CS 271 - Introduction to Artificial Intelligence **Fall 2016**

HomeWork 6

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Problem 1 **Solution:**

PutHat PRECOND: $\neg Wear(hat)$
EFFECT: $Wear(hat)$

PutShoes PRECOND: $\neg Wear(shoes)$
EFFECT: $Wear(shoes)$

PutShirt PRECOND: $\neg Wear(shirt)$
EFFECT: $Wear(shirt)$

PutSocks PRECOND: $\neg Wear(socks)$
EFFECT: $Wear(socks)$

Problem 2 **Solution:**

Goal state: $On(C, Table) \wedge On(B, C) \wedge On(A, B) \wedge clear(A) \wedge clear(Table)$.

First Step valid action $Move(A, Table, B)$
State is $On(C, Table) \wedge On(B, C) \wedge On(A, Table) \wedge clear(A) \wedge clear(B) \wedge clear(Table)$.

Second Step valid action $Move(B, Table, C)$
State is $On(C, Table) \wedge On(B, Table) \wedge On(A, Table) \wedge clear(A) \wedge clear(B) \wedge clear(C) \wedge clear(Table)$.

Third Step valid action $Move(C, A, Table)$
State is $On(C, A) \wedge On(B, Table) \wedge On(A, Table) \wedge clear(C) \wedge clear(B)$. which is the start state. Thus the problem solved.

Problem 3 **Solution:**

Initial state: $At(Monkey, A) \wedge At(Bananas) \wedge At(Box, C) \wedge Height(Monkey, Low) \wedge Height(Bananas, High)$

Action Schema :

Go(x,y) PRECOND: $At(Monkey, x)$
EFFECT: $At(Monkey, y) \wedge \neg At(Monkey, x)$

Push(x,y) PRECOND: $At(Monkey, x) \wedge At(Box, x) \wedge Height(Monkey, Low)$
EFFECT: $\neg At(Monkey, x) \wedge \neg At(Box, x) \wedge At(Monkey, y) \wedge At(Box, y)$

ClimbUp PRECOND: $At(Monkey, x) \wedge At(Box, x) \wedge Height(Monkey, Low)$
EFFECT: $\neg Height(Monkey, Low) \wedge Height(Monkey, High)$

ClimbDown PRECOND: $At(Monkey, x) \wedge At(Box, x) \wedge Height(Monkey, High)$
EFFECT: $\neg Height(Monkey, High) \wedge Height(Monkey, Low)$

Grasp PRECOND: $At(Monkey, x) \wedge At(Bananas, x) \wedge Height(Monkey, y) \wedge Height(Bananas, y)$
EFFECT: $With(Monkey, Bananas)$

UnGrasp PRECOND: $With(Monkey, Bananas)$
EFFECT: $\neg With(Monkey, Bananas)$

c $With(Monkey, Box, s) \wedge (\exists x)[At(Box, x, s_0) \wedge At(Box, x, s)]$
There is no way to represent the relationship between two state within the plan in STRIP. So no way to represent this goal.

d In function push, add $Pushable(Box)$ in PRECOND.

Problem 4 **Solution:**

Problem 5 **Solution:**