OPTIMIZATION ALGORITHM

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Abstract In this paper we present computer and mathematical model for solving the optimal conditions in mining using examples using graph theory.

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1. THE ALGORITHM YEN

Consider costs associated with a w matrix graf and want to get shorter distance from top to any other.

STAGE 1:

D=W

STAGE 2:

I=1;h(k)=0,h(j_0)=1 pt 1<=j<=n,j<>k

STAGE III

Compute min{d[k,j], 1<=j<=n,h(j)=1}

Compute j_0 so h(j_0)=1 and d[k,j0]= min{d[k,j], 1<=j<=n,h(j)=1}

B(j_0)=d[k,j_0],h(j_0)=0

D[k,j]=min{d[k,j],d[k,j0],d[j0,j]}, for all j, 1<=j<=n,

i=i+1

STAGE IV:

If i<n get back to the stage 3 otherwise stop.

Example:

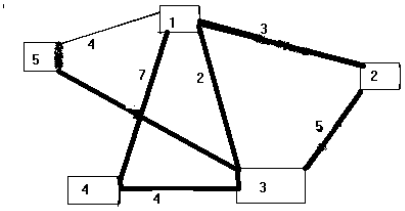

Figure 1

1) write the attached matrix d;

2)i=1,h=(0,1,1,1,1),b(1)=0;

j_0=3,b(3)=2,h=(0,1,0,1,1)

$$D=\begin{pmatrix} \infty & 3 & 2 & 6 & 3 \\ 3 & \infty & 5 & \infty & \infty \\ 2 & 5 & \infty & 4 & 1 \\ 7 & \infty & 4 & \infty & \infty \\ 4 & 1 & \infty & \infty & \infty \end{pmatrix}$$

i=2

3)i<5 return to stage 3

j_0=2 b(2)=3,h=(0 0 0 1 1)

{THE ALGORITHM YEN: to determine the shortest distance from a to any other. If no connection is 10000 (a [i, 1] = 0 and is no longer required, for i=1...n)

ex:n=5

3 2 7 4

3 5 10000 1000

2 5 4 1

7 10000 4 10000

4 10000 1 10000

from the knot 1

=> minimum distances

1----->2 e 3.....

}

```
var d,w:array[1..20,1..20] of real;
k,i,j,n,L,j0:byte;
v,b:array[1..20] of real;
min:real;
function minim(x,y:real):real;
begin
if x<y then minim:=x else minim :=y;
end;
begin
writeln('n=');readln(n);
for i:=1 to n do
for j:=1 to n do
if i<>j then
begin
write('w[',i,'  ',j,']=');
readln(w[i,j]);
d[i,j]:=w[i,j];
end
else
begin
w[i,j]:=10000;
d[i,j]:=10000;
end;
writeln('varful dorit ');readln(k);
for i:=1 to n do v[i]:=1;
v[k]:=0;b[k]:=0;
for i:=1 to n do
          begin
min:=10000;
for j:=1 to n do
if (v[j]=1) and (d[k,j]<min) then   begin
j0:=j;
min:=d[k,j];
            end;
for j:=1 to n do
d[k,j]:=minim(d[k,j],d[k,j0]+d[j0,j]);
v[j0]:=0;
b[j0]:=d[k,j0];
end;
writeln(' minimum distances from the ',k, ' the other peaks ' );
for i:=1 to n do
begin
write(k,'------>',i);
writeln(':',b[i]);
end;
readln;
end.
```

Suppose we have a graph in which all edges have length equal to the number of vertices is n and the edges of m and the connections between knowing that there are edges to determine minimum length between two nodes that you read from the keyboard

STAGE I:

- start from the end of his neighbours with marches 1-for each next door neighbors with their marches not marches (meaning it marks each node with dad)-as do all

STAGE II

- If you do I mark and then marking of node x is the minimum distance when I get to it ex:n=4

m=4

```
var n,m,i,j,nc,nd,nd,nuc:integer;
a:array[1..30,1..30] of 0..1;
costurile:array[1..30] of integer;
procedure parcurginlatimegraful(x:integer);
var p,u,virf,j,costuldelaunnodlaaltul:integer;
c:array[1..30] of integer;
gata:boolean;
begin
p:=1;u:=1;
costurile[x]:=-
1;costuldelaunnodlaaltul:=0;c[p]:=x;
gata:=false;
while (p<=u) and not gata do begin
virf:=c[p];
costuldelaunnodlaaltul:=costuldelaunnodlaal
tul+1;
for j:=1 to n do
if (a[virf,j]=1) and (costurile[j]=0) then
begin
u:=u+1;c[u]:=j;
costurile[j]:=costuldelaunnodlaaltul;
if j=nd then begin
gata:=true;writeln(' lantul are lungimea
minima ',costuldelaunnodlaaltul);
end;
end;
p:=p+1;
end;end;
begin
write(' dati numarul de noduri n=');readln(n);
write(' dati numarul de muchii
m=');readln(m);
writeln(' muchiile ');
for i:=1 to m do
begin
writeln('primul nod al muchiei ',i);readln(nc);
writeln('al doile nod al muchiei
',i);readln(nd);
a[nc,nd]:=1;  a[nd,nc]:=1;
end;
write('nodul de plecare ');readln(nd);
 write('nodul de sosire ');readln(nuc);
 parcurginlatimegraful(nuc);
 if costurile[nd]=0 then writeln(' nu este lant
intre ',nd, ' si nodul ',nuc);
 readln;
 end.
```

[1] The ALGORITHM UNGAR

Stage I

Considering n workers that produce more waste from cars. It requires an optimal distribution of cars. A graph is the set of its bipartisan if ends into two disjoint subset X 1 and X 2 such that whatever the arc (ai, aj), representatives of X 1, X 2 of aj. By coupling into a graphs we understand a lot of adjacent arches. Through the support of matrix associate a network data we understand a lot of rows and columns that contain all the zeroes of the matrix. The cost matrix labeled a. phase I-the matrix minorantul is subtracted each lines from all

elements of the line concerned. From the left it does the same with minorantii columns. Note the resulting Ά.

Stage I I

-stick a zero on line with most zeroes and all other zeroes cut placed on line and column framed zeros-repeat the previous operation, of zeros included making abstraction and crossed out, pan the matrix zeros Ά needles have been framed or barred. If at the end of the stage I we obtained exactly n zeros framed, take out the algorithm, otherwise go to step I I I.

Stage I I I

-mark lines that do not contain zeros and columns that have highlighted the zeros struck through on the lines marked lines with zero-marking framed columns marked,..... Operation tracer can go.

Stage I V

In the Ά, cut all lines marked columns and unmarked. -subtraction of elements netaiate elements minorantul netaiate, il gather elements double cut, leaving unchanged the remaining elements.

Stage V

In the array obtained from the operations repeat I until we obtain the maximum coupling with minimum total cost.

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