Assignment 6:

Constraint Satisfaction Problem (CSP)

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TC2011 Intelligent Systems

September 2, 2018

4-Queens problem by Constraint Satisfaction

Variables:

$X_i \rightarrow X_1, X_2, X_3, X_4$

Domains:

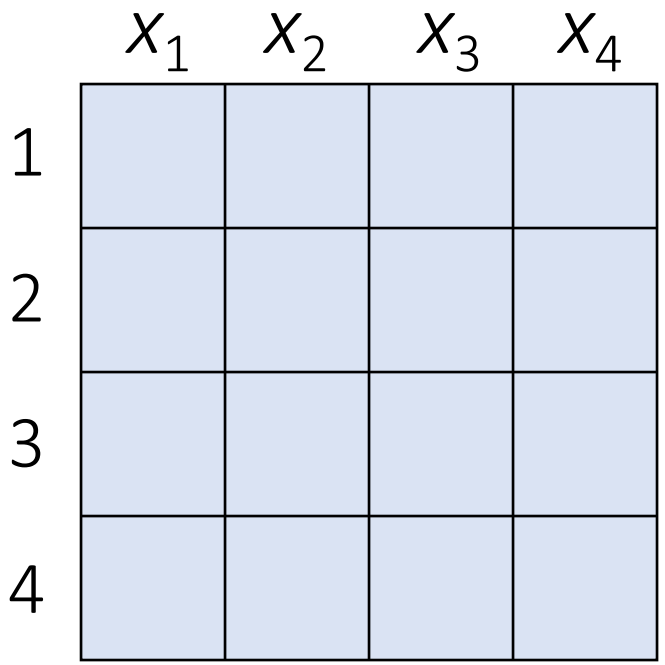
$D_i = \{1, 2, 3, 4\}$, values can take each X_i

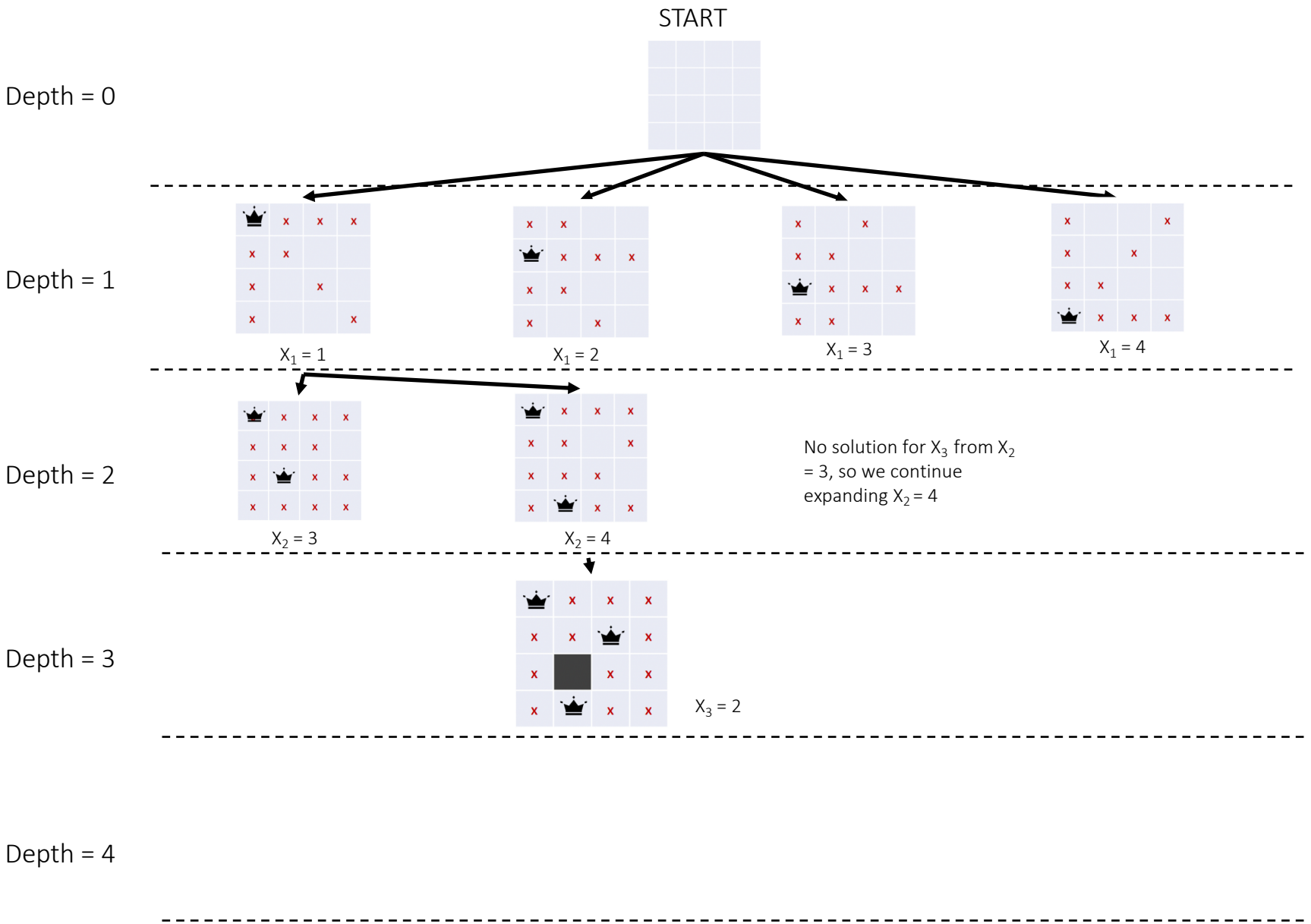
Constraints:

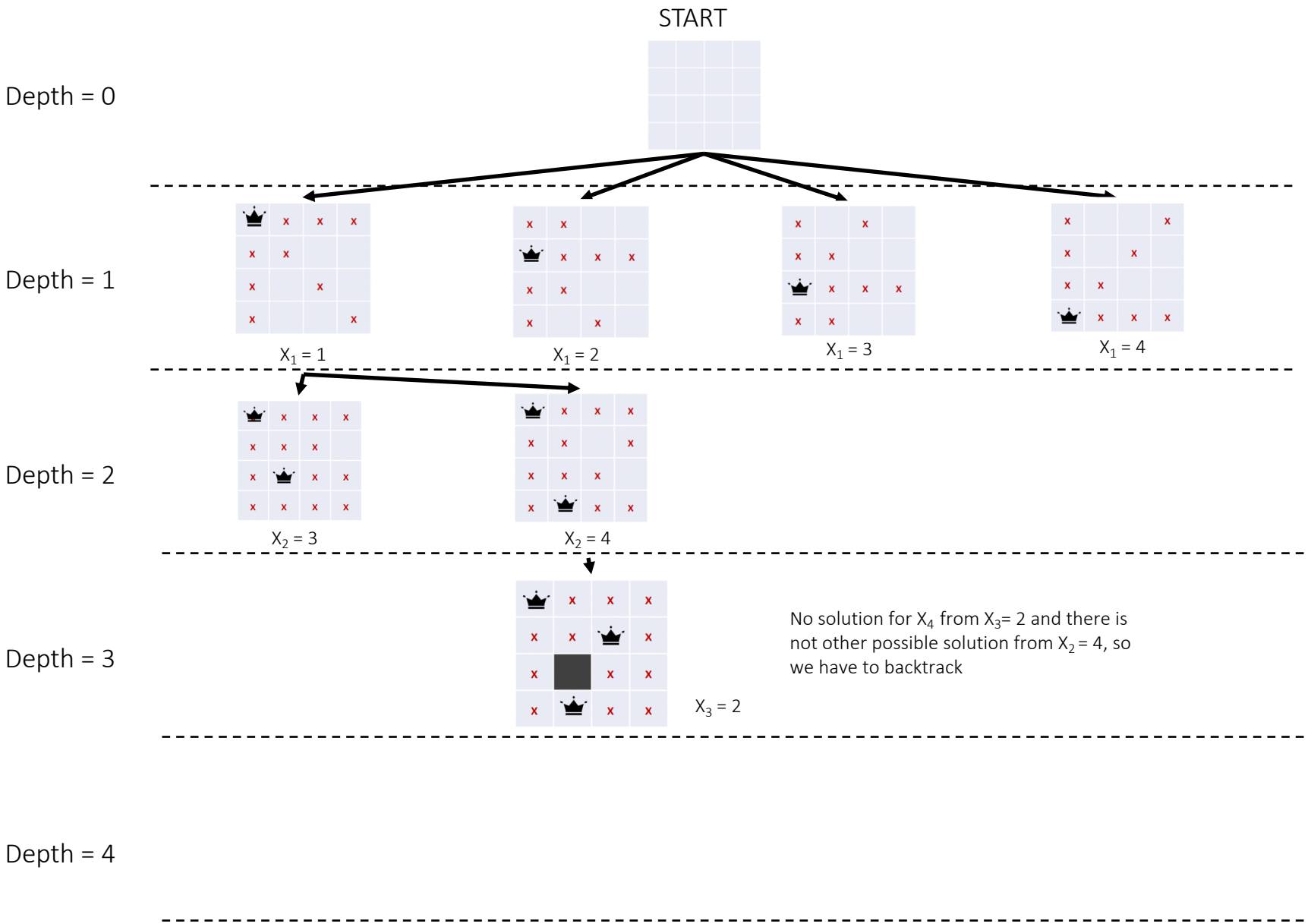
$C_i = (x_i \neq x_j \; and \; | x_i - x_j | \neq | i - j |)$,

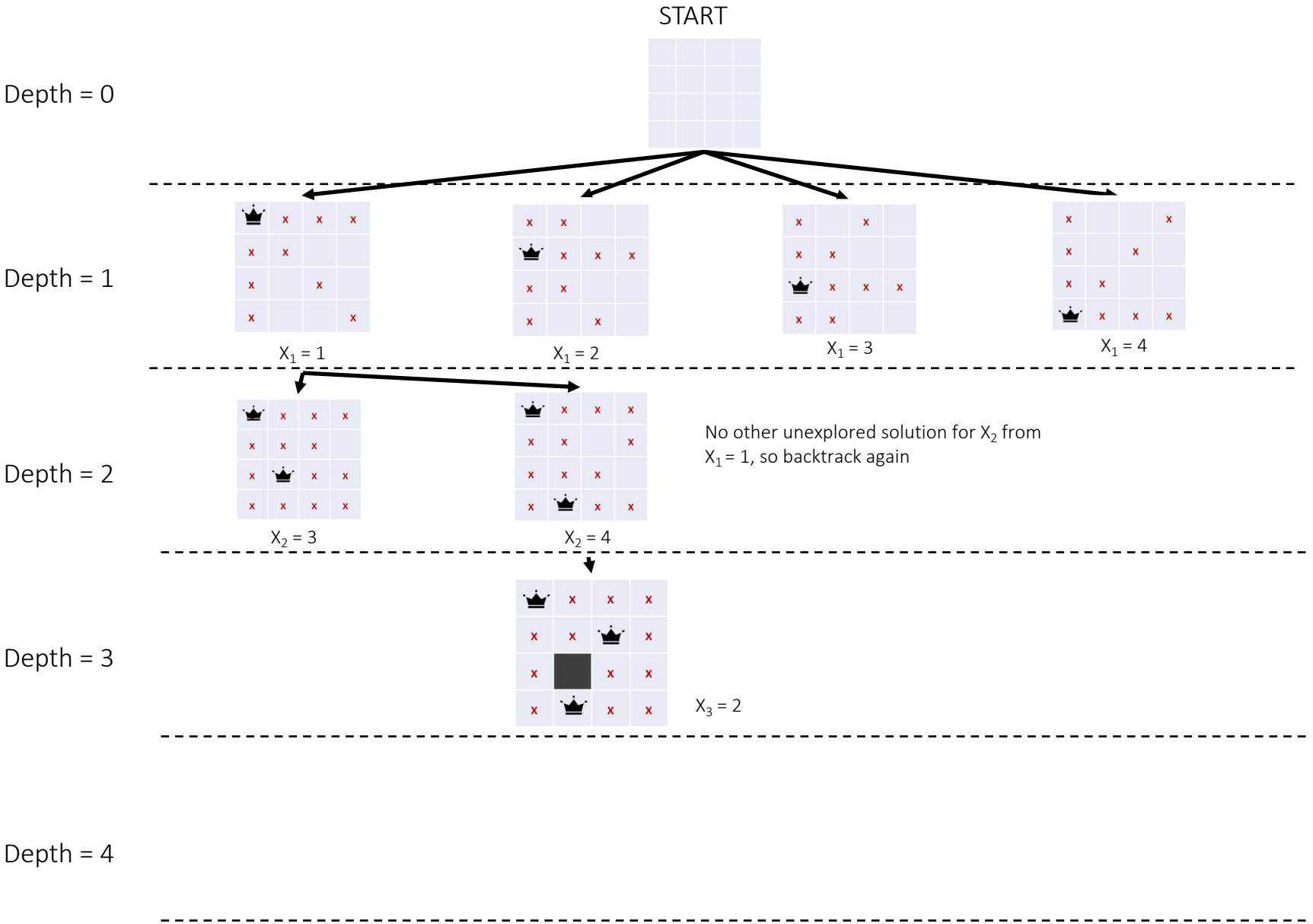
such that there are non attacking queens in the board

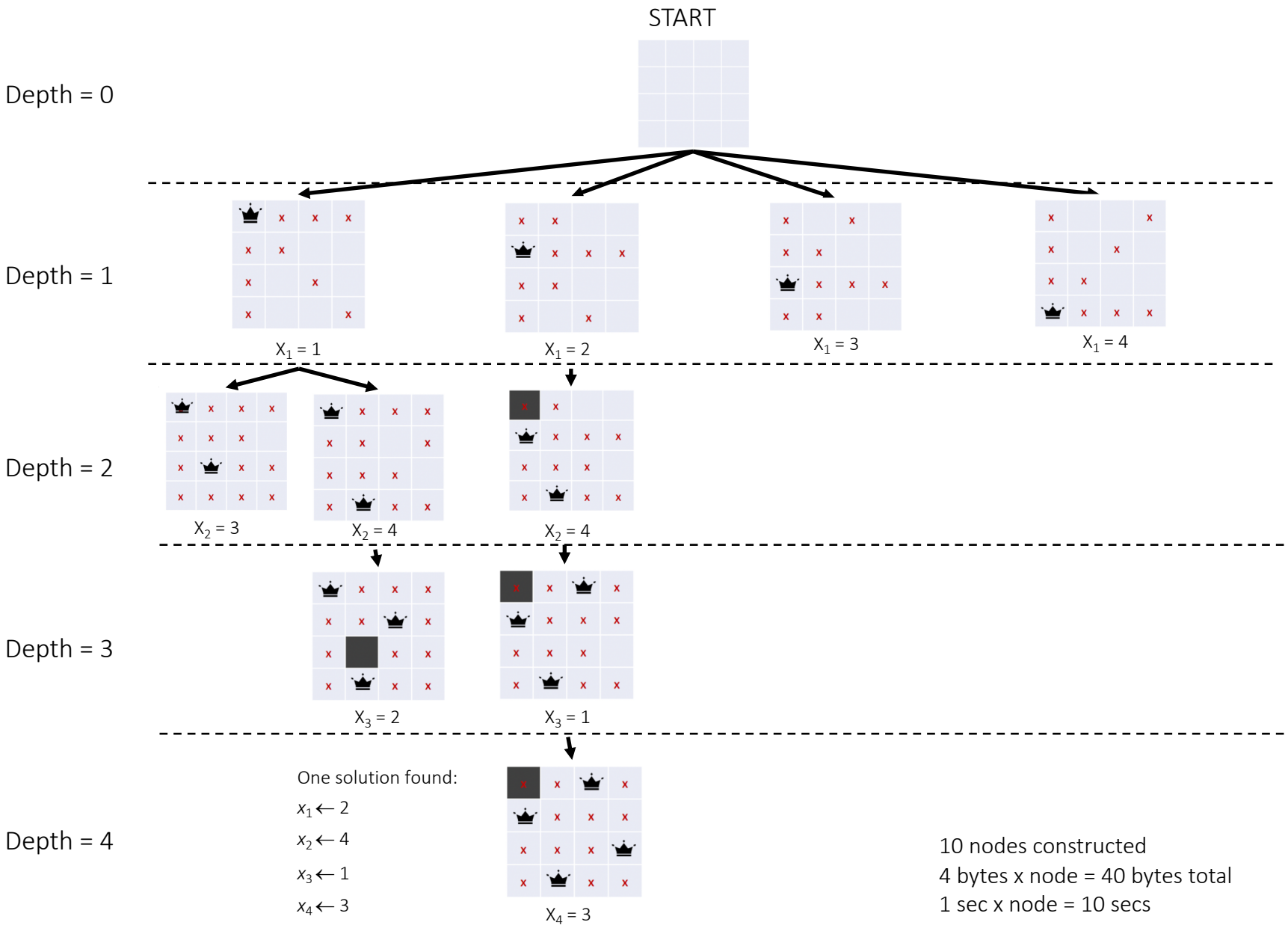
Initial State (S):




START
Depth = 0
Depth = 1
Depth = 2
Depth = 3
Depth = 4
X1 = 1
X1 = 2
X1 = 3
X1 = 4
X2 = 3
X2 = 4
No solution for X3 from X2 = 3, so we continue expanding X2 = 4
X3 = 2


START
Depth = 0
Depth = 1
Depth = 2
Depth = 3
Depth = 4
X1 = 1
X1 = 2
X1 = 3
X1 = 4
X2 = 3
X2 = 4
X3 = 2
No solution for X4 from X3= 2 and there is not other possible solution from X2 = 4, so we have to backtrack


START
Depth = 0
Depth = 1
Depth = 2
Depth = 3
Depth = 4
X1 = 1
X1 = 2
X1 = 3
X1 = 4
X2 = 3
X2 = 4
No other unexplored solution for X2 from X1 = 1, so backtrack again
X3 = 2


START
Depth = 0
Depth = 1
Depth = 2
Depth = 3
Depth = 4
X1 = 1
X1 = 2
X1 = 3
X1 = 4
X2 = 3
X2 = 4
X2 = 4
X3 = 2
X3 = 1
X4 = 3
One solution found:
x1 ← 2
x2 ← 4
x3 ← 1
x4 ← 3
10 nodes constructed
4 bytes x node = 40 bytes total
1 sec x node = 10 secs