Hashing expected number of probes for a successful search using quadratic or double hashing

$$-\frac{1}{\lambda}\log_e(1-\lambda)$$

$$\Downarrow$$

$$\frac{1}{\lambda}\log_e\left(\frac{1}{1-\lambda}\right)$$

$$\frac{1}{1-\lambda}$$

Floyd's Algorithm (1956)

→ All paths shortest path

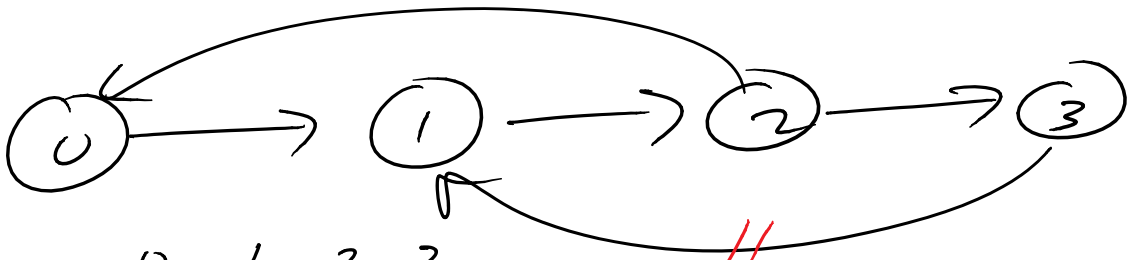
Warshall's Algorithm (1952)

↳ Transitive Closure

Transitive Closure

Given a boolean adjacency matrix A

```
for (int i = 0; i < |V|; i++)
    for (int j = 0; j < |V|; j++)
        for (int k = 0; k < |V|; k++)
            A[i][j] = A[i][j] ||
                (A[i][k] && A[k][j])
```



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

K=0

$i \to j$

$i \xrightarrow{1} j$

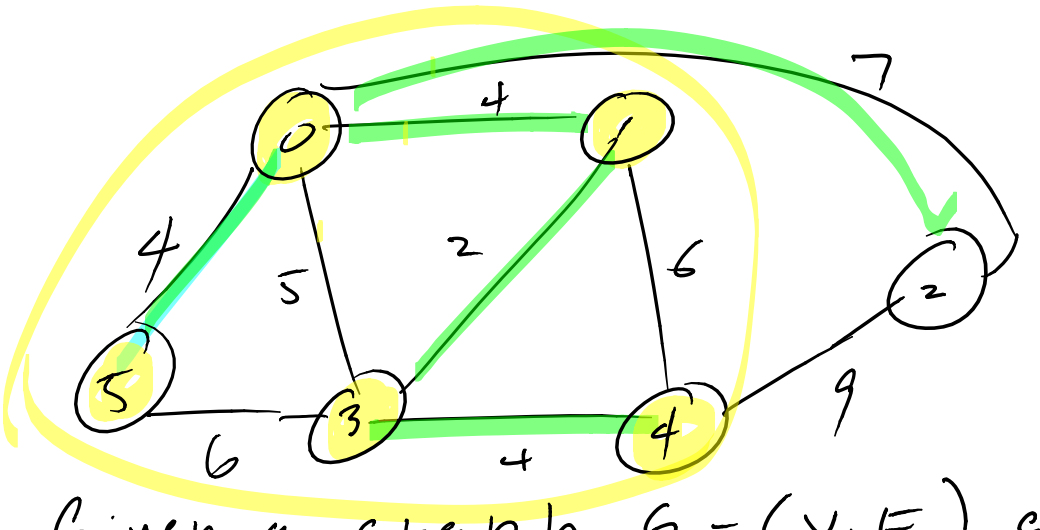
$i \xrightarrow{*} j$

Reachability Matrix

Reachability Matrix

Undirected Graphs $G=(V,E)$

(0,1) or (1,0) Same edge



Given a graph $G=(V,E)$ a spanning tree is set of edges $E_s \subseteq E$ such that all Vertices in V are represented in E_s

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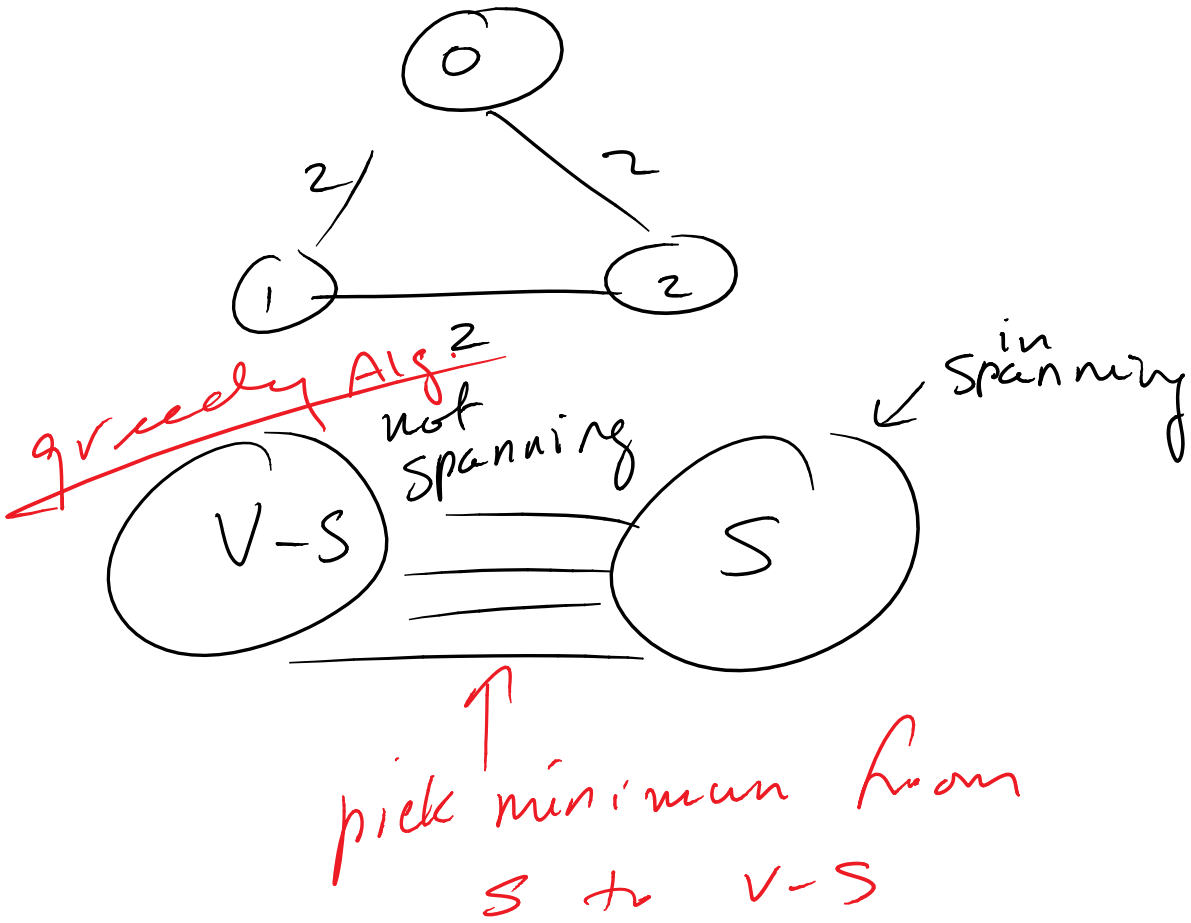
A minimum cost spanning tree. (may not be unique)


0
2
2
1
2
greedy Alg.
not spanning
in spanning
V-S
S
pick minimum from S to V-S