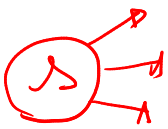
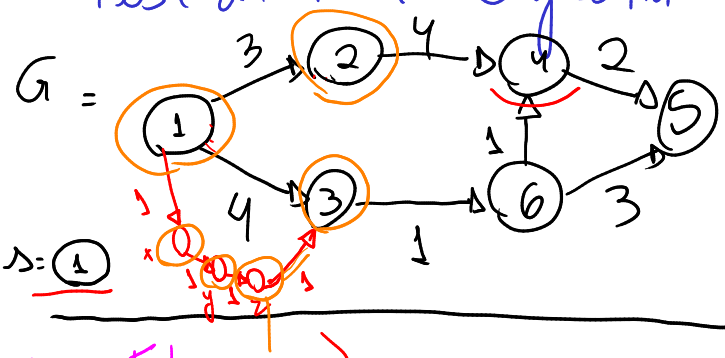
5.3 Dijkstra

→ Caminho mínimo de fonte única para um grafo $G = (V, E, w)$, tal que $w: E \to \mathbb{R}^+_*$;

→ Não funciona com pesos negativos.



Teste de Mesa Dijkstra



u = 1 2 3 6 4 5

N(u) = 1 4

	D	A	C
1	0	n	F T
2	~~3~~	~~1~~	F T
3	~~4~~	~~1~~	F T
4	~~6~~ 3	~~6~~	F T
5	~~8~~	~~6~~	F T
6	~~5~~	~~3~~	F T

① : custo 0; ①

② : custo 3 : ① → ②

③ : custo 4 : ① → ③

④ : custo 6 : ① → ③ → ⑥ → ④

⑤ : custo 8 : ① → ③ → ⑥ → ⑤

⑥ : custo 5 : ① → ③ → ⑥

Heap Fibonacci :)

Extract-min - $O(\lg n)$

Decrease-key - $O(1)$ — comp. amortizada

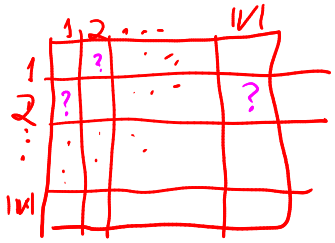
$2m \cdot DK + nEM$

$2m \cdot O(1) + n\,O(\lg n) \in O(n \lg n + m)$

5.4 Floyd-Warshall

→ Caminhos mínimos p/ todas fontes e destinos de um grafo $G = (V, E, w)$.

→ Não opera sobre ciclos negativos.



→ Alg 12 : descobrir as dist. mínimas

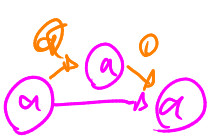
Alg 13 : + os caminhos mínimos

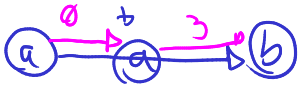
$D^{(1)}$

	a	b	c
a	0	3	
b			
c			

$D^{(0)} =$

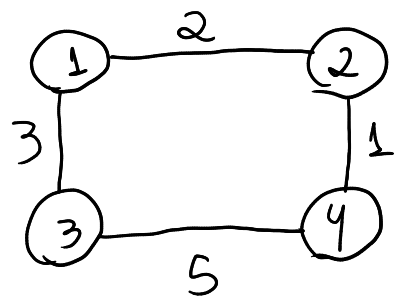
	a	b	c
a	0	3	∞
b	∞	0	2
c	∞	∞	0





Teste de Mesa:

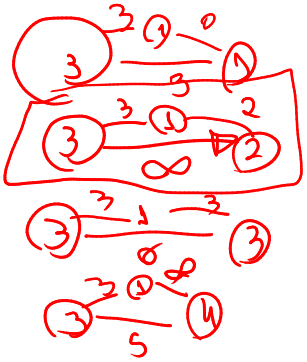
$G =$

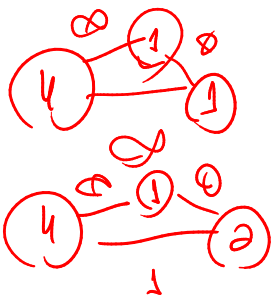


$D^{(0)} =$

	1	2	3	4
1	0	2	3	∞
2	2	0	∞	1
3	3	∞	0	5
4	∞	1	5	0

$w(a)$





$k = 1 \quad D^{(1)} =$

	1	2	3	4
1	0	2	3	∞
2	2	0	5	1
3	3	5	0	5
4	∞	1	5	0

$k = 2 \quad D^{(1)}$

$\vdots$

$D^{(n)}$

Continuaremos o teste na próxima quinta!