SAT

Forma Normal Conjuntiva(CNF)

$$
\begin{array}{ccc}
\phi \leftrightarrow \psi & \Rightarrow & (\phi \rightarrow \psi) \wedge (\psi \rightarrow \phi) \\
\phi \rightarrow \psi & \Rightarrow & \neg\phi \vee \psi \\
\neg\neg\phi & \Rightarrow & \phi \\
\neg(\phi \vee \psi) & \Rightarrow & \neg\phi \wedge \neg\psi \\
\neg(\phi \wedge \psi) & \Rightarrow & \neg\phi \vee \neg\psi \\
\phi \vee (\psi \wedge \theta) & \Rightarrow & (\phi \vee \psi) \wedge (\phi \vee \theta) \\
(\psi \wedge \theta) \vee \phi & \Rightarrow & (\psi \vee \phi) \wedge (\theta \vee \phi)
\end{array}
$$

(A ∨ B) ∧ (B ∨ ¬C ∨ D) ∧ (¬A ∨ ¬B) ∧ (¬A ∨ ¬C ∨ ¬D) ∧ A
{{A, B}, {B,not(C), D}, {not(A), not(B)}, {not(A),not(C),not(D)}, {A}}

A	B	C	D		
					$\{\{A,B\},\{B,\overline{C},D\},\{\overline{A},\overline{B}\},\{\overline{A},\overline{C},\overline{D}\},\{A\}\}$
1				deduce A	$\{\{B,\overline{C},D\},\{\overline{B}\},\{\overline{C},\overline{D}\}\}$
1	0			deduce $\overline{B}$	$\{\{\overline{C},D\},\{\overline{C},\overline{D}\}\}$
1	0	1		guess C	$\{\{D\},\{\overline{D}\}\}$
1	0	1	1	deduce D	$\{\{\}\}$
1	0	0		guess $\overline{C}$	$\{\}$

Para C = 1 há uma contradição

DIMACS

$$\{\{A, B\}, \{B, \overline{C}, D\}, \{\overline{A}, \overline{B}\}, \{\overline{A}, \overline{C}, \overline{D}\}, \{A\}\}$$

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c example
p cnf 4 5
1 2 0
2 -3 4 0
-1 -2 0
-1 -3 -4 0
1 0
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4 variáveis 5 formulas
Valores negativos são negações, valor 0 é o fim da clausula

- At least one container per item

$$\bigwedge_{x \in \text{Item}} \bigvee_{a \in \text{Container}} p_{x,a}$$

		Container		
		1	2	3
Item	a	$p_{a,1}$	$p_{a,2}$	$p_{a,3}$
	b	$p_{b,1}$	$p_{b,2}$	$p_{b,3}$

- At most one container per item

$$\bigwedge_{x \in \text{Item}} \bigwedge_{a < b \in \text{Container}} (\neg p_{x,a} \vee \neg p_{x,b})$$

(pa,1 ∨ pa,2 ∨ pa,3) ∧ (pb,1 ∨ pb,2 ∨ pb,3)