#include <bits/stdc++.h>

#define loop(i,s,e) for(int i = s;i<=e;i++) //including end point

#define pb(a) push\_back(a)

#define sqr(x) ((x)\*(x))

#define CIN ios\_base::sync\_with\_stdio(0); cin.tie(0);

#define ll long long

#define ull unsigned long long

#define SZ(a) int(a.size())

#define read() freopen("input.txt", "r", stdin)

#define write() freopen("output.txt", "w", stdout)

#define ms(a,b) memset(a, b, sizeof(a))

#define all(v) v.begin(), v.end()

#define PI acos(-1.0)

#define pf printf

#define sfi(a) scanf("%d",&a);

#define sfii(a,b) scanf("%d %d",&a,&b);

#define sfl(a) scanf("%lld",&a);

#define sfll(a,b) scanf("%lld %lld",&a,&b);

#define sful(a) scanf("%llu",&a);

#define sfulul(a,b) scanf("%llu %llu",&a,&b);

#define sful2(a,b) scanf("%llu %llu",&a,&b); // A little different

#define sfc(a) scanf("%c",&a);

#define sfs(a) scanf("%s",a);

#define getl(s) getline(cin,s);

#define mp make\_pair

#define paii pair<int, int>

#define padd pair<dd, dd>

#define pall pair<ll, ll>

#define vi vector<int>

#define vll vector<ll>

#define mii map<int,int>

#define mlli map<ll,int>

#define mib map<int,bool>

#define fs first

#define sc second

#define CASE(t) printf("Case %d: ",++t) // t initialized 0

#define cCASE(t) cout<<"Case "<<++t<<": ";

#define D(v,status) cout<<status<<" "<<v<<endl;

#define INF 1000000000 //10e9

#define EPS 1e-9

#define flc fflush(stdout); //For interactive programs , flush while using pf (that's why \_\_c )

#define CONTEST 1

using namespace std;

//CONTEST MATRIX LIB

#define GB 0

#define dim 4

#define mat vector<vector<int>>

mat GBv;

int idmat[] = //Each row

{

1,0,1,1 ,

1,0,0,0 ,

0,1,0,0 ,

0,0,0,1

};

mat assImat(int arr[]) // assign identity matrix

{

mat X;

int arridx = 0;

vi rows;

if(!rows.empty())

{

rows.clear();

}

loop(r,0,dim-1)

{

loop(c,0,dim-1)

{

rows.pb(arr[arridx]);

arridx++;

}

X.pb(rows);

rows.clear();

}

return X;

}

mat matmul(mat A,mat B,int ra,int ca,int rb,int cb)

{

if(ca!=rb)

{

cout<<"ERR dim"<<endl;

return GBv;

}

mat res;

vi rows;

loop(amr,0,ra-1) //ans matrix row

{

loop(amc,0,rb-1)

{

int rowi = 0;

loop(crc,0,ca-1) //common row column

{

rowi+=A[amr][crc]\*B[crc][amc];

}

rows.pb(rowi);

}

res.pb(rows);

rows.clear();

}

return res;

}

mat expo(mat A, int row,int col,int p)

{

if(p==1)

return A;

else if(p==2)

{

mat res = matmul(A,A,row,col,row,

col);

return res;

}

else if(p%2==0)

{

mat halfp = expo(A,row,col,p/2);

mat res = matmul(halfp,halfp,

row,col,row,col);

return res;

}

else if(p%2==1)

{

mat halfp = expo(A,row,col,p/2);

mat resp = matmul(halfp,halfp,

row,col,row,col);

mat finres = matmul(resp,A,

row,col,row,col);

return finres;

}

}

void showmat(mat A,int row,int col)

{

loop(r,0,row-1)

{

loop(c,0,col-1)

cout<<A[r][c]<<" ";

cout<<endl;

}

}

int main()

{

mat TT = assImat(idmat);

showmat(TT,dim,dim);

mat ans = matmul(TT,TT,dim,dim,dim,dim);

cout<<"----------"<<endl;

showmat(ans,dim,dim);

mat ans2 = expo(TT,dim,dim,2);

cout<<"----------"<<endl;

showmat(ans2,dim,dim);

return 0;

}