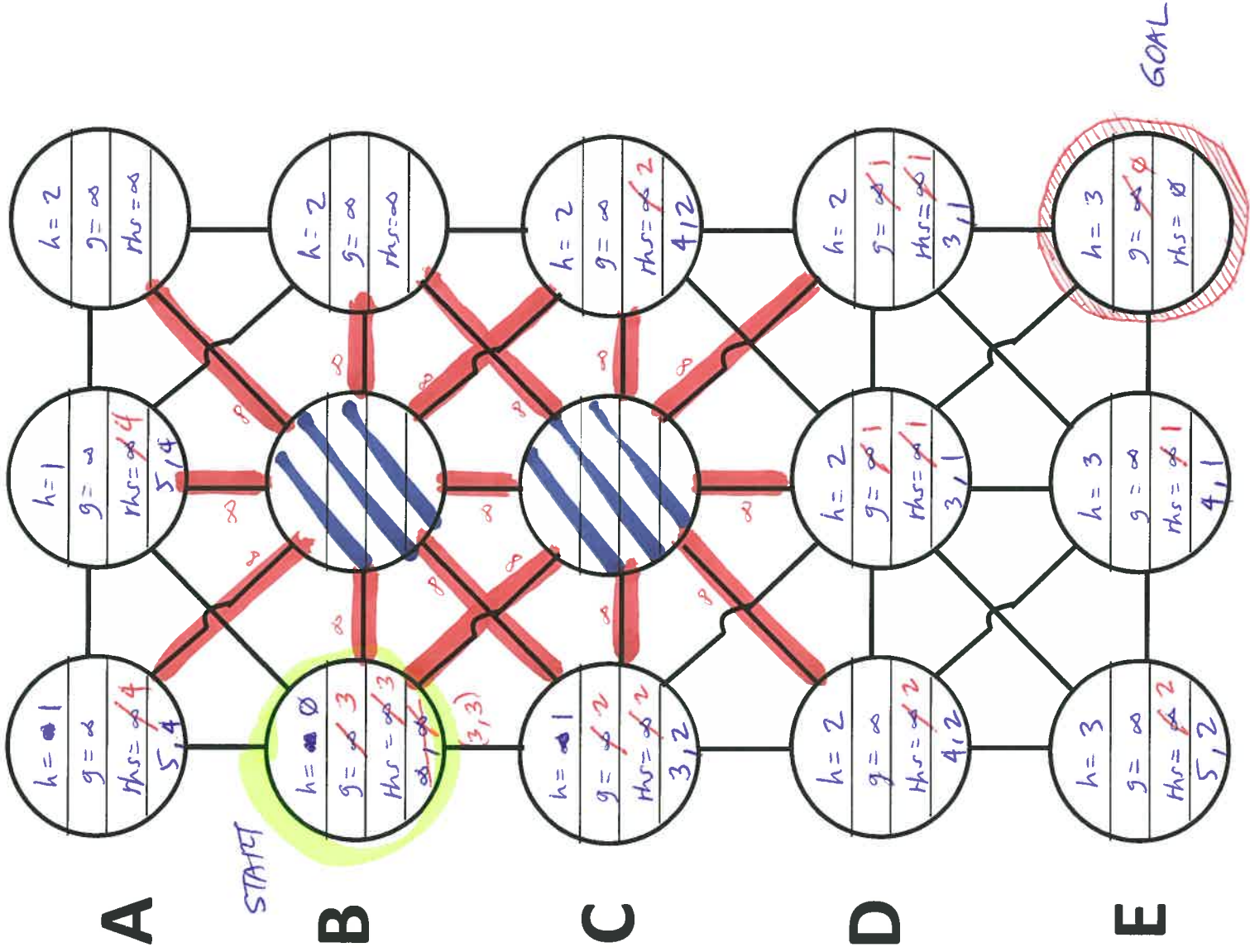


1 2 3



g -values = estimates
of goal
distances

6-connected gridworld

INITIAL PLANNING (robot assumed that cell D2 is traversable)

D*Lite

Computations

SLAST = B1

km = α

Kold = (3, 0)

$$0 + 3 + 0 = 3$$

$$\begin{pmatrix} E3 \\ g = \alpha \\ rhs = \emptyset \\ (3, 0) \end{pmatrix}$$

$$\begin{pmatrix} b2 \\ g = \infty \\ rhs = 1 \\ 3, 1 \end{pmatrix} \quad \begin{pmatrix} b3 \\ g = \infty \\ rhs = 1 \\ 3, 1 \end{pmatrix} \quad \begin{pmatrix} E2 \\ g = \infty \\ rhs = 1 \\ 4, 1 \end{pmatrix}$$

TopKey CalcKey (Start)

$(3, 0) < (\infty, \infty)$

kold = (3, 0)

pred (E3): D2, D3, E2

updateVertex (D2)

$$rhs = 0 + 1 = 1$$

rhsant

updateVertex (D3)

$$rhs = 0 + 1 = 1$$

rhsant

updateVertex (E2)

$$rhs = 0 + 1 = 1$$

rhsant

STEP	DEQ	ENQ
2	$\begin{pmatrix} D2 \\ g = \infty \\ rhs = 1 \\ 3, 1 \end{pmatrix}$	

TopKey (3,1) < CalcKey (5,5,4)

Kold = (3,1)

pred(D2): C1, C3, D1, D3, E1, E2, E3

updateVertex(C1):

rhs = 1 + 1 = 2
Insert

updateVertex(C3):

rhs = 1 + 1 = 2
Insert

updateVertex(D1)

rhs = 1 + 1 = 2
Insert

updateVertex(D3):

rhs = 0 + 1 = 1
remove, Insert back

updateVertex(E1):

rhs = 1 + 1 = 2
Insert

updateVertex(E2):

rhs = 0 + 1 = 1
remove, Insert

updateVertex(E3)

goal! don't update rhs
commit, don't insert

$$\begin{pmatrix} C1 \\ g = \infty \\ rhs = 2 \\ 3, 2 \end{pmatrix} \begin{pmatrix} C3 \\ g = \infty \\ rhs = 2 \\ 4, 2 \end{pmatrix} \begin{pmatrix} D1 \\ g = \infty \\ rhs = 2 \\ 4, 2 \end{pmatrix}$$

$$\begin{pmatrix} D3 \\ g = \infty \\ rhs = 1 \\ 3, 1 \end{pmatrix} \begin{pmatrix} E1 \\ g = \infty \\ rhs = 2 \\ 5, 2 \end{pmatrix} \begin{pmatrix} E2 \\ g = \infty \\ rhs = 1 \\ 4, 1 \end{pmatrix}$$

Step	DEQ	ENQ
3	$ \begin{pmatrix} D3 \\ g = \infty \\ rhs = 1 \\ 3, 1 \end{pmatrix} $	<div> $(3, 1) < (\infty, \infty)$ $kold = (3, 1)$ $pred(D3): C3, D2, E2, E3$ </div> <hr/> <div> $updateVertex(C3)$ $rhs = 1 + 1 = 2$ remove, insert $updateVertex(D2)$ $rhs = 0 + 1 = 1$ consistent already $updateVertex(E2)$ $rhs = 0 + 1 = 1$ remove, insert $updateVertex(E3)$ goal!, don't update rhs consistent already </div>

END

STEP VER

4

$$\begin{pmatrix} C1 \\ g = \infty \\ h_s = 2 \\ 3, 2 \end{pmatrix}$$

$$\begin{pmatrix} B1 \\ g = \infty \\ h_s = 3 \\ 3, 3 \end{pmatrix} \quad \begin{pmatrix} D1 \\ g = \infty \\ h_s = 2 \\ 4, 2 \end{pmatrix} \quad \begin{pmatrix} C3 \\ g = \infty \\ h_s = 2 \\ 4, 2 \end{pmatrix}$$

$$(3, 2) < (\infty, \infty)$$

$$k_{old} = (3, 2)$$

$$pred(C1): B1, D1, D2$$

updateVertex(B1):

$$h_s = 2 + 1 = 3$$

Insert

updateVertex(D1)

$$h_s = 1 + 1 = 2$$

Remove, Insert

updateVertex(D2)

$$h_s = \emptyset + 1 = 1$$

insert + delete

$$\begin{pmatrix} E2 \\ g = \infty \\ h_s = 1 \\ 4, 1 \end{pmatrix} \quad \begin{pmatrix} E1 \\ g = \infty \\ h_s = 2 \\ 5, 2 \end{pmatrix}$$

STEP DEQ ENQ

5
 (B1)
~~g = ∞~~ 3
 hrs = 3
 (3, 3)

(A1)
 g = ∞
 hrs = 4
 5, 4

(A2)
 g = ∞
 hrs = 4
 5, 4

(D1)
 g = ∞
 hrs = 2
 4, 2

(C3)
 g = ∞
 hrs = 2
 4, 2

(E2)
 g = ∞
 hrs = 1
 4, 1

(E1)
 g = ∞
 hrs = 2
 5, 2

TopKey (3, 3) < CalcKey (Start)
 (3, 3) false

hrs(start) ≠ g(start)
 3 ≠ ∞
 OR
 true ✓

Kold = (3, 3)

prod (B1) : A1, A2, C1

updateVertex (A1):

hrs = 3 + 1 = 4
 present

updateVertex (A2):

hrs = 3 + 1 = 4
 present

updateVertex (C1):

hrs = 1 + 1 = 2
 committed already

ENQ

DEQ

6

TopKey < CalcKey (Start) OR

(4, 1) < (3, 3) hrs(start) ≠ g(s)
 false OR 3 ≠ 3 false

false

FIN.

5