**Notre Dame University**

**Faculty of Engineering**

 ENG 202 Section C

 Computers and Engineering

 MATLAB Project-Fall 2013

**Optimization for Efficient Industrial Operations**

 Done By ID:

 Presented to DR. Joseph Issa

 Description:

Write what is needed in this project in your own words….

The MATLAB code is as follows:

Code for function”cost” that finds the cost given the coordinates x and y.

function [ c ] = cost(x,y)

c=0.5\*(3\*sqrt((x-1)^2+(y-28)^2)+7\*sqrt((x-7)^2+(y-18)^2)+4\*sqrt((x-8)^2+(y-16)^2)+5\*sqrt((x-17)^2+(y-2)^2)+2\*sqrt((x-22)^2+(y-10)^2)+6\*sqrt((x-27)^2+(y-8)^2));

end

Using the following code we can find the minimum cost as well as the coordinates of the location of the distribution center that minimizes the cost.

for i=1:30

 for j=1:30

 money(i,j)=cost(i,j);

 end

end

[value,k]=min(money);

[minimum\_cost,north\_distance]=min(value);

east\_distance=k(north\_distance);

display('The minimum cost is ');

display(minimum\_cost);

display('The xlocation of the distribution center is ');

display(east\_distance);

display('The ylocation of the distribution center is ');

display(north\_distance);

The mesh plot for the cost versus the coordinates x and y of the location of the distribution center can be obtained using the following code:

x=[1:30];

y=[1:30];

[X,Y]=meshgrid(x,y);

for i=1:30

for j=1:30

z(i,j)=cost(i,j);

end

end

mesh(x,y,z)

The contour plot for the cost versus the coordinates x and y of the location of the distribution center can be obtained in a similar way using the following code:

x=[1:30];

y=[1:30];

[X,Y]=meshgrid(x,y);

for i=1:30

for j=1:30

z(i,j)=cost(i,j);

end

end

contour(x,y,z)

If the distribution center is moved one mile in either direction (due east, due west, due north, or due south), this will result in an increase in the cost calculated using the following code.

xlocation=9;

ylocation=16;

min\_cost=cost(xlocation,ylocation);

cost\_mile\_east=cost(10,16);

cost\_mile\_west=cost(8,16);

cost\_mile\_north=cost(9,17);

cost\_mile\_south=cost(9,15);

disp('The increase in the cost if the distribution center is moved one mile to the east is');

disp(cost\_mile\_east-min\_cost);

disp('The increase in the cost if the distribution center is moved one mile to the west is');

disp(cost\_mile\_west-min\_cost);

disp('The increase in the cost if the distribution center is moved one mile to the north is');

disp(cost\_mile\_north-min\_cost);

disp('The increase in the cost if the distribution center is moved one mile to the south is');

disp(cost\_mile\_south-min\_cost);