Name: Jay Maniyar

Roll No.: 7; Div.: D

G.R. No.: 1710982

Name: Dinesh Lalwani

Roll No.: 1; Div.: D

G.R. No.: 1711065

**HA3** ASSIGNMENT ON FINDING SHORTEST PATH USING AStar algorithm

Code-

#include <iostream>

#include<algorithm>

#include<map>

using namespace std;

int minimumpath[100],con,minimumlength,flag;

void replace(int temp[],int c,int cost)

{

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

{

minimumpath[i]=temp[i];

}

con=c; minimumlength=cost;

}

int visited(int \*v,int co,int n)

{

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

{ if(v[i]==n) return 1;

}

return 0;

}

void leave(int \*\*a,int n,int current,int weight,int \*visited,int co,int target) {

if(target==current&&minimumlength>weight)

{ flag=1;

replace(visited,co,weight);

} else

{

map<int,int> m; int togo[100],c=0;

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

{

if(a[i][0]==current&&visited(visited,co,a[i][1])==0)

{

togo[c]=a[i][1]+a[i][2]; m[togo[c]]=i; c++;

}

}

sort(togo,togo+c);

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

{

if(minimumlength>a[m[togo[i]]][2])

{ co++;

visited[co]=a[m[togo[i]]][1];

leave(a,n,a[m[togo[i]]][1],weight+a[m[togo[i]]][2],visited,co,target); co--;

}

}

}

}

void print()

{

cout<<"\n\n Requiured Astar Path is : "; for(int i=0;i<con;i++) cout<<minimumpath[i]<<" ---> ";

cout<<"Target\n\n And Total cost is : "<<minimumlength<<"\n\n";

}

int main()

{

int \*\*a = new int\*[100]; for(int i=0;i<100;i++) a[i]=new int[3]; int n,temp;

cout<<"Enter the Number of Edges : ";

cin>>n; minimumlength=0;

cout<<"Enter the Properties of the graph : \n";

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

{

cout<<" From : "; cin>>a[i][0]; cout<<" To : "; cin>>a[i][1]; cout<<" Weight : "; cin>>a[i][2]; minimumlength+=a[i][2]; minimumlength+=a[i][1];

}

temp=minimumlength;

cout<<"\n\nGraph Loaded successfully and ready for operations : \n"; int q=1; while(q==1)

{

minimumlength=temp;

int k;

cout<<"Enter the Starting Location : "; cin>>k;

cout<<"Enter the Target location : ";

int target; cin>>target; int co=0; int visited[100]; visited[0]=k; flag=0;

leave(a,n,k,0,visited,co,target);

if(flag==1) print(); else

cout<<"\n\nCannot Reach the Target, Try again \n\n"; cout<<"Enter 1 to repeat the operation : "; cin>>q;

}

return 0;

}

Output

