Associate a label with each gap/shadow region
1 = the shadow region might contain the evader
O = it certainly does not

2D cells: the gaps are the same
Critical change occurs only when cell boundaries are crossed
1) **Appear**: A gap appears

2) **Disappear**: Do nothing

3) **Split**: A gap splits into 2

4) **Merge**
   - $0,0 \rightarrow 0$
   - $1,1 \rightarrow 1$
   - $0,1 \rightarrow 1$

\[ \begin{align*}
1 & \rightarrow 1,1 \\
0 & \rightarrow 0,0
\end{align*} \]
Sec 12.4
In a 2D cell with k gaps, there are $2^k$ possible labelings.

Initially, start in any 2D cell. All labels are "1".

Task: Arrive in any cell with all labels being "0".

Directed graph of cells in $\text{Pow}(X)$

Vertex: 2D cell + labeling

Systematic search → complete algorithm

Variations
Visibility regions
\[ \text{cone} \quad \text{1-beam} \quad \text{2-beam} \]

Environments:
- holes
  - piecewise-analytic
  - 3D

Multiple agents: Different teams

Ex. red and blue teams

Labels: no blues, at least one red
3 blues, 2 reds
7 agents
[stochastic control theory]
- input-output representation
- system identification

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