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Assignment 2

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CLASS: B.E. IT

ROLL NO 49

SUBJECT: IS Lab

DOP	DOC	MARKS	SIGN

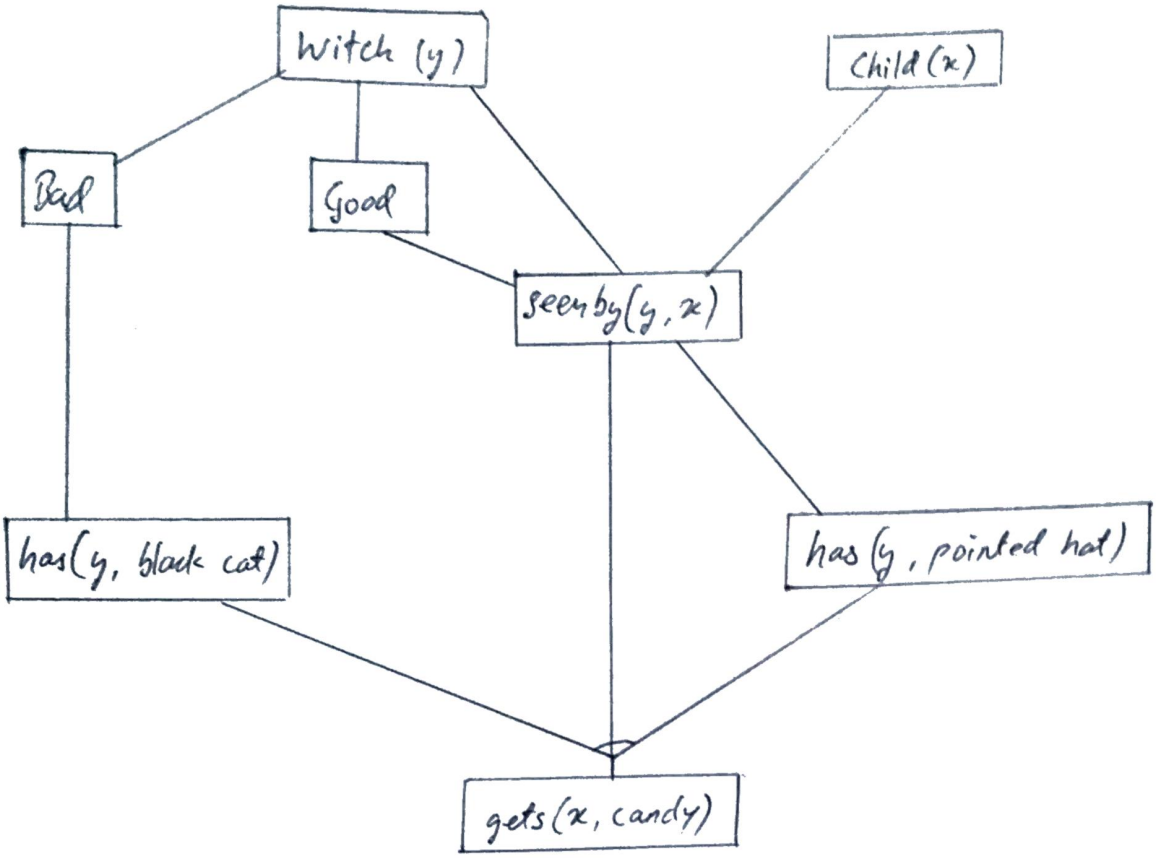
Q.1) Solve the following with forward chaining or backward chaining or resolution (any one). Use predicate logic as the language of knowledge representation. Clearly specify the facts and inference rules used.

Example 1:

1. Every child sees some witch. No witch has both a black cat and a pointed hat.
2. Every witch is good or bad.
3. Every child who sees any good witch gets candy
4. Every witch that is bad has a black cat.
5. Every witch that is seen by any child has a pointed hat.
6. Prove : Every child gets candy.

Ans: Inference rules -

1. $\neg \forall y$ has(witch(y), black cat) $\wedge$ has(witch(y), pointed hat)
2. $\forall y$ witch(y) $\rightarrow$ good $\vee$ bad
3. $\forall x, y$ sees(child(x), witch(y) $\rightarrow$ good) $\Rightarrow$ gets(child(x), candy)
4. $\forall y$ has((witch(y) $\rightarrow$ bad), blacks cat)
5. $\forall y, x$ seen by(witch(y), child(x)) $\Rightarrow$ has(witch(y), pointed hat)


witch (y)
child (x)
Bad
Good
seen by (y, x)
has (y, black cat)
has (y, pointed hat)
gets (x, candy)

Example 2

1. Every boy or girl is a child
2. Every child gets a doll or a train or a lump of coal
3. No boy gets any doll
4. Every child who is bad gets any lump of coal
5. No child gets a train
6. Ram gets lump of coal
7. Prove = Ram is bad.

Ans:

Inference rules

1. $\forall x \ child(x) \rightarrow boy \vee child(x) \rightarrow girl$

2. $\forall x \ gets(child(x), doll) \vee gets(child(x), train) \vee gets(child(x), coal)$

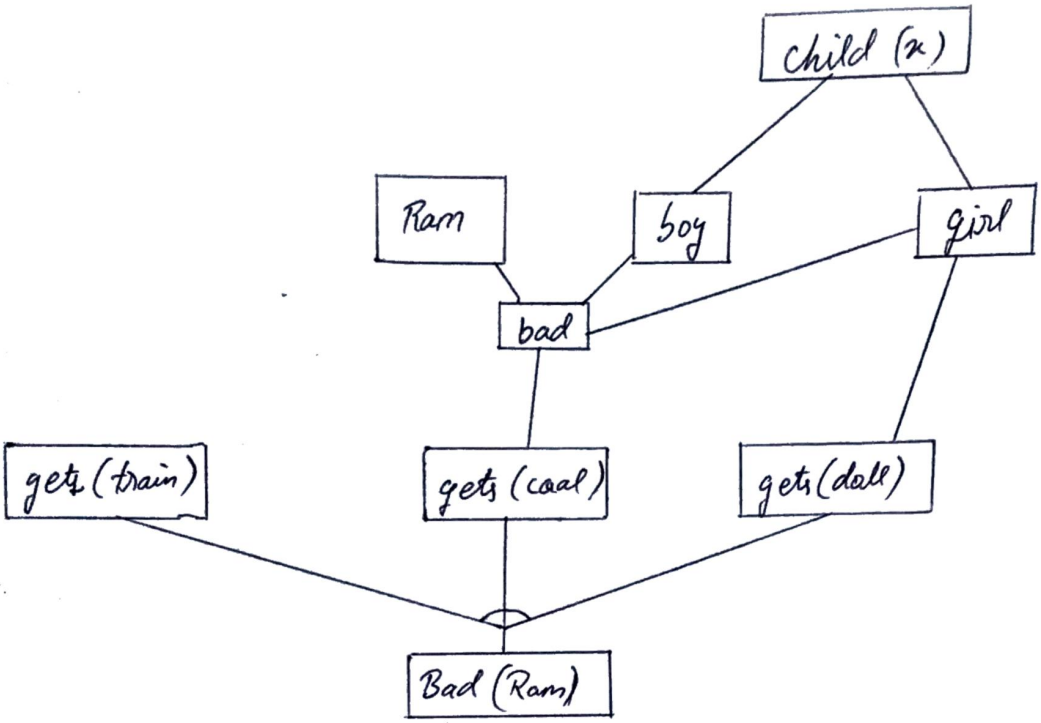
3. ~~$\neg \forall x \ gets((child(x) \rightarrow bad), coal)$~~

3. $\neg \forall x \ gets((child(x) \rightarrow boy), doll)$

4. $\forall x \ gets((child(x) \rightarrow bad), coal)$

5. $\neg \forall x \ gets(child(x), train)$

6. $gets(Ram, coal)$


child (x)
Ram
boy
girl
bad
gets (train)
gets (coal)
gets (doll)
Bad (Ram)

Q.2) Differentiate between STRIPS and ADL.

Ans:

	Parameter	STRIPS	ADL
1.	Full forms	STanford Research Institute Problem Solver	Action Description Language
2.	Literals allowed in states	Only positive Example - Intelligent ∧ Beautiful	Positive as well as negative example: ~boring ∧ ugly
3.	Assumption for Unmentioned Literals	Closed world assumption Unmentioned literals are false	Open world assumption, unmentioned literals are unknown
4	Equality	No support	Supported. Equality predicate (x = Y) is built in
5	Types	No support	Supported variables can have types → C: Car
6.	Effects	Effects are conjunctions	Conditional effect allowed when P:E
7.	Effect P ∧ ~Q means:	Add P and Delete Q	Add P ∧ ~Q Delete ~P ∧ Q

8.	Goals	Goals are conjunctions	Allows conjunctions and Disjunctions : ~poor ∧ (Famous ∨ smart)
9	Goals	Only ground literals	Quantified variables
10.	Scheme includes	Action name parameter list precondition effect	Action name parameter list (optional) groups of clauses : labelled : precondition, add, delete, update (optional)
11.	Modelling action in real world application	Not suitable	Suitable (This inadequacy of STRIPS led the development of ADL