

CS2 101

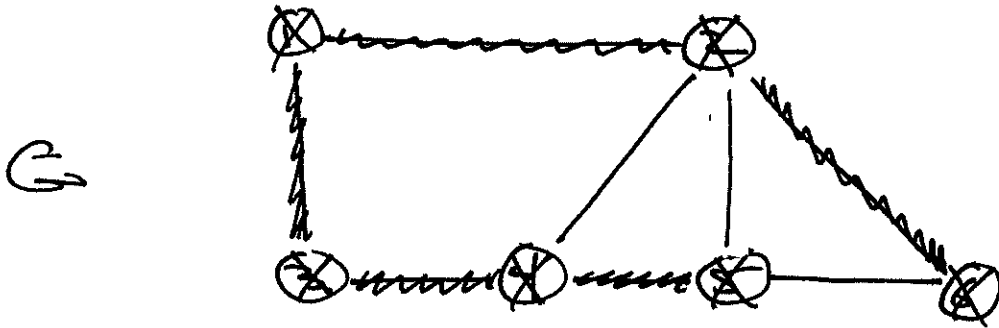
10-9-25

1

BFS examples

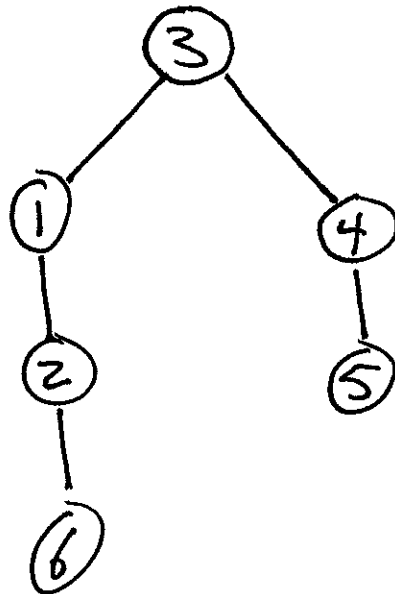
Ex. $S=3$

Par: ext.
1 day to
Monday



Q: 3 1 4 7 5 6

BFS Tree:



dist

0

1

2

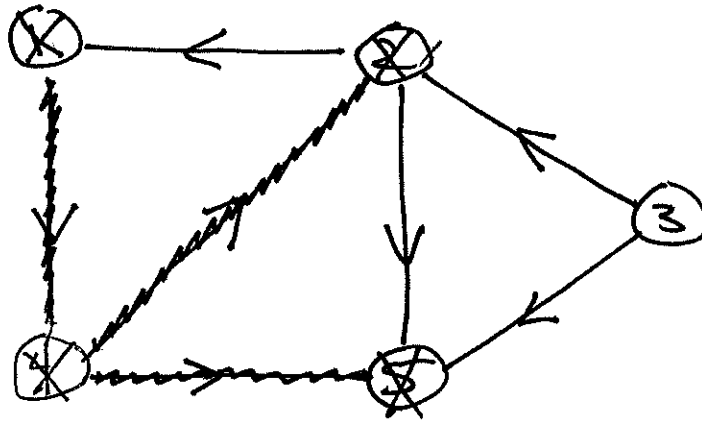
3

7

R = 1

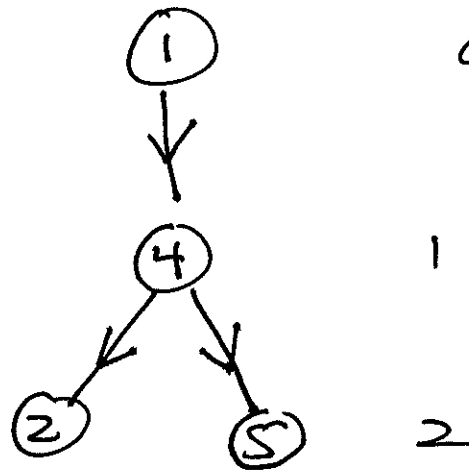
2

III x



Q: X ≠ Z ≠

BFS Tree:



dist

0

1

2

	adj	color	dist	Parent
1	4	b	0	∅
2	1 5	b	2	4
3	2 5	w	∞	∅
4	2 5	b	1	1
5		b	2	4

(BFS Tree)

13

Predecessor Subgraph:

$$T = (V_p, E_p)$$

$$V_p = \{x \in V(G) \mid P[x] \neq \text{nil}\} \cup \{s\}$$

and

$$E_p = \{ \underbrace{(P[x], x)} \mid P[x] \neq \text{nil} \}$$

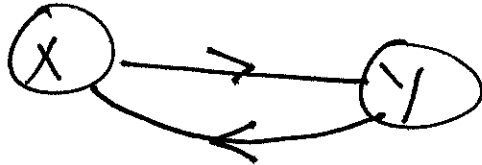
ordered pair for digraph

unordered pair for graph

How to find shortest paths?



$$\begin{array}{l}
 x : y \\
 \vdots \\
 y : x
 \end{array}
 \left. \vphantom{\begin{array}{l} x : y \\ \vdots \\ y : x \end{array}} \right\} \begin{array}{l} +1 \\ \text{NUM} \\ \text{Edges} \end{array}$$



$$\begin{array}{l}
 x : y \\
 \vdots \\
 y : x
 \end{array}
 \left. \vphantom{\begin{array}{l} x : y \\ \vdots \\ y : x \end{array}} \right\} \begin{array}{l} +2 \\ \text{NUM} \\ \text{Arcs} \end{array}$$