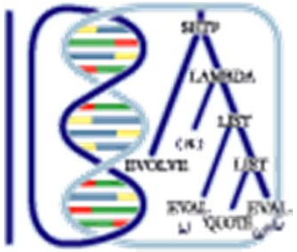

ATMS

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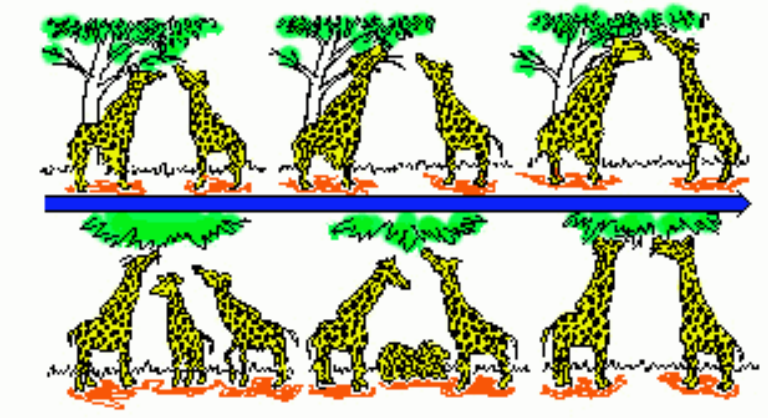
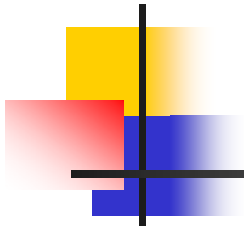
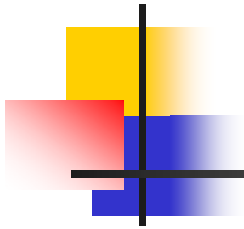


iba lab.



ATMS

- Assumption-based TMS
  - de Kleer, J.
- TMS
  - 計算コスト:多くの解が必要なとき非効率的
  - Inefficient data-dependency backtracking
- ATMS
  - Multiple contexts



ATMSのデータ

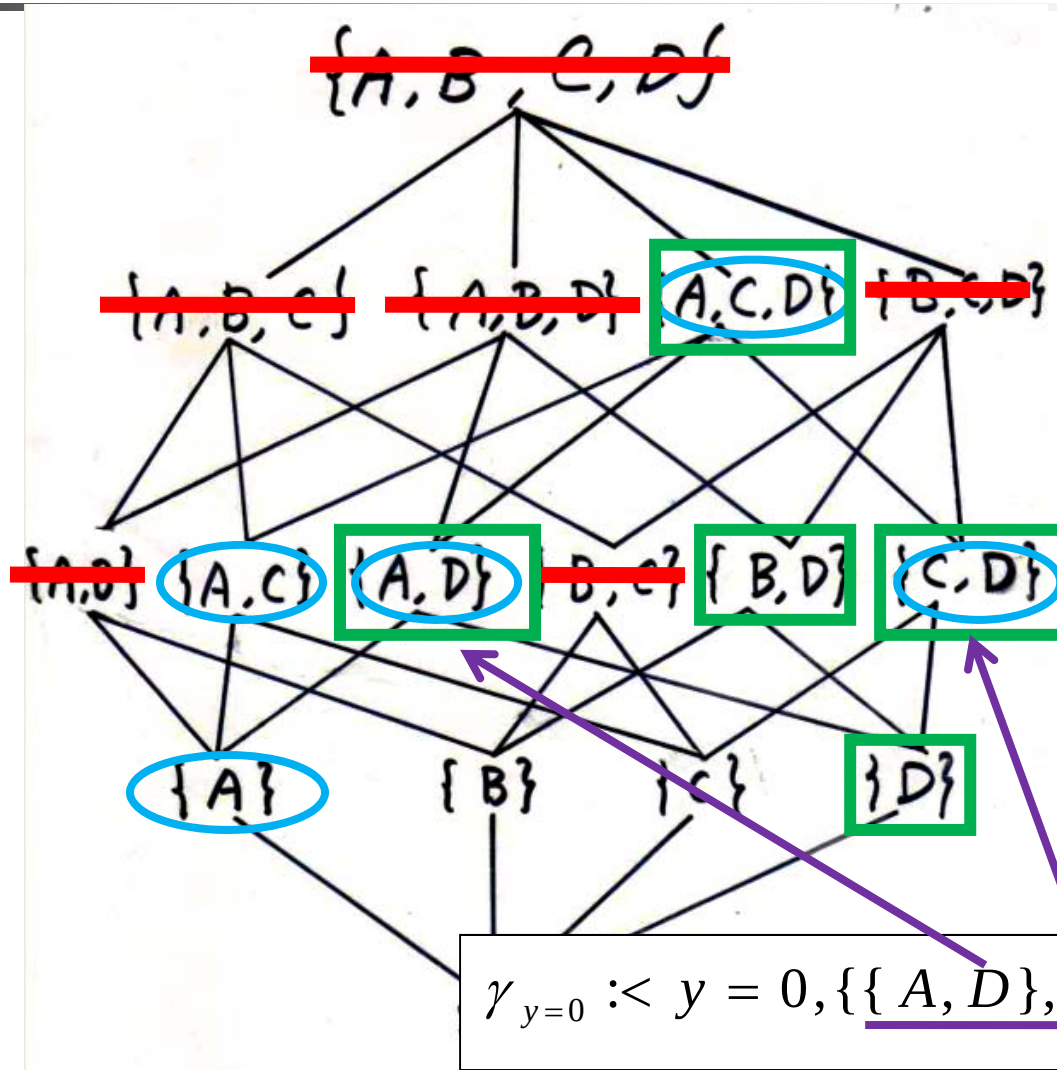
- Premise <P,{{}},{()}>
- Choise
- Assumption (A,{{A}},{(A)}>
- Node <datum, label, justication>
  - Label = {env_1, ..., $envi_m$}

$$\gamma_{x+y=1} :< x + y = 1, \{\{A\}, \{C, D\}\}, \{...\} >$$

$$\gamma_{x=1} :< x = 1, \{\{D\}\}, \{...\} >$$

ATMS: Extension environments

$$\gamma_{x+y=1}, \gamma_{x=1} \Rightarrow \gamma_{y=0}$$

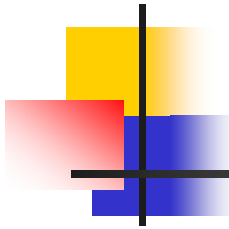


Nogood{A,B}
Nogood{B,C}

greatest lower bounds of the intersection

Environment lattice

$$\gamma_{y=0} :< y = 0, \{\{A, D\}, \{C, D\}\}, \{...\} >$$



ATMS：例

1. 直角三角形
   - $x^2 + y^2 = z^2$
2. xを3とする
3. $\{x \neq v - 4\}$　を満たす

ATMS：例

- Premise P_1 $< x^2 + y^2 = z^2, \{\{\}\}, \{()\} >$

- Assumption A_1 $< x = 3, \{\{x = 3\}\}, \{(x = 3)\} >$

z=5の成り立つ環境：
$\{x = 3, w = 6\} \subset \{x = 3, w = 6, u = 8\} \cdots$

- Nodes

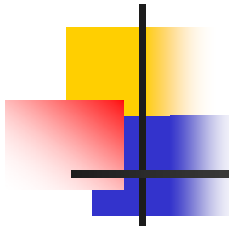
N_1 $< y = 4, \{\{w = 6\}\{v = 7\}\}, \cdots >$

N_2 $< z = 5, \{\{x = 3, w = 6\}\}, \{(P_1, A_1, N_1) \cdots\} >$

- Nogood $\{x = v - 4\}$

$\{x = 3, w = 6\}\{x = 3, v = 7\}$

z=5のsupport



ATMSの特色

- Multiple Contexts
  - 充足性の判定がsubset testでできるので効率的である
- Data-dependency backtracking を回避
  - 効率性の向上
  - “Back to backtracking”, AAAI86, by deKleer

Nクィーン問題とATMS

- Label updatesによる解法

1. **Make assumptions** $Queen_{i,j}$ **for each position of** $n \times n$ **board.**
2. **Make nogoods for capturing Position pair on different rows.**
3. **Create nodes for 1st-row Queens** $Pos_{i,1}$ **and Justify it with its position:** $Queen_{i,1} \Rightarrow Pos_{i,1}$**.**
4. **Repeat for** $2 \leq k \leq n$**,**

   $Pos_{i,k}, Queen_{j,k-1} \Rightarrow Pos_{i,k}$
5. **Gather labels of** $Queen_{i,n}$ **for** n**.** $\Longrightarrow$ **solutions.**