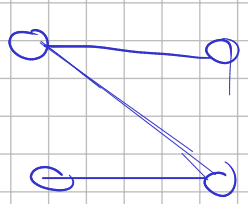
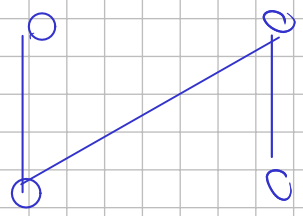
Grafos complementarios.

Grafos simples: No dirigidos, sin ciclos ni aristas multiples
Los complementarios se definen a partir del grafo Kn

G $\quad$ $\overline{G}$





$G \cup \overline{G} = K_n$

$K_n = \{n-1, n-1, n-1, \ldots, n-1\}$

$G = \{d_1, d_2, d_3, \ldots, d_n\}$

$\overline{G} = \{n-1-d_1, n-1-d_2, \ldots, n-1-d_n\}$

$\overline{W_n}$

$K_{n+1} = \{n, n, \ldots, n\}$

$W_n = \{3, \underbrace{3, \ldots 3}_{n \text{ veces}}, n\}$

$\overline{W_n} = \{n-3, n-3, \ldots n-3, 0\}$

$0 \rightarrow$ centro

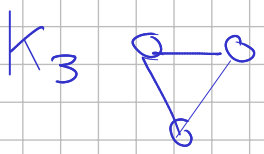
$2e = n(n-3) \qquad e = \frac{n(n-3)}{2}$

Representación de grafos

- Matrices de adyacencia

vertices vs vertices

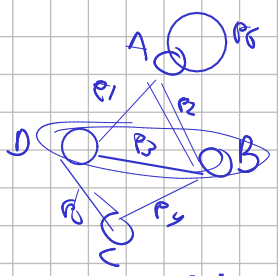
$n \times n$



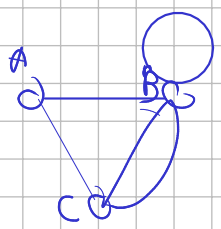
	A	B	C
A	0	1	1
B	1	0	1
C	1	1	0

- Matrices de incidencia

Vertices o aristas

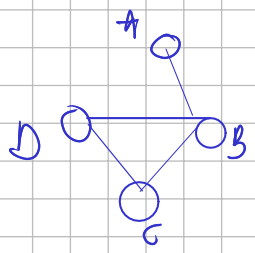


	e1	e2	e3	e4	e5	e6
A	1	1				2
B		1	1	1		
C				1	1	
D	1		1		1	

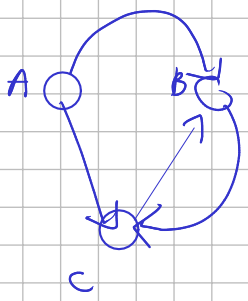


	A	B	C
A	0	1	1
B	1	1	2
C	1	2	0

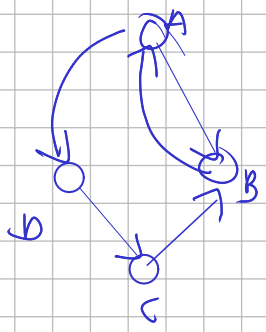
- Listas de aristas



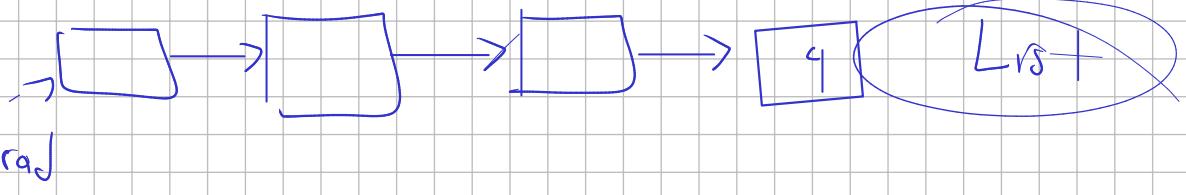
{{A, B}, {B, C}, {B, D}
{D, C}}

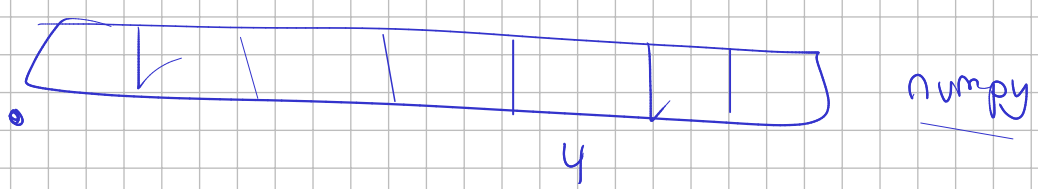


	A	B	C
A	0	1	1
B	0	0	1
C	0	1	0



{(A, B), (B, A), (C, B)
(D, C) (A, D)}

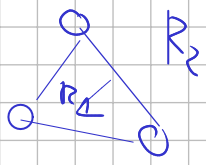


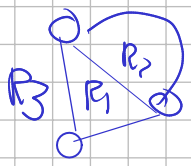


Grafos Planos

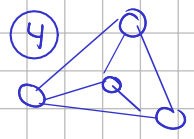
1) $3r \leq 2e$

2) $e \leq 3v - 6$

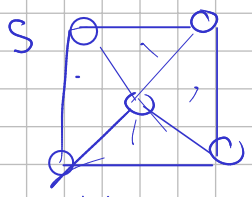




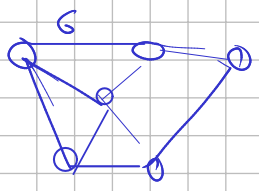
W_n



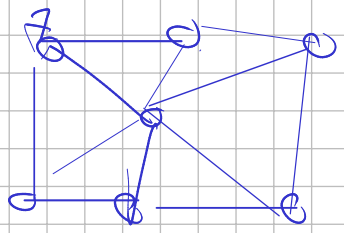
W_3



W_4



W_5



$r = n + 1$ $\quad V = n + 1$

$e = 2n$

$3r \leq 2e$

$3(n+1) \leq 4n$

$3n + 3 \leq 4n$ $\quad \boxed{3 \leq 4}$ ✓

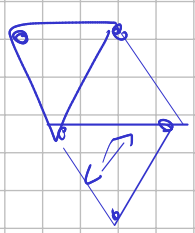
$e \leq 3v - 6$

$2n \leq 3(n+1) - 6$

~~$2n \leq 3n + 3 - 6$~~

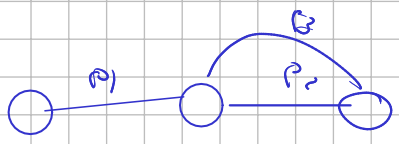
~~$2n \leq 3n - 3$~~

~~$2 \leq 3$~~



Conectividad

Camino



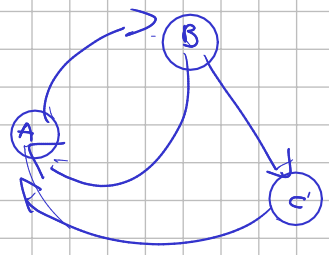
P1, P2, P3

P1, P1, P1, P2, P3

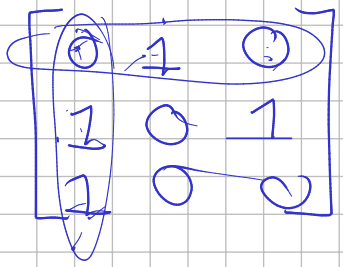
Camino simple: Es un camino que no permite repetir aristas

Circuito: Es un camino que empieza y termina en el mismo VERTICE

Circuito simple: Es un camino que empieza y termina en el mismo VERTICE y NO permite repetir aristas



M_R

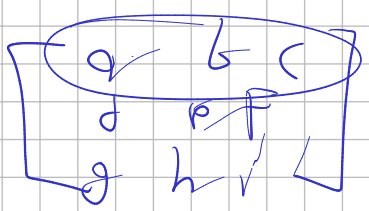


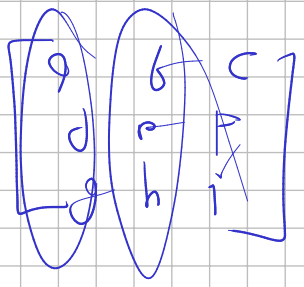
$M_R^2 =$

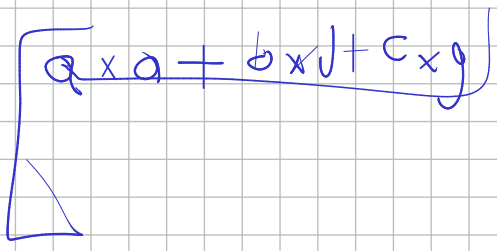
[[1 0 1]
[1 1 0]
[0 1 0]]

A — B
B — A
A — B

[[1 1 0]
[1 1 1]
[1 0 1]]

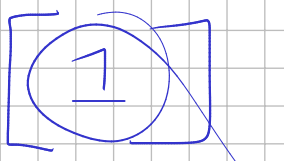




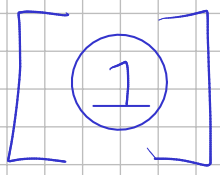


$M_R^{\infty} = M_R \vee M_R^2 \vee M_R^3 \vee \dots \vee M_R^n$

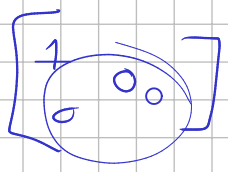
$n \times n$ $O(n^3)$



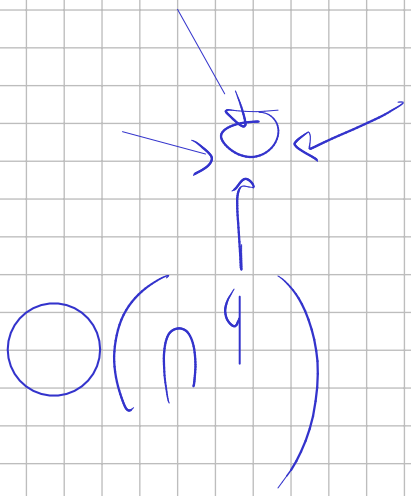
No dígrafo



Fecho de Conexo



Dígrafo Conexo



Algoritmo de Warshall

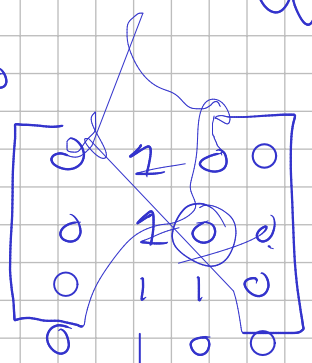
MR $O(n^3)$

$W_0 = M_R$

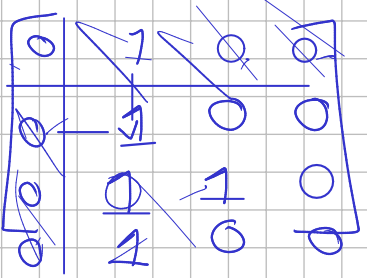
$W_{ij}^k = W_{ij}^{k-1} \vee (W_{kj}^{k-1} \wedge W_{ik}^{k-1})$

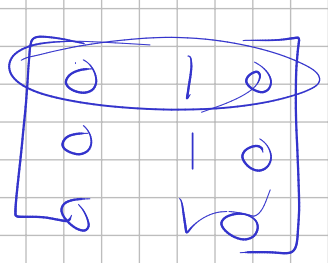
$W_{23}^1 = W_{23}^0 \vee (W_{13}^0 \wedge W_{21}^0)$

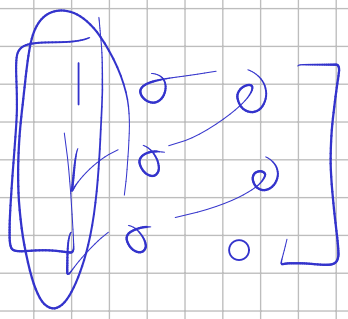
W^0

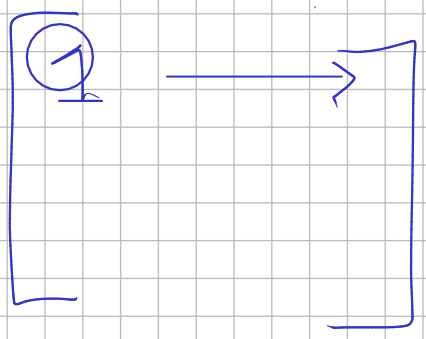


W^1









$$\sigma(0,0) \times H(0,0) +$$
$$\sigma(0,1) \times H(1,0) +$$
$$\sigma(0,2) \times H(2,0)$$