AI3

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2 Company

2.1

Infer FLoor(Frank)=12

$$\frac{S5 : ReportsTo(Frank, Lily), S7 : ReportsTo(x, Lily) \implies Floor(x) = 12}{Floor(Frank) = 12}$$

$$\theta = x/Frank$$

2.2

C1: $(\neg ReportsTo(x, y) \vee \neg Floor(y) = 3) \vee ReportsTo(\text{Rose }, x)$
$C2 : Position(\text{ Frank }) = manager$
$C3 : (\neg ReportsTo(x, y) \vee \neg Floor(x) = 12) \vee Floor(y) = 3$
$C4 : Floor(\text{ Harry}) = 9$
$C5 : ReportsTo(Frank, Lily)$
$C6 : \neg Floor(x) = 3 \vee ReportsTo(x, Harry)$
$C7 : \neg ReportsTo(x, \text{ Lily}) \vee Floor(x) = 12$

2.3

In multiple steps:

$$\frac{ReportsTo(Frank, Lily), \neg ReportsTo(x, y) \vee \neg Floor(x) = 12 \vee Floor(y) = 3}{\neg Floor(Frank) = 12 \vee Floor(Lily) = 3}$$

$$\frac{Floor(Frank) = 12, \neg Floor(x) = 12 \vee Floor(Lily) = 3}{Floor(Lily) = 3}$$

$$\frac{Floor(Lily) = 3, \neg ReportsTo(x, y) \vee \neg Floor(y) = 3 \vee ReportsTo(Rose, x)}{\neg ReportsTo(Frank, Lily) \vee ReportsTo(Rose, Frank)}$$

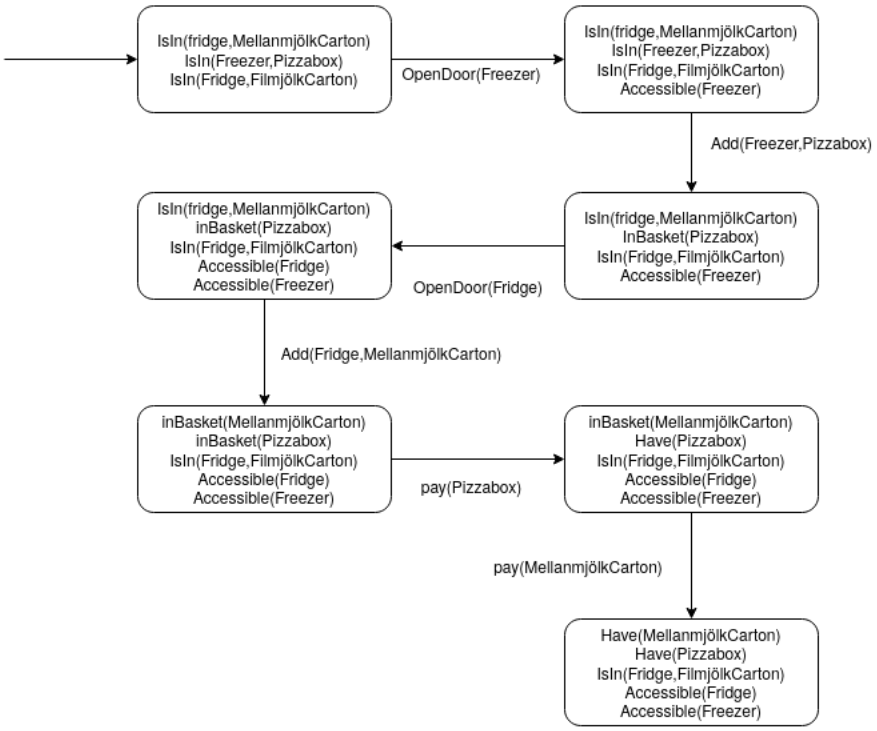
$$\frac{ReportsTo(Frank, Lily), \neg ReportsTo(x, y) \vee ReportsTo(Rose, x)}{ReportsTo(Rose, Frank)}$$

$$\theta = x, y/Frank, Lily$$

3 Grocery shopping

3.1.1

Figure 1:



3.1.2

There are 108 different states in the whole reachable state space. Each item (Pizzabox, MellanmjölkCarton, FilmjölkCarton) have three states that cannot

be true at the same time. This gives 3*3*3 combinations of those states. The fridge and freezer have four different states. In total there are therefore 3*3*3*4 different states which is equal to 108 states.

3.1.3

There are 8 goal states. The FilmjölkCarton can either be in the basket or in the fridge, the fridge can be accessible or not, the freezer can be accessible or not. The combination gives 8 possible states.

3.1.4

Infite number of plans lead to the satisfaction of the goal condition because there are infinite ways to open and close the doors before adding the item to your basket.

3.1.5

There are multiple optimal plans, one of them is to: OpenDoor(Freezer), Add(Freezer,Pizzabox), OpenDoor(Fridge), Add(Fridge,MellanmjölkCarton), Pay(Pizzabox), Pay(MellanmjölkCarton). This sequence is the same as the one given in Figure 1.