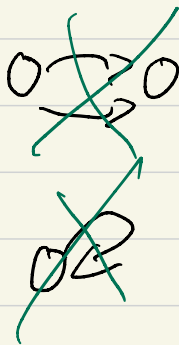
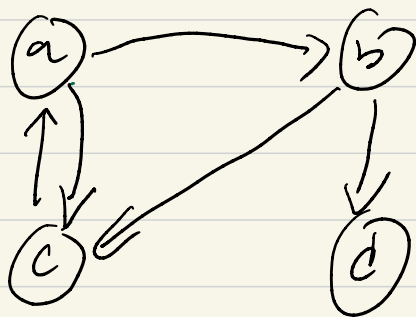


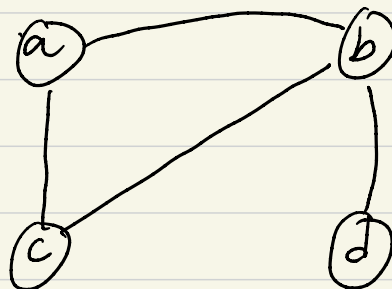
10.01 Elem: Gráfok $G=(V,E)$ $E \subseteq V \times V \setminus \{(u,u) | u \in V\}$

irított



Grafikus
repr.

iratlan



$$(u,v) \neq (v,u)$$

$$(u,v) = (v,u)$$

$a \rightarrow b; c.$

$b \rightarrow a; d.$

$c \rightarrow a.$

$[d.]$

szöveges
repr.

$a - b; c,$

$b - c; d$

$\begin{bmatrix} c. \\ d. \end{bmatrix}$

Repr: $V = \{v_1, \dots, v_n\}$

Stom. St. d. g. g. i. m. t. x. - Adjacency m. t. x. repr. $A[1: \text{bit}[n, n]]$
 (cs. u. cs. m. t. x.) $A[i, j] = \begin{cases} 1 & \Leftrightarrow (v_i, v_j) \in E \\ 0 & \Leftrightarrow (v_i, v_j) \notin E \end{cases}$ bit = {0, 1}

A

	a	b	c	d
1 = a	0	1	1	0
2 = b	0	0	1	1
3 = c	1	0	0	0
4 = d	0	0	0	0

ir. ott floató

a_{ij}

A

	a	b	c	d
a	0	1	1	0
b	1	0	1	1
c	1	1	0	0
d	0	1	0	0

ir. (nn)

$a_{ij} = a_{ji}$

$S(n) = n^2 \text{ bit}$
 $S(n) \in \Theta(n^2)$

sort. Δ m. t. x.

$C = \langle a_{21}, a_{31}, a_{32}, a_{41}, a_{42}, a_{43}, \dots, a_{n1}, a_{n2}, \dots, a_{n(n-1)} \rangle$

$C = \text{bit} \left[\frac{n(n-1)}{2} \right]$ $S(n) = 1 + 2 + 3 + \dots + (n-1) = \frac{n(n-1)}{2}$
 $S(n) \in \Theta(n^2)$

A[1:bit][n, n] (abstract matrix)

$$A[i, j] = \begin{cases} C\left[\frac{(i-1)(i-2)}{2} + (j-1)\right] & \underline{\text{for}} \ i > j \\ 0 & \underline{\text{for}} \ i = j \\ C\left[\frac{(j-1)(j-2)}{2} + (i-1)\right] & \underline{\text{for}} \ i < j \end{cases}$$

a_{21}

a_{31}, a_{32}

\vdots

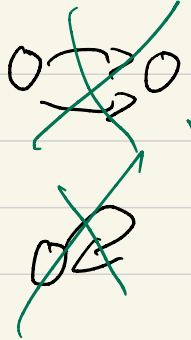
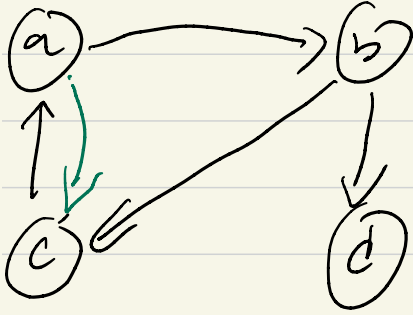
$a_{(i-1)1} \dots a_{(i-1)(j-2)}$

$a_{i1} \dots a_{i(j-1)} (a_{ij}) :$

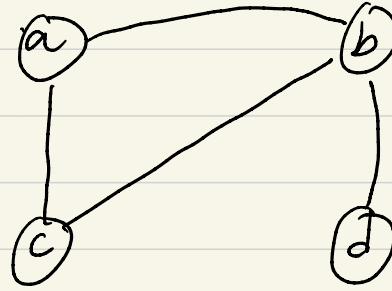
a_{ij} \leftarrow 1st H :

$$1 + 2 + \dots + (i-2) + 0 - 1 = \frac{(i-1)(i-2)}{2} + (j-1) \text{ elem van.}$$

irrott

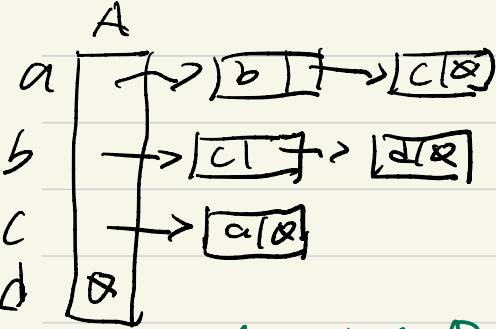


irran



Adjacency list repr. (Szomszédossági listás)

A/1: Edge * [w]

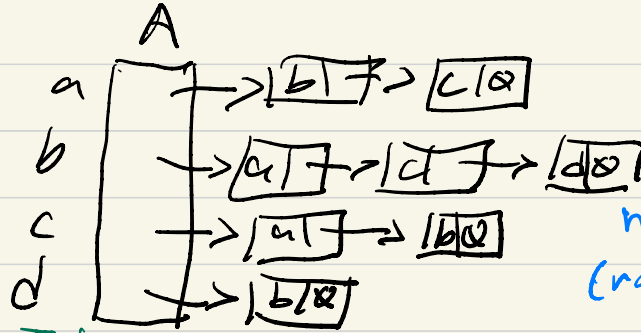


a=1
b=2
c=3
d=4

$S(n, m) \in \Theta(n + m)$

n db pontok

m db listaelem



Társlás:

n db pontok

2 m db listaelem

$S(n, m) \in \Theta(n + m)$

$m \in \Theta(n^2) \parallel$

$\Theta(n^2)$

(sűrű gr.)

$m \in \Theta(n) \parallel$
(ritka gr.)

Edge
+ v: $N_+ / v \in L_n$
+ next: Edge*

$A[1]: \text{Edge}^*[n]$

$E \approx n$ tipikus



Távigeány öh.

Geom sz. listaig: $S(n, m) \in \Theta(n+m)$ jobb

Geom sz. mfx-os: $S(n) \in \Theta(n^2)$ jobb, ha sűrűn
száfv kicsi

{ ha ritkán,
nagy méretű
a gráf

ABSTRACT GRAFABRAZOLA'S

 \mathcal{E} $+ u, v : \mathcal{V}$ \mathcal{G} $+ V : \mathcal{V}\{\}$ $+ E : \mathcal{E}\{\} \ // \ E \subseteq V \times V \setminus \{(u, u) : u \in V\} \ // \text{ edges}$ $+ A : V \rightarrow 2^V \ // \ A(u) = \{v \in V \mid (u, v) \in E\}$ $\ // \ A(u) = \text{the adjacent vertices of vertex } u.$