  int i=a.size();int j=b.size();
```

```
   int c=0;
   while(i+j+c){
     if(i) c+=a[i-1]-'0', i--;
     if(j) c+=b[j-1]-'0', j--;

      res+=(c%10+'0');
      c/=10;
   }
   reverse(res.begin(),res.end());
   return res;
}

int main() {

        vector<string> fib(1001);
        fib[0]="0" ; fib[1]="1"; fib[2]="1";
        for(int i=3;i<1001;i++){
           fib[i]=add(fib[i-1],fib[i-2]);
        }
        int t;
        cin>>t;
        while(t--){
           int n,m;
           cin>>n>>m;
      int ans=0; string s=fib[n];
      for(int i=0;i<s.length();i++){
         ans=ans*10 + (s[i]-'0');
         ans%=m;
      }
      ans=(2*ans)%m;
      cout<<ans<<endl;
         }
}
```

3. Harry Potter has n mixtures in front of him, arranged in a row.Each mixture has one of 100 different colors (colors have numbers from 0 to 99).
He wants to mix all these mixtures together. At each step, he is going to take two mixtures that stand next to each other and mix them together, and put the resulting mixture in their place.

When mixing two mixtures of colors a and b, the resulting mixture will have the color (a+b) mod 100.
Also, there will be some smoke in the process. The amount of smoke generated when mixing two mixtures of colors a and b is a*b.
Find out what is the minimum amount of smoke that Harry can get when mixing all the ixtures together.

CODE:-

```
#include<bits/stdc++.h>
using namespace :: std;
#define ll long long
```

```
ll T[101][101];

ll solve(ll A[], ll i, ll j){
    if(i==j){
        return 0;
    }
    if(T[i][j]!=-1){
        return T[i][j];
    }
    ll ans=LLONG_MAX;
    for(int k=i; k<j; k++){
        ll temp = solve(A, i, k)+solve(A, k+1, j)+((A[k]-A[i-1])%100)*((A[j]-A[k])%100);
        ans=min(ans, temp);
    }

    return T[i][j]=ans;
}

int main(){
    ll n=0;
    while(cin>>n){
        memset(T, -1, sizeof(T));
        // ll n=0;
        // cin>>n;
        ll*A=new ll [n+1];
        A[0]=0;
        ll b=0;
        for(ll i=1; i<n+1; i++){
            ll a;
            cin>>a;
            b+=a;
            A[i]=b;
        }

        // for(auto it=A.begin(); it!=A.end(); it++){
        //     cout<<*it<<" ";
        // }
        // cout<<"\n";
        // cout<<A.size()<<"\n";
        cout<<solve(A, 1, n)<<"\n";
    }
    return 0;
}
```

4. *Binod* is giving chocolates to his three daughters.He has two chocolates boxes.One contains A chocolates, and the other contains B chocolates. He can thus give A chocolates, B chocolates or $A+B$ chocolates to his daughters (He cannot open the boxes). Your task is to determine whether Binod can give chocolates to his three daughters so that each of them can have the same number of chocolates.

Binod is a Dumb guy but famous so go and help him.

###Input:

- First line will contain T, number of testcases. Then the testcases follow.
- Each testcase contains of a single line of input, two integers A, B.

###Output: For each test case if it is possible to give chocolates so that each of the three daughters can have the same number of chocolates, print YES; otherwise, print NO.

CODE:-

```
#include <iostream>
using namespace std;
```

```
int main() {
int t, a, b;
cin>>t;
while(t--) {
   cin>>a>>b;
   if( a%3==0 || b%3==0 || (a+b)%3==0 )
      cout<<"YES\n";
   else
      cout<<"NO\n";
   }
   return 0;
}
```

5. Sankalp recently learned **Fibonacci numbers** and now he is studying different algorithms to find them. After getting bored of reading them, he came with his own new type of numbers. He defined them as follows:

- ***f(0) = a;***
- ***f(1) = b;***
- ***f(n) = f(n-1) ^ f(n-2);*** when $n>1$, where ^ denotes the bitwise xor operation.

You are given three integers **a**,**b** and **n** , calculate ***f(n)***.

CODE:-

```
#include <iostream>
using namespace std;

int main() {
        // your code goes here
        int t;
        cin>>t;
        while(t--)
        {
           long long a,b,n,c = 0;
                cin >> a >> b >> n;
                c = a ^ b;
                if(n%3==0)cout << a;
                else if(n%3==2)cout << c;
                else cout << b;
                cout<<endl;
        }
        return 0;
           }
```