Problem 1

Write a program that takes four integers a, b, c, m as input. And outputs the result as $(a * b * c)$ % m. Here, a, b, c & m all fits in 32-bit integer.

Code 1

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

int main(){
ll a,b,c,m;

cout<<"Enter A B C & M:"<<endl;
cin>>a>>b>>c>>m;

cout<<"\n (A*B*C) % M : ";
cout<<((a%m)*(b%m)*(c%m))%m<<endl;


return 0;
}
```

Problem 2

Write a program that takes 3 integers (b, n, m) as input and gives a single output computing the value $b\ n\ mod\ m$.

Code 2

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

int main(){
    ll a,b,x,n,m;
    vector<int>v;

    cout<<"Enter B N & M:"<<endl;
    cin>>b>>n>>m;
    a=n;

    while(a){
        v.push_back(a%2);
        a/=2;
    }
    a=b%m;
    x=1;

    for(int i=0;i<v.size();i++){
        if(v[i]){
            x=(x*a)%m;
        }
        a=(a*a)%m;
    }

    cout<<"\n (B^N) % M : ";
    cout<<x<<endl;
```

```
    return 0;
}
```

Problem 3

Take a number n as input. Print all the prime numbers less than or equal to n. Here, n > 0.

Code 3

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

bool p[1000003];

void seive(ll n){
    for(ll i=0;i<n+1;i++){
        p[i]=true;
    }

    for(ll i=2;i*i<=n;i++){
        if(p[i]){
            for(ll j=i*i;j<=n;j+=i){
                p[j]=false;
            }
        }
    }

    for(ll i=2;i<=n;i++){
        if(p[i]){
            cout<<" "<<i;
        }
    }
```

```
    cout<<endl;
}

int main(){
    ll a,b,c,n;

    cout<<" Enter N: ";
    cin>>n;

    cout<<"\n The Prime Numbers till N are:
"<<endl;
    seive(n);


    return 0;
}
```

Problem 4

Take two numbers m & n as input. Here n can be as large as 1000 digits long. Print the result $n \ mod \ m$ as output of the program.

Code 4

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

int main(){
    ll a,x,x1,x2,p,i,j,b,c,m;
    map<char,int>mp;
```

```
string n;

mp['0']=0;
mp['1']=1;
mp['2']=2;
mp['2']=3;
mp['4']=4;
mp['5']=5;
mp['6']=6;
mp['7']=7;
mp['8']=8;
mp['9']=9;

cout<<"Enter N & M:"<<endl;
cin>>n;
cin>>m;

x=0;

for(i=0;i<n.size();i++){
    vector<int>v;
    c=n.size()-i-1;

    while(c){
        v.push_back(c%2);
        c/=2;
    }
    x1=1;
    p=10%m;

    for(j=0;j<v.size();j++){

        if(v[j]){
            x1=(x1*p)%m;
        }
        p=(p*p)%m;
    }
    x2=((mp[n[i]]%m)*x1)%m;

    x= (x+x2)%m;
```

```
    }


    cout<<"\n N % M : ";
    cout<<x<<endl;


    return 0;
}
```

 # End #