Tutorial 7

Part 1: Planning with certainty

The plan would be:

0 – $FillWithWaterFromTap(K)$

1 – $BoilWaterInKettle(K)$

2 – $PourWaterToCupFromKettle(C1, K)$

3 – $PourWaterToCupFromKettle(C2, K)$

4 – $AddTeabagToCup(C1)$

5 – $AddTeabagToCup(C2)$

Part 2: Conformant Planning

1. The agents believe state would be: $kettle(K) \wedge cup(C1) \wedge cup(C2) \wedge \neg kettle(C1) \wedge \neg kettle(C2) \wedge \neg cup(K)$.

2.One possibility is that as there is some uncertainty regarding the predicates $containsWater(x)$ and $containsTeabag(x)$ we can introduce a new action that may be useful in helping to resolve the uncertainty. We can call this:

$Action(\ ClearContents(x)\ )$
$EFFECT$: $\neg containsWater(x) \wedge \neg containsTeabag(x)$

Another issue is the fact that we are not completely sure whether the water is hot or not. To deal with these a possible solution would be to amend the $BoilWaterInKettle(k)$ action by removing the precondition $\neg waterIsHot()$ which would then mean that the robot would be able to turn on the kettle again even if the water were hot already and we won't have to worry about the water being hot or not.

3. The conformant plan would be:

0 – $ClearContents(C1)$

1 – $ClearContents(C2)$

2 – $ClearContents(K)$

3 – $FillWithWaterFromTap(K)$

4 – $BoilWaterInKettle(K)$

5 – $PourWaterToCupFromKettle(C1, K)$

6 – $PourWaterToCupFromKettle(C2, K)$

7 – $AddTeabagToCup(C1)$

8 – $AddTeabagToCup(C2)$

Part 3: Contingent Planning

1. We should add three precepts which can each sense the unknown predicates:

$Percept(\ containsWater(x)\ )$

$Percept(\ WaterIsHot(x)\ )$

$Percept(\ containsTeabag(x)\ )$

2. A possible contingent plan would be:

[Percept(waterIsHot())

If waterIsHot() then PourWaterToCupFromKettle(C,K) else

BoilWaterInKettle(K), PourWaterToCupFromKettle(C,K)].