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Lab 7 : Truth table Entailment check

Algorithm :

Step 1 Initialize Knowledge Base
> Create an empty set for facts
> Create an empty list for rules, where each rule has a premise (conditions) & a conclusion

Step 2 Add Facts & Rules :
> Add facts to the set (known facts)
> Add rules to the list, where each rule has a list of conditions & a single conclusion.

Step 3 Inference Process :
> set a flag new_inferences to True
> While new_inference is True :
> set new_inference to False
> For each rule :
· check if all conditions (premises) of the rule are in the facts
· If so, & the conclusion to the facts
> Add the conclusion to the facts
> set new_inference to True
(Indicating that new facts were inferred)

Step 4 Check Hypothesis :
To check if a hypothesis is true, simply see if it is in the facts set, it is entailed by the knowledge base

: Continues inferring until no new facts are added, ensuring all possible conclusions are reached.

new_inference : A flag to check if any new facts were added in the current loop. If no new facts are added in a full iteration, the inference process stops.

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Example:

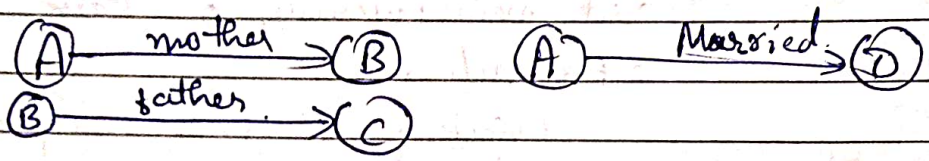
* Knowledge basis:

1 Alice is the mother of Bob
2 Bob is the father of charlie
3 A father is a parent
4 A mother is a parent
5 All parents have children
7 Alice is married to David.
6 If someone is a parent, their children are siblings

Hypothesis

"Charlie is a sibling of Bob"

Entailment Process :



Father & Mother is parent according to Knowledge basis if someone is parent their children's are siblings

Conclusion :

The hypothesis "charlie is a sibling of bob" is Entailed by Knowledge basis Where Charli & bob share the relationship through the rule that children of a parent are sibling.

O/P :- The hypothesis :- charlie is a sibling of bob is TRUE

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Lab 8 :-

Unification in First order Logic

Expression 1 — ¬ Brother (leftleg (Richard), John)

it says :- The left leg of Richard is not John's brother

here,

leftleg (Richard) is treated as a term &

Brother is a predicate

¬ → negation [indicates not true]

Step 1	They are not identical | ψ_1 : Brother (x, y) ψ_2 : Brother (leftleg (Richard), John)
Step 2	Predicate of ψ_1 & ψ_2 are same
Step 3	Both ψ_1 & ψ_2 have same number of argument = 2
Step 4	Initialisation of Subset SUBST = ϕ
Step 5	Iterate through argument of ψ_1 & ψ_2 i = 1 → S_1 = {(x | leftleg (Richard))} i = 2 → S_2 = {(y | John)}
Step 6	Final Substitution set SUBST = {(x | leftleg (Richard)) ; (y | John)}
Step 7	Interpretation :- (a) Subsitute ψ_1 in SUBST => ¬ Brother (leftleg (Richard), John) (b) Subsitute ψ_2 in SUBST => ¬ Brother (leftleg (Richard), John)

O/P :- Meaning : leftleg of Richard is not Brother of John.

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