CS255: Artificial Intelligence
Exercise Sheet 5 — Planning

1. Given a knowledge base KB and query sentence α, such that $\alpha = A \vee C$ and $KB = A \wedge (A \vee B) \wedge (B \vee \neg C) \wedge (\neg B \vee C)$, use inference by enumeration to determine whether $KB \models \alpha$.

2. Explain the differences between planning and problem-solving.

3. Explain the process of selecting and fulfilling open preconditions in a partial-order planner.

4. Describe how a clobbering conflict might occur during planning, and how to resolve it.

5. Show how a partial-order regression planner works by deriving a plan for the Blocks World problem described below. The available operators are as follows.

   $Action(Move(b, x, y),$
   $\quad Precond : On(b, x) \wedge Clear(b) \wedge Clear(y),$
   $\quad Effect : On(b, y) \wedge Clear(x) \wedge \neg On(b, x) \wedge \neg Clear(y))$

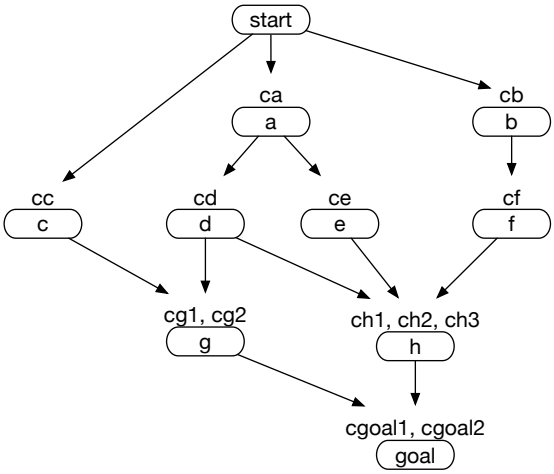
   $Action(MoveToTable(b, x),$
   $\quad Precond : On(b, x) \wedge Clear(b),$
   $\quad Effect : On(b, Table) \wedge Clear(x) \wedge \neg On(b, x))$

   You may assume that the interpretation of $Clear(b)$ means that there is a clear space on b to place a block, and so $Clear(Table)$ will always be true.

   The initial state for the problem is
   $\quad On(C, A), On(A, Table), On(B, Table), Clear(B), Clear(C)$
   and the goal state that your plan should achieve is
   $\quad On(A, B), On(B, C), On(C, Table), Clear(A).$

6. Explain what is meant by conditional planning, and why it might be useful.

7. Explain what is meant by action monitoring and plan monitoring. Considering the following plan, assuming a, b, c, d and e have been executed and g is selected for execution, what is the result of action monitoring and plan monitoring?


start
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cg1, cg2
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ch1, ch2, ch3
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cgoal1, cgoal2
goal