2015 Prac Exam

Sets

S set of all squares (SIn in the code)

S' subset of squares with starting numbers (SOut in the code)

M_s set of squares that the number in square $s \in S'$ can move to (function MoveTo in the code)

$T = \{0,1, \dots, |S'| - 1\}$

Data

Variables

$x_{s_1 s_2 t} \in \{0,1\}$ if we move $s_1 \in S'$ to $s_2 \in M_{s_1}$ for move $t \in T$

Constraints

Move out of every starting square

$$\sum_{\substack{t \in T \\ s_2 \in M_{s_1}}} x_{s_1 s_2 t} = 1 \quad \forall\, s_1 \in S'$$

Max one move into each square

$$\sum_{\substack{s_1 \in S' | s_2 \in M_{s_1} \\ t \in T}} x_{s_1 s_2 t} \leq 1 \;\; \forall\, s_2 \in S$$

If square starts occupied, don't move in before we move out

$$\sum_{s_2 \in S' | s_1 \in M_{s_2}} x_{s_2 s_1 t} \leq \sum_{\substack{t' < t \\ s_2 \in M_{s_1}}} x_{s_1 s_2 t'} \quad \forall\, t \in T, s_1 \in S'$$

One move per turn

$$\sum_{\substack{s_1 \in S' \\ s_2 \in M_{s_1}}} x_{s_1 s_2 t} = 1 \quad \forall\, t \in T$$

Variables

$x_{s_1 s_2} \in \{0,1\}$ if we move $s_1 \in S'$ to $s_2 \in M_{s_1}$

Constraints

Move out of every starting square

$$\sum_{s_2 \in M_{s_1}} x_{s_1 s_2} = 1 \quad \forall\, s_1 \in S'$$

Max one move into each square

$$\sum_{s_1 \in S' | s_2 \in M_{s_1}} x_{s_1 s_2} \leq 1 \;\; \forall\, s_2 \in S$$