Assignment 2

Q1) If Ravi goes wherever Raju goes and Raj is at School, where is Ravi? find using Resolution

→

a) If Ravi goes wherever Raj goes.
$\forall x$ [at (Raj, x) → at (Ravi, x)]

b) Raj goes at School
at (Raj, school)

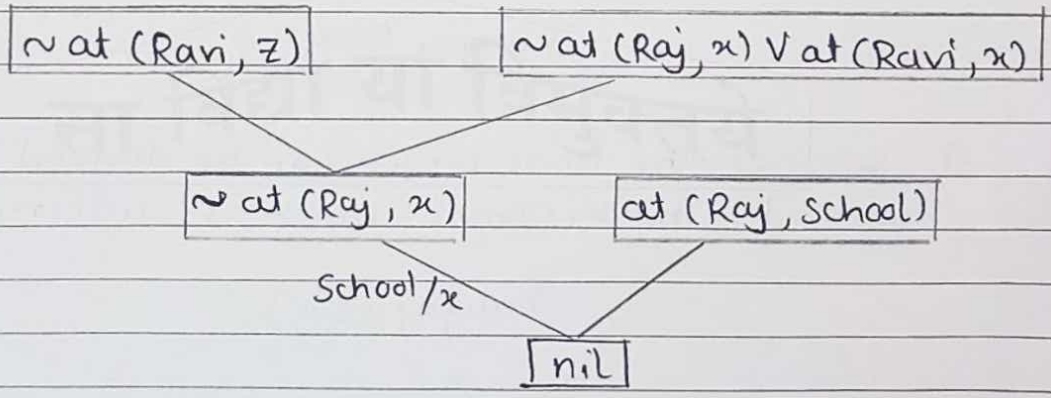
c) where is Ravi
at (Ravi, z).

Clausal form

i) ~ at (Raj, x) V at (Ravi, x)
ii) at (Raj, School)
iii) at (Ravi, z).

Proof: The negated goal is : ~ at (Ravi, z)

Resolution Tree :



Since the conclusion is 'nil' our assumption is wrong. Therefore keeping the substitution in mind, Ravi must be at school, since we proved that at (Ravi, School) holds true.

Q27 Dog is hungry.
If Dog is hugry, he barks.
If Dog barks, Raja is angry.
PT. Raja is angry using (i) forward (ii) Backward chaining.

→

fact are as follows: In first order definite clauses

i) Dog is hungry.
hungry(Dog) ..... ①

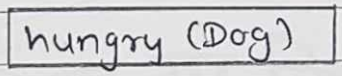
ii) if Dog is hungry, he is barks.
hungry(Dog) → barks(Dog) ..... ②

iii) if dog barks, Raja is angry.
barks(Dog) → angry(Raja) ..... ③

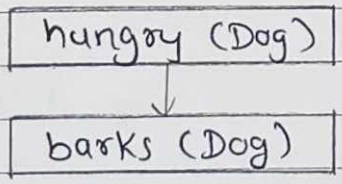
iv) Raja is angry.
angry(Raja).

By forward chaining.

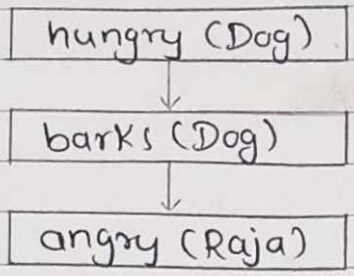
1) first we choose the clause which does not have any implication we select the fact hungry(Dog).



2) We see the facts which can be derived from clause. we add barks(Dog) which is inferred from rule 1.



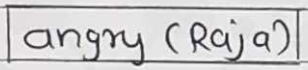
3) we can also infer angry(Raja) which is done when rule 3 miggers.



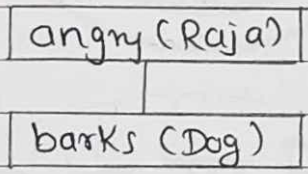
Hence, we proved that Raja is angry with forward chaining.

Backward Chaining:

1) we assume the goal fact. We'll prove that the other facts are true. Hence assuming that angry(Raja) is true.

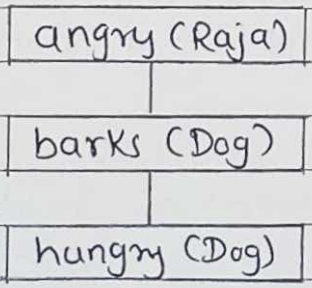


2) we infer other clauses from the goal fact. As evident in rule 3 barks (Dog) holds true.



3) we refer from rule 2, that hungry (Dog) holds true if barks (Dog) does

Thus,



Since hungry (Dog) is a fact, as known from rule (1), we have proved all facts and intermediate clauses. Thus, we have proven that Raja is angry by backward chaining

Q3) Write a STRIP program for partial order planning for any one example. Also analyze the effect and precondition.

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Problem: A situation has occured and the bulb in the holder has broken. There is a replacement bulb in a box. The goal is to replace the bulb and keep the broken bulb in the box.

STRIP Program: Representing the facts and clauses in first order predicate logic.

Broken bulb → Holder.
Working bulb → Box.

And the goal state is,
Working bulb → Holder
Broken bulb → Box.

1) Action : Remove broken bulb from holder (A)
- remove (broken, holder)
  - Precondition : in (broken, holder)
  - Effect : ~ in (broken, holder)

2) Action : Take working bulb out of the Box (B)
- remove (working, box)
  - Precondition : in (working, box)
  - Effect : ~ in (working, box)

3) Action : Insert working bulb in holder (C)
- Put (working, holder)
  - Precondition : ~in (working, box)
  - Effect : in (working, holder)

4) Action : Put the broken bulb in the box (D)
- Put (broken, box)
  - Precondition : Nin (broken, holder)
  - Effect : in (broken, box)

- Orderings :- O - {A < B < C < D}.

- Links :- L - {A → D, B → C}.

Q4) How will you design healthcare application using AI? What parameters and data will you consider for this?

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Problem : Cardiovascular disease (CVD) are no one cause of death globally, making an estimated 31% of all deaths that occur annually. People with CVD needs early detection and management, where AI can be of great help.

Data : Since the problem involves predicting heart failures, it makes sense to consider the patients basic features. But most importantly, we require data related to patient's blood. The features about the blood and various tests run on the blood sample give us the required data, which is parameterized. The parameters are described below.

Parameters :

(i) Age : It plays a pivotal role in CVD. Greater the age is usually associated with a greater risk of CVD

(ii) Sex : Since males and females exhibit different symptoms of an incoming heart failure, it makes sense to include this parameter.

iii) Anaemia: Decrease of RBC or haemoglobin. This can be a boolean value.

iv) Creatinine Phosphokinase: levels of CPK enzyme in blood (mcg) can be an integer

v) Diabetes: If the patient has diabetes (boolean)

vi) Ejection fraction: Percentage of blood leaving the heart at each ejection. Higher (50 - 75 %) is better (Integer)

vii) Hypertension: If the person's BP. This can be a bad indicator (Boolean).

viii) Platelets: Platelets in the blood (Kiloplateles / mgL). Platelet abnormalities can lead to CVD. (Double / Decimal)

ix) Serum ~~Cer~~ Creatinine: level of Serem Creatinine in blood (mg/dL). They are results of a creatinine tests (Double / Decimal)

x) Serum Sodium: Level of Serum Sodium in blood. This is a test for Hyponatremia. The respectable range is 135-147 (mEq/L) (Integer).