#include <bits/stdc++.h>

using namespace std;

int main()

{

int n;

cin >> n;

vector<vector<int>> v(n, vector<int> (n)), path(n, vector<int> (n));

for(int i = 0; i < n; i++)

{

for(int j = 0; j < n; j++)

{

cin >> v[i][j];

}

}

for(int k = 0; k < n; k++)

{

for(int i = 0; i < n; i++)

{

for(int j = 0; j < n; j++)

{

// v[i][j] = min(v[i][j], v[i][k] + v[k][j]);

if(v[i][k] + v[k][j] < v[i][j])

{

path[i][j] = k + 1;

v[i][j] = v[i][k] + v[k][j];

}

}

}

}

cout << "Dist " << endl << endl;

for(auto &i: v){

for(auto &j: i)cout << j << " ";

cout << endl;

}

cout << endl << "Path " << endl << endl;

for(auto &i: path){

for(auto &j: i)cout << j << " ";

cout << endl;

}

cout << endl << "Displaying paths" << endl;

for(int i = 0; i < n; i++)

{

for(int j = 0; j < n; j++)

{

if(v[i][j] != 999)

{

cout << "Intermediate nodes from: " << i + 1 << " " << j + 1<< ": ";

int x = path[i][j];

while(x != 0)

{

cout << x << " ";

x = path[x-1][j];

}

cout << endl;

}

}

}

}



