1.

A	B	C	$\overbrace{A \vee C}^{\alpha}$	A	$A \vee B$	$B \vee \neg C$	$\neg B \vee C$	KB
T	T	T	T	T	T	T	T	T ✓
T	T	F	T	T	T	T	F	
T	F	T	T	T	T	F	T	
T	F	F	T	T	T	T	T	T ✓
F	T	T	T	F	T	T	T	
F	T	F	F	F	T	T	F	
F	F	T	T	F	F	F	T	
F	F	F	F	F	F	T	T	

Yes $KB \models \alpha$

2.

Planning	Problem Solving
• States, goals and actions • Model action consequences • States not discrete (presence/absence of preconditions) • Use divide and conquer with subgoals	• State representations complete • Don't model actions and their effects • Must start over if solution changes/wrong • Relies on black-box calculations

3. POP steps at each iteration:

1. Select a step that allows us to achieve a precondition C of a step S_{need} that has open preconditions.

2. Choose an operator O to achieve C (from existing steps or a new step).
preference

3. Add operator O to plan (if needed) and record causal link O, OS_{need}.

4. If O is new add Start ≺ O and O ≺ End to ordering constraints.

4. • Clobbering occurs when a new action threatens a causal link that already exists.
• To resolve, the new action could be demoted (placed after the causal links) or promoted (placed before) to not break the causal links.

5.

$\boxed{\text{Start}}$

On(C, A), On(A, Table), On(B, Table), Clear(B), Clear(C)

On(C, A), Clear(C)

$\boxed{\text{MoveToTable(C, A)}}$

On(C, Table), Clear(A), ¬On(C, A)

clobbers therefore promote MoveToTable(C, A)

order

On(B, anything), Clear(B), Clear(C)

$\boxed{\text{Move(B, anything, C)}}$

Clear(Table), On(B, C), ¬On(B, anything), ¬Clear(C)

clobbers therefore promote Move(B, anything, C)

order

On(A, anything), Clear(B), Clear(A)

$\boxed{\text{Move(A, anything, B)}}$

Clear(anything), On(A, B), ¬On(A, anything), ¬Clear(B)

1. 2. 3. 4.

On(A, B), On(B, C), On(C, Table), Clear(A)

$\boxed{\text{Finish}}$

6. • Used when:
   - incomplete info: not known until run time
   - incorrect info
   - too many possible outcomes

• Allows:
   - creating subplans of the form [if x then plan1 else plan2]
   - check the state of x using sensing at execution
   - similar to POP-algorithm but:
     if a precondition can be achieved by observation, add observation to plan and complete plan for all outcomes (with conditional finish steps)

• Need to consider branching factor and the extra complexity.

7. • Action and plan monitoring are both methods to decide if we need to re-plan due to remaining parts of the plan not being able to be executed.

• Action-monitoring: look at preconditions of next action
• Plan-monitoring: look at preconditions of entire plan (excluding those that have a causal link not completed yet)

For the example:

Action: look at cg1 and cg2

Plan: look at cg1, cg2, ch1, ch2, ch3, cf
   • not cgoal1 or cgoal2 because require g and h to be executed