2. What is the difference between refutation and unification in resolution?

Refutation : To resolve, add the negation of the this we want to prove to the fact fase Unification: To resolve, just substitute the variable with suitable constant according to the facts.

4. If the forward chaining algorithm is applied to TSP (the travelling salesman problem) for a salesman who has to visit five cities, how do you determine the desired series of visits? Assume that he cannot visit a city more than once.

Since the direction of search is in a forward manner, the desired series of visits will be the path from the starting city (ex. A), then visiting other cities at least once and end by returning back to the city that it started from (i.e. A). Since cities cannot be revisited, the solution path should avoid and cannot include visits of a city which has already been visited i.e. avoid visiting the same city again.

5. What is the difference between a state space graph and a search tree?

A state space graph is a model representing the solution framework of the problem whereas a search tree represents the paths to be searched to find solution path(s) of the problem from the start state to any possible goal configurations, and also taking into account of dead ends.

4. (e) You are given two jugs (one can hold 4 liters and the other 3 liters of water). Assume that you are given no external measuring device. You can fill up a jug from a pump any time you need, and you can pour water out of a jug or from one into the other. The problem is for you to begin from a start state [0, 0] i.e. both jugs are empty, and to get to a goal state [2, 0] i.e. the 4-liter jug has 2 liters of water and the 3-liter jug is empty. Show the transition made between states by a sequence of legal moves (apply the rules given below).

The list of rules that you may apply to show the possible in solving this problem:

R1: If the 4-liter jug is empty, fill up the 4-liter jug until the 4-liter jug is full.

R2: If the 3-liter jug is empty, fill up the 3-liter jug until the 3-liter jug is full.

R3: Pour out water from the 4-liter jug until the 4-liter jug is empty.

R4: Pour out water from the 3-liter jug until the 3-liter jug is empty.

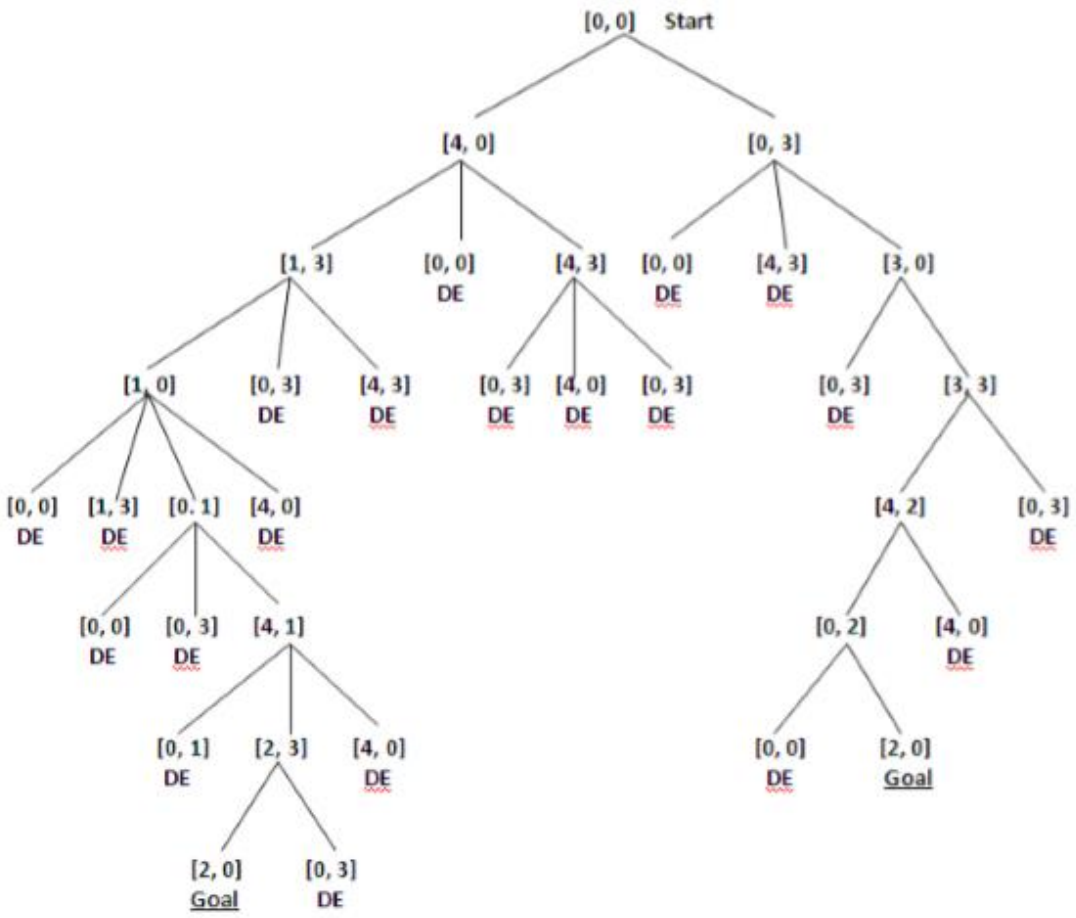
R5: Pour water from the 4-liter jug into the 3-liter jug until the 3-liter jug is full.

R6: Pour water from the 3-liter jug into the 4-liter jug until the 4-liter jug is full.

R7: Pour water from the 4-liter jug into the 3-liter jug until the 4-liter jug is empty.

R8: Pour water from the 3-liter jug into the 4-liter jug until the 3-liter jug is empty.

In this configuration [L, R], L represents the status of the 4-liter jug and R represents the status of the 3-liter jug. Draw the full search tree listing all possible moves to get from the start state [0, 0] until a goal configuration [2, 0] is found. Avoid cycles (dead ends) by not generating children of states already explored. (8 marks)



1. Application of inference rules is one of the proof methods. Give TWO (2) prominent characteristics of this method.

   Sound generation of new sentence from the old one

   A proof is a sentence of inference rule application

   Inference rules can be used as operators in a standard search algorithm

2. Resolution consists of three parts: unit resolution, set of support, and input resolution. Explain briefly the input resolution and provide an example of proof involved.

   Input resolution: always combine a sentence from the query or knowledge base from another sentence

   Example: modus ponen i.e. ∀ x cat(x) ⇒ has_paws(x) to cat(garfield) ⇒ has_paws(garfield)