

SPEEDING UP DIJKSTRA

Initialize() $\leftarrow d[s] = 0$ $d[u \neq s] = \infty$

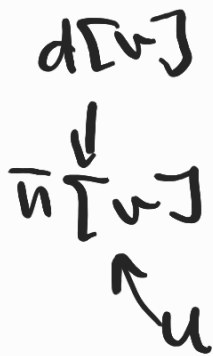
$Q \leftarrow V[G]$

while $Q \neq \emptyset$ (stop if $u = t$)

do $u \leftarrow \text{EXTRACT-MIN}(Q)$

for each vertex $v \in \text{Adj}[u]$

do RELAX(u, v, w)



Directional-Search

Alternate forward search from s

backward search from t

(following edges backward)

$d_f[u]$: distance for forward search

$d_b[u]$: distance for backward search

Priority Queues : Q_f : forward

Q_b : backward

Q: what is the termination condition?

Some vertex u has been processed both in the forward search & backward search.

Deleted from both Q_f & Q_b .

Q: How do we find the shortest path from s to t ?

Claim: If w was processed first from both Q_f, Q_b then find shortest-path using π_f from s to w

find s - p using π_b from w to t (backwards)

