

ALG - 13/12/23 - BFS

$$\forall v \in V \quad \text{col}(v) = \begin{cases} W, G, B \end{cases} \quad \pi(v) = \text{prev.} \quad d(v) = |(s, v)|$$
$$\quad \quad \quad = W \quad \quad \quad = \text{NIL} \quad \quad \quad = \infty$$

$$s \in V \quad d(s) = 0$$

$$\text{Adj}(v) = \text{LISTA Adj}$$

$$Q \text{ como FIFO} = \emptyset$$

$$t = O(|V| + |E|)$$

ENQ(s)

WHILE $Q \neq \emptyset$

$v = \text{HEAD } Q$ (POP)

FOR EACH $w \in \text{Adj}(v)$

IF $\text{col}(w) = W$

$\text{col}(w) = G$

ENQ(w)

$d(w) = d(v) + 1$

$\pi(w) = v$

$\text{col}(v) = B$

BFTREE

$$\text{BFS}(G, s) \rightarrow (V_\pi, E_\pi) \quad V_\pi \subseteq V \quad E_\pi \subseteq E$$

$$V_\pi = \{v \in V \mid \text{col}(v) = B\} = \{v \in V \mid d(v) \neq \infty\} = \{v \in V \mid \pi(v) \neq \text{NIL}\}$$

$$E_\pi = \{(\pi(v), v) \mid v \in V - \{s\}\}$$