Matrix functions:

```
typedef vector <int> Row;
typedef vector <Row> Matrix;
const int Mod = 1e9 + 7;

void add_self(int& x, int y)
{
    if((x += y) >= Mod) x -= Mod;
}

int mul(int x, int y)
{
    return (ll) x * y % Mod;
}

Matrix Zero(int n, int m)
{
    return Matrix(n, Row(m, 0));
}

Matrix Ident(int n)
{
    Matrix Res = Zero(n, n);
    for(int i = 0; i < n; i++)  Res[i][i] = 1;
    return Res;
}

Matrix Multy(const Matrix& A, const Matrix& B)
{
    assert(A[0].size() == B.size());
    Matrix Res = Zero(A.size(), B[0].size());

    for(int i = 0; i < Res.size(); i++)
        for(int j = 0; j < Res[0].size(); j++)
            for(int k = 0; k < B.size(); k++)
                add_self(Res[i][j], mul(A[i][k], B[k][j]));

    return Res;
}

Matrix Power(const Matrix& A, ll k)
{
    if(!k)      return Ident(A.size());
    if(k & 1)   return Multy(A, Power(A, k - 1));
    return Power(Multy(A, A), k / 2);
}
```