#include<iostream>

#include<string>

#define max 20

using namespace std;

class graph

{

private:

string data;

graph \*link,\*down,\*start;

string city[10];

int a[10][10];

int n;

public:

void create\_list();

void display\_list();

void create\_matrix();

void display\_matrix();

};

void graph::create\_list()

{

graph \*temp,\*node,\*temp1,\*node1;

temp=new graph;

temp1=new graph;

node=new graph;

node1=new graph;

char ch,ch1;

cout<<"\nEnter the parent node: ";

cin>>node->data;

node->down=NULL;

node->link=NULL;

start=node;

temp=node1=start;

temp1=node;

do

{

node1=new graph;

cout<<"\nEnter adjacent node for: "<<node->data<<"->";

cin>>node1->data;

node1->down=NULL;

node1->link=NULL;

temp1->link=node1;

temp1=node1;

cout<<"\nDo you want to insert more adjacent nodes?(Y/N): ";

cin>>ch;

}while(ch=='y' || ch=='Y');

cout<<"\nDo you want to enter more parent nodes?(Y/N): ";

cin>>ch1;

if(ch1=='y' || ch1=='Y')

{

do

{

node=new graph;

cout<<"\nEnter the parent node: ";

cin>>node->data;

node->down=NULL;

node->link=NULL;

temp->down=node;

temp=node;

temp1=node;

do

{

node1=new graph;

cout<<"\nEnter adjacent node for "<<node->data<<"->";

cin>>node1->data;

node1->down=NULL;

node1->link=NULL;

temp1->link=node1;

temp1=node1;

cout<<"\nDo you want to insert more adjacent nodes?(Y/N): ";

cin>>ch;

}while(ch=='y' || ch=='Y');

cout<<"\nDo you want to enter more parent nodes?(Y/N): ";

cin>>ch1;

}while(ch1=='y' || ch1=='Y');

}

}

void graph::display\_list()

{

graph \*temp,\*temp1;

temp=new graph;

temp1=new graph;

temp=start;

cout<<"\nThe graph is: "<<endl;

while(temp!=NULL)

{

cout<<temp->data<<"->";

temp1=temp->link;

while(temp1!=NULL)

{

cout<<"->"<<temp1->data;

temp1=temp1->link;

}

temp=temp->down;

if(temp!=NULL)

{

cout<<"\n";

}

}

}

void graph::create\_matrix()

{

cout<<"\nEnter number of cities: ";

cin>>n;

cout<<"\nEnter name of cities: ";

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

{

cin>>city[i];

}

cout<<"\nEnter the distances: ";

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

{

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

{

if(i==j)

{

a[i][j]=0;

continue;

}

cout<<"\nEnter the distance between "<<city[i]<<" and "<<city[j]<<": ";

cin>>a[i][j];

a[j][i]=a[i][j];

}

}

}

void graph::display\_matrix()

{

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

{

cout<<"\n";

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

{

cout<<a[i][j]<<"\t";

}

}

}

int main()

{

int ch;

graph g;

do

{

cout<<"\nMenu:";

cout<<"\n1.Create linked list \n2.Display linked list \n3.Create Matrix \n4.Display Matrix";

cout<<"\nEnter your choice: ";

cin>>ch;

switch(ch)

{

case 1:

g.create\_list();

break;

case 2:

g.display\_list();

break;

case 3:

g.create\_matrix();

break;

case 4:

g.display\_matrix();

break;

default:

cout<<"\nInvalid Choice!!";

}

}while(ch!=0);

return 0;

}