

# Inference for SRL

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# Chapter 1

## Probabilistic Inference Using Weighted Model Counting

### 1.1

#### 1.1.1 ENC 1

Indicator clauses:

$$\begin{aligned} &(\neg\lambda_{PollutionLow} \vee \neg\lambda_{PollutionHigh}) \wedge (\lambda_{PollutionLow} \vee \lambda_{PollutionHigh}) \wedge \\ &(\neg\lambda_{SmokerTrue} \vee \neg\lambda_{SmokerFalse}) \wedge (\lambda_{SmokerTrue} \vee \lambda_{SmokerFalse}) \wedge \\ &(\neg\lambda_{CancerTrue} \vee \neg\lambda_{CancerFalse}) \wedge (\lambda_{CancerTrue} \vee \lambda_{CancerFalse}) \wedge \\ &(\neg\lambda_{XrayPositive} \vee \neg\lambda_{XrayNegative}) \wedge (\lambda_{XrayPositive} \vee \lambda_{XrayNegative}) \wedge \\ &(\neg\lambda_{DyspnoeaTrue} \vee \neg\lambda_{DyspnoeaFalse}) \wedge (\lambda_{DyspnoeaTrue} \vee \lambda_{DyspnoeaFalse}) \end{aligned}$$

Parameter clauses:

$$\begin{aligned} &(\neg\lambda_{PollutionLow} \vee \theta_{PollutionLow}) \wedge (\lambda_{PollutionLow} \vee \neg\theta_{PollutionLow}) \wedge \\ &(\neg\lambda_{PollutionHigh} \vee \theta_{PollutionHigh}) \wedge (\lambda_{PollutionHigh} \vee \neg\theta_{PollutionHigh}) \wedge \\ &(\neg\lambda_{SmokerTrue} \vee \theta_{SmokerTrue}) \wedge (\lambda_{SmokerTrue} \vee \neg\theta_{SmokerTrue}) \wedge (\neg\lambda_{SmokerFalse} \vee \\ &\quad \theta_{SmokerFalse}) \wedge (\lambda_{SmokerFalse} \vee \neg\theta_{SmokerFalse}) \wedge (\neg\lambda_{PollutionLow} \vee \\ &\quad \neg\lambda_{SmokerTrue} \vee \neg\lambda_{CancerTrue} \vee \theta_{CancerTrue|PollutionLow,SmokerTrue}) \wedge \\ &(\lambda_{PollutionLow} \vee \neg\theta_{CancerTrue|PollutionLow,SmokerTrue}) \wedge (\lambda_{SmokerTrue} \vee \\ &\quad \neg\theta_{CancerTrue|PollutionLow,SmokerTrue}) \wedge (\lambda_{CancerTrue} \vee \\ &\quad \neg\theta_{CancerTrue|PollutionLow,SmokerTrue}) \wedge (\neg\lambda_{PollutionLow} \vee \neg\lambda_{SmokerTrue} \vee \\ &\quad \neg\lambda_{CancerFalse} \vee \theta_{CancerFalse|PollutionLow,SmokerTrue}) \wedge (\lambda_{PollutionLow} \vee \\ &\quad \neg\theta_{CancerFalse|PollutionLow,SmokerTrue}) \wedge (\lambda_{SmokerTrue} \vee \end{aligned}$$

$$\begin{aligned}
& \neg\theta_{CancerFalse|PollutionLow,SmokerTrue}) \wedge (\lambda_{CancerFalse} \vee \\
& \neg\theta_{CancerFalse|PollutionLow,SmokerTrue}) \wedge (\neg\lambda_{PollutionLow} \vee \neg\lambda_{SmokerFalse} \vee \\
& \neg\lambda_{CancerTrue} \vee \theta_{CancerTrue|PollutionLow,SmokerFalse}) \wedge (\lambda_{PollutionLow} \vee \\
& \neg\theta_{CancerTrue|PollutionLow,SmokerFalse}) \wedge (\lambda_{SmokerFalse} \vee \\
& \neg\theta_{CancerTrue|PollutionLow,SmokerFalse}) \wedge (\lambda_{CancerTrue} \vee \\
& \neg\theta_{CancerTrue|PollutionLow,SmokerFalse}) \wedge (\neg\lambda_{PollutionLow} \vee \neg\lambda_{SmokerFalse} \vee \\
& \neg\lambda_{CancerFalse} \vee \theta_{CancerFalse|PollutionLow,SmokerFalse}) \wedge (\lambda_{PollutionLow} \vee \\
& \neg\theta_{CancerFalse|PollutionLow,SmokerFalse}) \wedge (\lambda_{SmokerFalse} \vee \\
& \neg\theta_{CancerFalse|PollutionLow,SmokerFalse}) \wedge (\lambda_{CancerFalse} \vee \\
& \neg\theta_{CancerFalse|PollutionLow,SmokerFalse}) \wedge (\neg\lambda_{PollutionHigh} \vee \neg\lambda_{SmokerTrue} \vee \\
& \neg\lambda_{CancerTrue} \vee \theta_{CancerTrue|PollutionHigh,SmokerTrue}) \wedge (\lambda_{PollutionHigh} \vee \\
& \neg\theta_{CancerTrue|PollutionHigh,SmokerTrue}) \wedge (\lambda_{SmokerTrue} \vee \\
& \neg\theta_{CancerTrue|PollutionHigh,SmokerTrue}) \wedge (\lambda_{CancerTrue} \vee \\
& \neg\theta_{CancerTrue|PollutionHigh,SmokerTrue}) \wedge (\neg\lambda_{PollutionHigh} \vee \neg\lambda_{SmokerTrue} \vee \\
& \neg\lambda_{CancerFalse} \vee \theta_{CancerFalse|PollutionHigh,SmokerTrue}) \wedge (\lambda_{PollutionHigh} \vee \\
& \neg\theta_{CancerFalse|PollutionHigh,SmokerTrue}) \wedge (\lambda_{SmokerTrue} \vee \\
& \neg\theta_{CancerFalse|PollutionHigh,SmokerTrue}) \wedge (\lambda_{CancerFalse} \vee \\
& \neg\theta_{CancerFalse|PollutionHigh,SmokerTrue}) \wedge (\neg\lambda_{PollutionHigh} \vee \neg\lambda_{SmokerFalse} \vee \\
& \neg\lambda_{CancerTrue} \vee \theta_{CancerTrue|PollutionHigh,SmokerFalse}) \wedge (\lambda_{PollutionHigh} \vee \\
& \neg\theta_{CancerTrue|PollutionHigh,SmokerFalse}) \wedge (\lambda_{SmokerFalse} \vee \\
& \neg\theta_{CancerTrue|PollutionHigh,SmokerFalse}) \wedge (\lambda_{CancerTrue} \vee \\
& \neg\theta_{CancerTrue|PollutionHigh,SmokerFalse}) \wedge (\neg\lambda_{PollutionHigh} \vee \neg\lambda_{SmokerFalse} \vee \\
& \neg\lambda_{CancerFalse} \vee \theta_{CancerFalse|PollutionHigh,SmokerFalse}) \wedge (\lambda_{PollutionHigh} \vee \\
& \neg\theta_{CancerFalse|PollutionHigh,SmokerFalse}) \wedge (\lambda_{SmokerFalse} \vee \\
& \neg\theta_{CancerFalse|PollutionHigh,SmokerFalse}) \wedge (\lambda_{CancerFalse} \vee \\
& \neg\theta_{CancerFalse|PollutionHigh,SmokerFalse}) \wedge (\neg\lambda_{CancerTrue} \vee \neg\lambda_{XrayPositive} \vee \\
& \theta_{XrayPositive|CancerTrue}) \wedge (\lambda_{CancerTrue} \vee \neg\theta_{XrayPositive|CancerTrue}) \wedge \\
& (\lambda_{XrayPositive} \vee \neg\theta_{XrayPositive|CancerTrue}) \wedge (\neg\lambda_{CancerTrue} \vee \neg\lambda_{XrayNegative} \vee \\
& \theta_{XrayNegative|CancerTrue}) \wedge (\lambda_{CancerTrue} \vee \neg\theta_{XrayNegative|CancerTrue}) \wedge \\
& (\lambda_{XrayNegative} \vee \neg\theta_{XrayNegative|CancerTrue}) \wedge (\neg\lambda_{CancerFalse} \vee \\
& \neg\lambda_{XrayPositive} \vee \theta_{XrayPositive|CancerFalse}) \wedge (\lambda_{CancerFalse} \vee \\
& \neg\theta_{XrayPositive|CancerFalse}) \wedge (\lambda_{XrayPositive} \vee \neg\theta_{XrayPositive|CancerFalse}) \wedge \\
& (\neg\lambda_{CancerFalse} \vee \neg\lambda_{XrayNegative} \vee \theta_{XrayNegative|CancerFalse}) \wedge (\lambda_{CancerFalse} \vee \\
& \neg\theta_{XrayNegative|CancerFalse}) \wedge (\lambda_{XrayNegative} \vee \neg\theta_{XrayNegative|CancerFalse}) \wedge \\
& (\neg\lambda_{CancerTrue} \vee \neg\lambda_{DyspnoeaTrue} \vee \theta_{DyspnoeaTrue|CancerTrue}) \wedge (\lambda_{CancerTrue} \vee \\
& \neg\theta_{DyspnoeaTrue|CancerTrue}) \wedge (\lambda_{DyspnoeaTrue} \vee \neg\theta_{DyspnoeaTrue|CancerTrue}) \wedge \\
& (\neg\lambda_{CancerTrue} \vee \neg\lambda_{DyspnoeaFalse} \vee \theta_{DyspnoeaFalse|CancerTrue}) \wedge (\lambda_{CancerTrue} \vee \\
& \neg\theta_{DyspnoeaFalse|CancerTrue}) \wedge (\lambda_{DyspnoeaFalse} \vee \neg\theta_{DyspnoeaFalse|CancerTrue}) \wedge \\
& (\neg\lambda_{CancerFalse} \vee \neg\lambda_{DyspnoeaTrue} \vee \theta_{DyspnoeaTrue|CancerFalse}) \wedge (\lambda_{CancerFalse} \vee \\
& \neg\theta_{DyspnoeaTrue|CancerFalse}) \wedge (\lambda_{DyspnoeaTrue} \vee \neg\theta_{DyspnoeaTrue|CancerFalse}) \wedge \\
& (\neg\lambda_{CancerFalse} \vee \neg\lambda_{DyspnoeaFalse} \vee \theta_{DyspnoeaFalse|CancerFalse}) \wedge (\lambda_{CancerFalse} \vee \\
& \neg\theta_{DyspnoeaFalse|CancerFalse}) \wedge (\lambda_{DyspnoeaFalse} \vee \neg\theta_{DyspnoeaFalse|CancerFalse})
\end{aligned}$$

Weights

$$\begin{aligned}
W(\lambda_{PollutionLow}) &= 1.00 \\
W(\neg\lambda_{PollutionLow}) &= 1.00 \\
W(\lambda_{PollutionHigh}) &= 1.00 \\
W(\neg\lambda_{PollutionHigh}) &= 1.00 \\
W(\lambda_{SmokerTrue}) &= 1.00
\end{aligned}$$

$W(\neg\lambda_{SmokerTrue}) = 1.00$   
 $W(\lambda_{SmokerFalse}) = 1.00$   
 $W(\neg\lambda_{SmokerFalse}) = 1.00$   
 $W(\lambda_{CancerTrue}) = 1.00$   
 $W(\neg\lambda_{CancerTrue}) = 1.00$   
 $W(\lambda_{CancerFalse}) = 1.00$   
 $W(\neg\lambda_{CancerFalse}) = 1.00$   
 $W(\lambda_{XrayPositive}) = 1.00$   
 $W(\neg\lambda_{XrayPositive}) = 1.00$   
 $W(\lambda_{XrayNegative}) = 1.00$   
 $W(\neg\lambda_{XrayNegative}) = 1.00$   
 $W(\lambda_{DyspnoeaTrue}) = 1.00$   
 $W(\neg\lambda_{DyspnoeaTrue}) = 1.00$   
 $W(\lambda_{DyspnoeaFalse}) = 1.00$   
 $W(\neg\lambda_{DyspnoeaFalse}) = 1.00$   
 $W(\theta_{PollutionLow}) = 0.90$   
 $W(\neg\theta_{PollutionLow}) = 1.00$   
 $W(\theta_{PollutionHigh}) = 0.10$   
 $W(\neg\theta_{PollutionHigh}) = 1.00$   
 $W(\theta_{SmokerTrue}) = 0.30$   
 $W(\neg\theta_{SmokerTrue}) = 1.00$   
 $W(\theta_{SmokerFalse}) = 0.70$   
 $W(\neg\theta_{SmokerFalse}) = 1.00$   
 $W(\theta_{CancerTrue|PollutionLow,SmokerTrue}) = 0.03$   
 $W(\neg\theta_{CancerTrue|PollutionLow,SmokerTrue}) = 1.00$   
 $W(\theta_{CancerFalse|PollutionLow,SmokerTrue}) = 0.97$   
 $W(\neg\theta_{CancerFalse|PollutionLow,SmokerTrue}) = 1.00$   
 $W(\theta_{CancerTrue|PollutionLow,SmokerFalse}) = 0.00$   
 $W(\neg\theta_{CancerTrue|PollutionLow,SmokerFalse}) = 1.00$   
 $W(\theta_{CancerFalse|PollutionLow,SmokerFalse}) = 1.00$   
 $W(\neg\theta_{CancerFalse|PollutionLow,SmokerFalse}) = 1.00$   
 $W(\theta_{CancerTrue|PollutionHigh,SmokerTrue}) = 0.05$   
 $W(\neg\theta_{CancerTrue|PollutionHigh,SmokerTrue}) = 1.00$   
 $W(\theta_{CancerFalse|PollutionHigh,SmokerTrue}) = 0.95$   
 $W(\neg\theta_{CancerFalse|PollutionHigh,SmokerTrue}) = 1.00$   
 $W(\theta_{CancerTrue|PollutionHigh,SmokerFalse}) = 0.02$   
 $W(\neg\theta_{CancerTrue|PollutionHigh,SmokerFalse}) = 1.00$   
 $W(\theta_{CancerFalse|PollutionHigh,SmokerFalse}) = 0.98$   
 $W(\neg\theta_{CancerFalse|PollutionHigh,SmokerFalse}) = 1.00$   
 $W(\theta_{XrayPositive|CancerTrue}) = 0.90$   
 $W(\neg\theta_{XrayPositive|CancerTrue}) = 1.00$   
 $W(\theta_{XrayNegative|CancerTrue}) = 0.10$   
 $W(\neg\theta_{XrayNegative|CancerTrue}) = 1.00$   
 $W(\theta_{XrayPositive|CancerFalse}) = 0.20$   
 $W(\neg\theta_{XrayPositive|CancerFalse}) = 1.00$   
 $W(\theta_{XrayNegative|CancerFalse}) = 0.80$   
 $W(\neg\theta_{XrayNegative|CancerFalse}) = 1.00$   
 $W(\theta_{DyspnoeaTrue|CancerTrue}) = 0.65$   
 $W(\neg\theta_{DyspnoeaTrue|CancerTrue}) = 1.00$   
 $W(\theta_{DyspnoeaFalse|CancerTrue}) = 0.35$

$$\begin{aligned}
W(\neg\theta_{DyspnoeaFalse|CancerTrue}) &= 1.00 \\
W(\theta_{DyspnoeaTrue|CancerFalse}) &= 0.30 \\
W(\neg\theta_{DyspnoeaTrue|CancerFalse}) &= 1.00 \\
W(\theta_{DyspnoeaFalse|CancerFalse}) &= 0.70 \\
W(\neg\theta_{DyspnoeaFalse|CancerFalse}) &= 1.00
\end{aligned}$$

### 1.1.2 ENC 2

Indicator clauses

$$\begin{aligned}
&(\neg\lambda_{PollutionLow} \vee \neg\lambda_{PollutionHigh}) \wedge (\lambda_{PollutionLow} \vee \lambda_{PollutionHigh}) \wedge \\
&(\neg\lambda_{SmokerTrue} \vee \neg\lambda_{SmokerFalse}) \wedge (\lambda_{SmokerTrue} \vee \lambda_{SmokerFalse}) \wedge \\
&(\neg\lambda_{CancerTrue} \vee \neg\lambda_{CancerFalse}) \wedge (\lambda_{CancerTrue} \vee \lambda_{CancerFalse}) \wedge \\
&(\neg\lambda_{XrayPositive} \vee \neg\lambda_{XrayNegative}) \wedge (\lambda_{XrayPositive} \vee \lambda_{XrayNegative}) \wedge \\
&(\neg\lambda_{DyspnoeaTrue} \vee \neg\lambda_{DyspnoeaFalse}) \wedge (\lambda_{DyspnoeaTrue} \vee \lambda_{DyspnoeaFalse})
\end{aligned}$$

Parameter clauses

$$\begin{aligned}
&(\neg\rho_{PollutionLow} \vee \lambda_{PollutionLow}) \wedge (\rho_{PollutionLow} \vee \lambda_{PollutionHigh}) \wedge \\
&(\neg\rho_{SmokerTrue} \vee \lambda_{SmokerTrue}) \wedge (\rho_{SmokerTrue} \vee \lambda_{SmokerFalse}) \wedge (\neg\lambda_{PollutionLow} \vee \\
&\neg\lambda_{SmokerTrue} \vee \neg\rho_{CancerTrue|PollutionLow,SmokerTrue} \vee \lambda_{CancerTrue}) \wedge \\
&(\neg\lambda_{PollutionLow} \vee \neg\lambda_{SmokerTrue} \vee \rho_{CancerTrue|PollutionLow,SmokerTrue} \vee \\
&\lambda_{CancerFalse}) \wedge (\neg\lambda_{PollutionLow} \vee \neg\lambda_{SmokerFalse} \vee \\
&\neg\rho_{CancerTrue|PollutionLow,SmokerFalse} \vee \lambda_{CancerTrue}) \wedge (\neg\lambda_{PollutionLow} \vee \\
&\neg\lambda_{SmokerFalse} \vee \rho_{CancerTrue|PollutionLow,SmokerFalse} \vee \lambda_{CancerFalse}) \wedge \\
&(\neg\lambda_{PollutionHigh} \vee \neg\lambda_{SmokerTrue} \vee \neg\rho_{CancerTrue|PollutionHigh,SmokerTrue} \vee \\
&\lambda_{CancerTrue}) \wedge (\neg\lambda_{PollutionHigh} \vee \neg\lambda_{SmokerTrue} \vee \\
&\rho_{CancerTrue|PollutionHigh,SmokerTrue} \vee \lambda_{CancerFalse}) \wedge (\neg\lambda_{PollutionHigh} \vee \\
&\neg\lambda_{SmokerFalse} \vee \neg\rho_{CancerTrue|PollutionHigh,SmokerFalse} \vee \lambda_{CancerTrue}) \wedge \\
&(\neg\lambda_{PollutionHigh} \vee \neg\lambda_{SmokerFalse} \vee \rho_{CancerTrue|PollutionHigh,SmokerFalse} \vee \\
&\lambda_{CancerFalse}) \wedge (\neg\lambda_{CancerTrue} \vee \neg\rho_{XrayPositive|CancerTrue} \vee \lambda_{XrayPositive}) \wedge \\
&(\neg\lambda_{CancerTrue} \vee \rho_{XrayPositive|CancerTrue} \vee \lambda_{XrayNegative}) \wedge (\neg\lambda_{CancerFalse} \vee \\
&\neg\rho_{XrayPositive|CancerFalse} \vee \lambda_{XrayPositive}) \wedge (\neg\lambda_{CancerFalse} \vee \\
&\rho_{XrayPositive|CancerFalse} \vee \lambda_{XrayNegative}) \wedge (\neg\lambda_{CancerTrue} \vee \\
&\neg\rho_{DyspnoeaTrue|CancerTrue} \vee \lambda_{DyspnoeaTrue}) \wedge (\neg\lambda_{CancerTrue} \vee \\
&\rho_{DyspnoeaTrue|CancerTrue} \vee \lambda_{DyspnoeaFalse}) \wedge (\neg\lambda_{CancerFalse} \vee \\
&\neg\rho_{DyspnoeaTrue|CancerFalse} \vee \lambda_{DyspnoeaTrue}) \wedge (\neg\lambda_{CancerFalse} \vee \\
&\rho_{DyspnoeaTrue|CancerFalse} \vee \lambda_{DyspnoeaFalse})
\end{aligned}$$

Weights

$W(\lambda_{PollutionLow}) = 1.00$   
 $W(\neg\lambda_{PollutionLow}) = 1.00$   
 $W(\lambda_{PollutionHigh}) = 1.00$   
 $W(\neg\lambda_{PollutionHigh}) = 1.00$   
 $W(\lambda_{SmokerTrue}) = 1.00$   
 $W(\neg\lambda_{SmokerTrue}) = 1.00$   
 $W(\lambda_{SmokerFalse}) = 1.00$   
 $W(\neg\lambda_{SmokerFalse}) = 1.00$   
 $W(\lambda_{CancerTrue}) = 1.00$   
 $W(\neg\lambda_{CancerTrue}) = 1.00$   
 $W(\lambda_{CancerFalse}) = 1.00$   
 $W(\neg\lambda_{CancerFalse}) = 1.00$   
 $W(\lambda_{XrayPositive}) = 1.00$   
 $W(\neg\lambda_{XrayPositive}) = 1.00$   
 $W(\lambda_{XrayNegative}) = 1.00$   
 $W(\neg\lambda_{XrayNegative}) = 1.00$   
 $W(\lambda_{DyspnoeaTrue}) = 1.00$   
 $W(\neg\lambda_{DyspnoeaTrue}) = 1.00$   
 $W(\lambda_{DyspnoeaFalse}) = 1.00$   
 $W(\neg\lambda_{DyspnoeaFalse}) = 1.00$   
 $W(\rho_{PollutionLow}) = 0.90$   
 $W(\neg\rho_{PollutionLow}) = 0.10$   
 $W(\rho_{SmokerTrue}) = 0.30$   
 $W(\neg\rho_{SmokerTrue}) = 0.70$   
 $W(\rho_{CancerTrue|PollutionLow,SmokerTrue}) = 0.03$   
 $W(\neg\rho_{CancerTrue|PollutionLow,SmokerTrue}) = 0.97$   
 $W(\rho_{CancerTrue|PollutionLow,SmokerFalse}) = 0.00$   
 $W(\neg\rho_{CancerTrue|PollutionLow,SmokerFalse}) = 1.00$   
 $W(\rho_{CancerTrue|PollutionHigh,SmokerTrue}) = 0.05$   
 $W(\neg\rho_{CancerTrue|PollutionHigh,SmokerTrue}) = 0.95$   
 $W(\rho_{CancerTrue|PollutionHigh,SmokerFalse}) = 0.02$   
 $W(\neg\rho_{CancerTrue|PollutionHigh,SmokerFalse}) = 0.98$   
 $W(\rho_{XrayPositive|CancerTrue}) = 0.90$   
 $W(\neg\rho_{XrayPositive|CancerTrue}) = 0.10$   
 $W(\rho_{XrayPositive|CancerFalse}) = 0.20$   
 $W(\neg\rho_{XrayPositive|CancerFalse}) = 0.80$   
 $W(\rho_{DyspnoeaTrue|CancerTrue}) = 0.65$   
 $W(\neg\rho_{DyspnoeaTrue|CancerTrue}) = 0.35$   
 $W(\rho_{DyspnoeaTrue|CancerFalse}) = 0.30$   
 $W(\neg\rho_{DyspnoeaTrue|CancerFalse}) = 0.70$

## 1.2

The CNF of the monty hall problem is given in image 1

```

=====
CNF:
select_door(1)
^ win_keep v -prize(1)
^ -win_keep v prize(1)
^ open_door(2) v prize(2) v -prize(3)
^ -open_door(2) v -prize(2)
^ -open_door(2) v prize(3)
^ open_door(3) v prize(3) v -prize(2)
^ -open_door(3) v -prize(3)
^ -open_door(3) v prize(2)
^ win_switch v -prize(2) v open_door(2)
^ win_switch v -prize(3) v open_door(3)
^ -win_switch v prize(2) v prize(3)
^ -win_switch v prize(2) v -open_door(3)
^ -win_switch v -open_door(2) v prize(3)
^ -win_switch v -open_door(2) v -open_door(3)
Queries:
query(prize(1))
query(prize(2))
query(prize(3))
query(select_door(1))
query(win_keep)
query(win_switch)
=====

```

Figure 1.1: Grounder problog cnf

## 1.3

### 1

We will use mini2CD and Cachet as WMC counters.

#### mini2CD

#### Cachet

## 2. Difference between WMC's

The three WMC we will compare are C2D, Cachet and SharpSAT.

#### C2D Vs Cachet

The biggest difference between C2D and Cachet is that C2D keeps a track of the operation it has performed. This means that Cachet is not a compiler but C2D is. In [1] they note that Cachet could easily be transformed into a compiler. There are some other minor differences like they have a different way to implement decompositions but they also do variable splitting and caching in a different way.

#### SharpSAT vs Cachet

SharpSAT has an efficient way to cache components. This cache has a limited size and removes old entries using an utility function. It also uses implicit boolean constraint propagation (BCP). This results in a smaller search space and reduces the cache size further. SharpSAT also inherits different techniques from conventional SAT solvers. It inherits a clause learning and a fast BCP algorithm. It also has some things in common with Cachet: For selecting the branch variables, SharpSAT applies the VSADS algorithm from Cachet. Cachet

uses a string representation for components while SharpSAT uses a smart coding to store its components in a cache. [2].

### **C2D vs SharpSAT**

The biggest difference between these two is that C2D is a compiler. A point they have in common is that they both use things from the literature. C2D creates a tree while SharpSAT doesn't.

## **3 Overview of computational requirements**

NOG DOEN.



# Bibliography

- [1] Mark Chavira and Adnan Darwiche. On probabilistic inference by weighted model counting. *Artificial Intelligence*, 172(6):772 – 799, 2008.
- [2] Marc Thurley. sharpsat - counting models with advanced component caching and implicit bcp. *Proceedings of the 9th International Conference on Theory and Applications of Satisfiability Testing (SAT 2006)*, pages 424–429, 2006.