

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

#define l long

l arr[2] = {0,0};
l a,b,c,d;

void fun(l n, l MOD){
    if(n == 0){
        arr[0] = 0;
        arr[1] = 1;
        return;
    }

    fun((n/2), MOD);
    a = arr[0];
    b = arr[1];
    c = 2 * b - a;
    if(c < 0){
        c += MOD;
    }
    c = (a * c) % MOD;
    d = (a*a + b*b) % MOD;
    if(n % 2 == 0){
        arr[0] = c;
        arr[1] = d;
    }
    else{
        arr[0] = d;
        arr[1] = c + d;
    }
}

int main(){
    int T;
    cin >> T;

    while(T--){
        int n, m;
        cin >> n >> m;
        fun(n, m);
        cout << 2 * arr[0] % m << '\n';
    }
    return 0;
}
```