# SPEEDING UP DIJSKSTRA

Initialize() ← d[s] = 0 d[u ≠ s] = ∞

Q ← V[G]

while Q ≠ ∅ (stop if u = t)

do u ← EXTRACT-MIN(Q)

for each vertex v ∈ Adj[u]

do RELAX(u, v, w)


## Directional-Search

Alternate forward search from s
backward search from t
(following edges backward)

df[u]: distance for forward search

db[u]: distance for backward search

Priority Queues : Qf : forward
Qb : 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 $\pi_f$ from $s$ to $w$
find $s$-$p$ using $\pi_b$ from $t$ to $w$
(backwards)