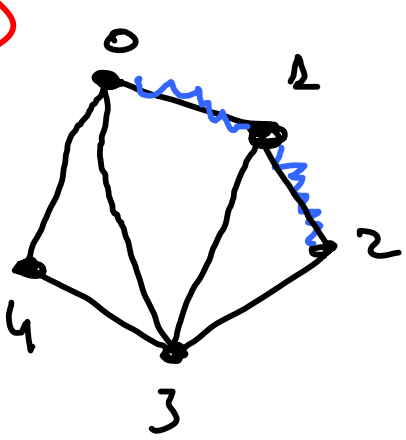
03.05.2023

Örnek



$A(G) =$

	0	1	2	3	4
0	0	1	0	1	1
1	1	0	1	1	0
2	0	1	0	1	0
3	1	1	1	0	1
4	1	0	0	1	0

Algoritma:

```
for i=1 to n
 for j=1 to n
  if A[i,j] ≠ 0 then D[i,j]=A[i,j]
                else D[i,j]=∞
 repeat
repeat
```

Başlık matrisi:

$D(G) =$

	0	1	2	3	4
0	∞	1	∞	1	1
1	1	∞	1	1	∞
2	∞	1	∞	1	∞
3	1	1	1	∞	1
4	1	∞	∞	1	∞

$D[0,2] = 2$

```
for k=1 to n
 for i=1 to n
  for j=1 to n
   if (D[i,k]+D[k,j] < D[i,j]) then D[i,j]=D[i,k]+D[k,j]
  repeat
 repeat
repeat
```

$n \times n \times 1 = n^3$

$\Theta(n^3)$

i=0 j=2 k=1 olsun.

$if\left(\underbrace{D[0,1]}_{1} + \underbrace{D[1,2]}_{1} < \underbrace{D[0,2]}_{\infty}\right)$

$2 < \infty$

$D[0,2] = 1+1 = 2$

$i=0$ $j=3$

$\boxed{D[0,3]=1}$ $k=1$ olsun

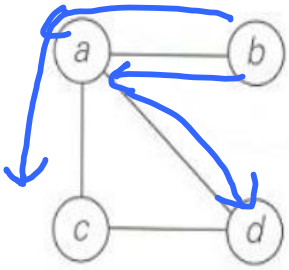
güncelleme oldu!!

$$\text{if}\left(\underbrace{D[0,1]}_{1}+\underbrace{D[1,3]}_{1} \overset{?}{<} \underbrace{D[0,3]}_{1}\right)$$

$2<1$ ✗ güncelleme yok!!

İçgen eşitsizliği yardımıyla tüm tepe çiftlerini maliz ediyor.

Yolların Sayılması



$$A = \begin{array}{c} \\ a \\ b \\ c \\ d \end{array} \begin{array}{c} \begin{array}{cccc} a & b & c & d \end{array} \\ \begin{bmatrix} 0 & 1 & 1 & 1 \\ 1 & 0 & 0 & 0 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 \end{bmatrix} \end{array} \qquad A^2 = \begin{array}{c} \\ a \\ b \\ c \\ d \end{array} \begin{array}{c} \begin{array}{cccc} a & b & c & d \end{array} \\ \begin{bmatrix} 3 & 0 & 1 & 1 \\ 0 & 1 & \boxed{1} & 1 \\ 1 & 1 & 2 & 1 \\ 1 & 1 & 1 & 2 \end{bmatrix} \end{array}$$

Bir graf Grafın komşuluk matrisi A A^2

$$D = \begin{bmatrix} 0 & 1 & 1 & 1 \\ 1 & 0 & \boxed{0} & \boxed{0} \\ 1 & \boxed{0} & 0 & 1 \\ 1 & \boxed{0} & 1 & 0 \end{bmatrix}$$

$$D = \begin{bmatrix} 0 & 1 & 1 & 1 \\ 1 & 0 & 2 & 2 \\ 1 & 2 & 0 & 1 \\ 1 & 2 & 1 & 0 \end{bmatrix}$$

Son halini !!

Farzedelimki:

$$D = \begin{bmatrix} 0 & 1 & 1 & 1 \\ 1 & 0 & 2 & 2 \\ 1 & 2 & 0 & 0 \\ 1 & 2 & 0 & 0 \end{bmatrix}$$

A^3 kontrol edilmeli.

A^k → grafın çapına kadar kuvvet olmır.

Son aldığımız kuvvet grafın çapı olmuyor.

Örnekte grafın çapı 2'dir.

$$\mathrm{diam}(G) = 2$$

Eccentricity

```
for (i=0;i<n;i++)
        {
        for (j=0;j<n;j++)
         {
          if (j==0)  enb=d[i][j];
          if ( d[i][j] >= enb )  enb=d[i][j];
         }
         e[i][0]=enb;
```

```
printf ("\n");
printf  ("Tum tepelerin eccenricity degerleri\n");


for (i=0;i<n;i++)
        {
        for (j=0;j<1;j++)
         {
          printf ("%d---> %d",i+1, e[i][j]);

}printf ("\n");}
```

Cop

```
for (i=0 ; i<n ; i++)
{ if (i=0> enb = e[i][0] ;
  if (e[i][0] >enb) enb =e[i][0];
  }

printf ('grafin cop = %d', enb);

for (i=0 ; i<n ; i++)
{ if (e[i][0] ==enb) printf ('%d kyı tepeler',
                                e[i][0]);
}
```

yerlaop

```
for (i=0 ; i<n ; i++)
{ if (i=0) enk = e[i][0] ;
  if (e[i][0] < enk) enk=e[i][0];
  }

  printf ('grafin yerlaop = %d', enk );
```

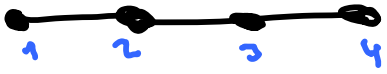
```
for (i=0 ; i<n ; i++)
{ if (e[i][0] == enk) printf ('%d merkez tepedor',
                                e[i][0]);
}
```

Ödev: P_n grafının çapı ve yarıçapı nedir? (n tepeli)

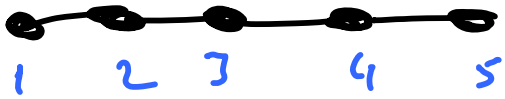
eccentricity

$e(1)=3$
$e(2)=2$
$e(3)=2$
$e(4)=3$

$diam(P_4)=3$
$r(P_4)=2$



P_4



P_5

$e(1)=e(5)=4$
$e(2)=e(4)=3$
$e(3)=2$

$diam(P_5)=4$
$r(P_5)=2$

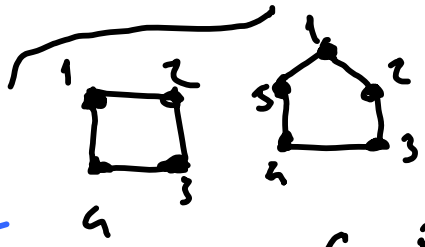
$diam(P_n)=?$ $r(P_n)=?$

$diam(P_n)=n-1$

$r(P_n)=\left\lfloor \frac{n}{2} \right\rfloor$ → alta yuvarlıyor.

$\left\lfloor \frac{5}{2} \right\rfloor=\lfloor 2.5 \rfloor=2$

$\left\lfloor \frac{4}{2} \right\rfloor=\lfloor 2 \rfloor=2$ //



Çalışma Soruları:

C_n için eccentricity aynıdır.
$diam(C_n)=r(C_n)=?$ $\left\lfloor \frac{n}{2} \right\rfloor$

1) $diam(C_n)?$ $r(C_n)=?$
2) $diam(K_n)?$ $r(K_n)=?$
3) $diam(K_{1,n})?$ $r(K_{1,n})=?$
4) $diam(W_{2,n})?$ $r(W_{1,n})=?$