

LPA* (INITIAL PLANNING)

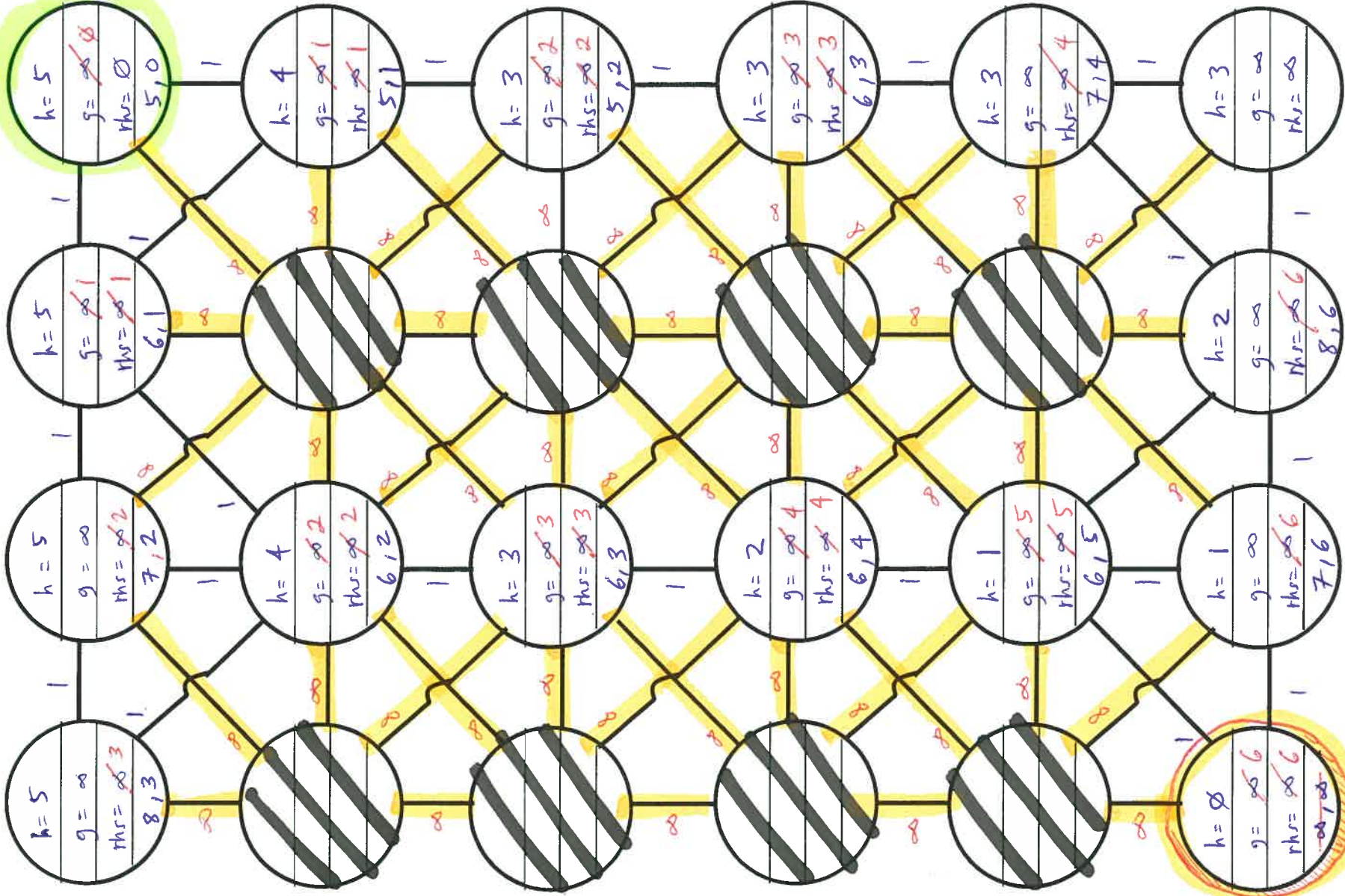
0

1

2

3

START



GOAL

STEP	DEQ	ENQ	LPA* INITIAL PLANNING CalcKey (START) 5, 0
0		 $\begin{pmatrix} A3 \\ g = \infty \\ rhs = \emptyset \\ 5, 0 \end{pmatrix}$ 	
1	 $\begin{pmatrix} A3 \\ g = \infty \\ rhs = \emptyset \\ 5, 0 \end{pmatrix}$ 	 $\begin{pmatrix} A2 \\ g = \infty \\ rhs = 1 \\ 6, 1 \end{pmatrix}$ $\begin{pmatrix} B3 \\ g = \infty \\ rhs = 1 \\ 5, 1 \end{pmatrix}$	$(5, 0) < \overset{GOAL}{(\infty, \infty)}$ $succ(A3): A2, B3$ $updateVertex(A2):$ $rhs = 0 + 1 = 1$ $insert$ $updateVertex(B3)$ $rhs = 0 + 1 = 1$ $insert$
2	 $\begin{pmatrix} B3 \\ g = \infty \\ rhs = 1 \\ 5, 1 \end{pmatrix}$ 	 $\begin{pmatrix} A2 \\ g = \infty \\ rhs = 1 \\ 6, 1 \end{pmatrix}$ $\begin{pmatrix} C3 \\ g = \infty \\ rhs = 2 \\ 5, 2 \end{pmatrix}$ 	$succ(B3): A2, A3, C3$ $updateVertex(A2):$ $rhs = 0 + 1 = 1$ $remove, insert back$ $updateVertex(A3):$ $START!, don't update rhs$ $NODE!$ $consistent already$ $updateVertex(C3)$ $rhs = 1 + 1 = 2$ $insert$
3	 $\begin{pmatrix} C3 \\ g = \infty \\ rhs = 2 \\ 5, 2 \end{pmatrix}$ 	 $\begin{pmatrix} D3 \\ g = \infty \\ rhs = 3 \\ 6, 3 \end{pmatrix}$ $\begin{pmatrix} A2 \\ g = \infty \\ rhs = 1 \\ 6, 1 \end{pmatrix}$ 	$succ(C3): B3, D3$ $updateVertex(B3):$ $rhs = 0 + 1 = 1$ $consistent!$ $updateVertex(D3)$ $rhs = 2 + 1 = 3$ $insert$

Step	DEQ	END
4	$A_2 \begin{pmatrix} g = \infty \\ rhs = 1 \\ 6, 1 \end{pmatrix}$	$A_1 \begin{pmatrix} g = \infty \\ rhs = 2 \\ 7, 2 \end{pmatrix}$ $B_1 \begin{pmatrix} g = \infty \\ rhs = 2 \\ 6, 2 \end{pmatrix}$ $D_3 \begin{pmatrix} g = \infty \\ rhs = 3 \\ 6, 3 \end{pmatrix}$
5	$B_1 \begin{pmatrix} g = \infty \\ rhs = 2 \\ 6, 2 \end{pmatrix}$	$A_\emptyset \begin{pmatrix} g = \infty \\ rhs = 3 \\ 8, 3 \end{pmatrix}$ $A_1 \begin{pmatrix} g = \infty \\ rhs = 2 \\ 7, 2 \end{pmatrix}$ $D_3 \begin{pmatrix} g = \infty \\ rhs = 3 \\ 6, 3 \end{pmatrix}$ $C_1 \begin{pmatrix} g = \infty \\ rhs = 3 \\ 6, 3 \end{pmatrix}$

succ(A2): A1, A3, B1, B3

updateVertex(A1)

rhs = 1 + 1 = 2
Insert

updateVertex(A3) START node!

rhs = don't update
consistent!

updateVertex(B1)

rhs = 1 + 1 = 2
~~consistent~~ Insert

updateVertex(B3)

rhs = 0 + 1 = 1
consistent!

succ(B1): A \emptyset , A1, A2, C1

updateVertex(A \emptyset)

rhs = 2 + 1 = 3
Insert

updateVertex(A1)

rhs = 1 + 1 = 2
remove, Insert back

updateVertex(A2)

rhs = 0 + 1 = 1
consistent

updateVertex(C1):

rhs = 2 + 1 = 3
Insert

STEP	DEQ	ENQ
6	<p>C1 $g = \infty$ $rhs = 3$ $6, 3$</p>	<p> $\begin{pmatrix} D1 \\ g = \infty \\ rhs = 4 \\ 6, 4 \end{pmatrix}$ $\begin{pmatrix} A\emptyset \\ g = \infty \\ rhs = 3 \\ 8, 3 \end{pmatrix}$ $\begin{pmatrix} A1 \\ g = \infty \\ rhs = 2 \\ 7, 2 \end{pmatrix}$ $\begin{pmatrix} D3 \\ g = \infty \\ rhs = 3 \\ 6, 3 \end{pmatrix}$ </p>
<p> $succ(C1): B1, D1$ $UpdateVertex(B1):$ $rhs = 1 + 1 = 2$ <i>consistent</i> $UpdateVertex(D1)$ $rhs = 3 + 1 = 4$ <i>consistent</i> </p>		
7	<p> $\begin{pmatrix} D3 \\ g = \infty \\ rhs = 3 \\ 6, 3 \end{pmatrix}$ $\begin{pmatrix} E3 \\ g = \infty \\ rhs = 4 \\ 7, 4 \end{pmatrix}$ $\begin{pmatrix} D1 \\ g = \infty \\ rhs = 4 \\ 6, 4 \end{pmatrix}$ $\begin{pmatrix} A\emptyset \\ g = \infty \\ rhs = 3 \\ 8, 3 \end{pmatrix}$ $\begin{pmatrix} A1 \\ g = \infty \\ rhs = 2 \\ 7, 2 \end{pmatrix}$ </p>	<p> $succ(D3): C3, E3$ $UpdateVertex(C3)$ $rhs = 1 + 1 = 2$ <i>consistent</i> $UpdateVertex(E3)$ $rhs = 3 + 1 = 4$ <i>consistent</i> </p>
8	<p> $\begin{pmatrix} D1 \\ g = \infty \\ rhs = 4 \\ 6, 4 \end{pmatrix}$ $\begin{pmatrix} E1 \\ g = \infty \\ rhs = 5 \\ 6, 5 \end{pmatrix}$ $\begin{pmatrix} E3 \\ g = \infty \\ rhs = 4 \\ 7, 4 \end{pmatrix}$ $\begin{pmatrix} A1 \\ g = \infty \\ rhs = 2 \\ 7, 2 \end{pmatrix}$ $\begin{pmatrix} A\emptyset \\ g = \infty \\ rhs = 3 \\ 8, 3 \end{pmatrix}$ </p>	<p> $succ(D1): C1, E1$ $UpdateVertex(C1)$ $rhs = 2 + 1 = 3$ <i>consistent!</i> $UpdateVertex(E1)$ $rhs = 4 + 1 = 5$ <i>consistent</i> </p>

Step	DEQ	
9	<div>$E1$ $g = \infty$ $h_s = 5$ $6, 5$</div> <div><div>$F\emptyset$ $g = \infty$ $h_s = 6$ $6, 6$</div><div>$F1$ $g = \infty$ $h_s = 6$ $7, 6$</div></div>	<div>Succ($E1$): $D1, F\emptyset, F1, F2$</div> <div>UpdateVertex($D1$) $h_s = 3 + 1 = 4$ consistent</div> <div>UpdateVertex($F\emptyset$) $h_s = 5 + 1 = 6$ insert</div> <div>UpdateVertex($F1$) $h_s = 5 + 1 = 6$ insert</div> <div>UpdateVertex($F2$) $h_s = 5 + 1 = 6$ insert</div>
10	<div><div>$F\emptyset$ $g = \infty$ $h_s = 6$ $6, 6$</div><div>$F1$ $g = \infty$ $h_s = 6$ $7, 6$</div><div>$F2$ $g = \infty$ $h_s = 6$ $8, 6$</div><div>$E3$ $g = \infty$ $h_s = 4$ $7, 4$</div><div>$A\emptyset$ $g = \infty$ $h_s = 3$ $8, 3$</div><div>$A1$ $g = \infty$ $h_s = 2$ $7, 2$</div></div>	<div>$(6, 6) < (6, 6)$ or $h_s(goal) \neq g(goal)$ $6 \neq \infty$ true</div> <div>Succ($F\emptyset$): $E1, F1$</div> <div>UpdateVertex($E1$) $h_s = 4 + 1 = 5$ consistent</div> <div>UpdateVertex($F1$) $h_s = 5 + 1 = 6$ remove, insert back</div>
11	<div>TopKey $(7, 2) < (6, 6)$ or $h_s(goal) \neq g(goal)$ $7 \neq 6$ false</div> <div>FIN.</div>	