Assingnment NO 2

Name :- Tejal P Dobale

RollNO :- 17

Class :- B.E - IT

SEM :- VII

Subject : IS LAB

DOP	DOA	Mark	Sign.

Q.1 Solve the following with forward chaining or backward chaining or resolution (any one) use predicate logic as language of knowledge representation clearly Specify the fact inference rule used

Eg:- 1

Every child sees some witch not witch has both a black cat & a pointed hat

Every witch is good or badd

Every child who sees any good witch get candy

Prove : Every child gets candy

Facts into fol.

i) $\exists x \forall y$ (child(x) , witch (y) $\rightarrow$ Sees (x, y))

$\sim \exists y$ (witch (Y) $\rightarrow$ has (Y, black cat) $\wedge$ has (Y, Pointed hat)

$\exists y$ (witch (y) $\rightarrow$ good(y) $\vee$ bad (y))

$\in$ X ((sees (x,Y) $\rightarrow$ (Witch (y) $\rightarrow$ good(y)) $\rightarrow$ get (x, candy)

FOL into CNF

$\exists x \forall y$ (child (x), witch $(y) \rightarrow$ sees(x,y))
$\rightarrow \sim \exists y$, (with$(y) \rightarrow$ has$(y$, black hat$)$
$\rightarrow \sim \exists y$ (witch $(y) \rightarrow$ has$(y$, Pointed hat$)$

2) $\forall y$ (witch $(y) \rightarrow$ good (y))
$\forall y$ (witch $(y) \rightarrow$ bad (y))
3) Ex [(sees $(x,y) \rightarrow$ witch $(y) \rightarrow$ good (y))
$\rightarrow$ gets $(x$, candy$)$

5) Ey [seen $(x,y) \rightarrow$ has $(y$, pointed hat$)$]
$\sim \forall y$ (Seen $(x,y) \rightarrow$ has $(y$, black hat$)$]

$\rightarrow$ Sees (x,y) witch(y) V seen (x, y)
{ good V bad/y }

$\sim$ Seen [x, (good) $\cap$ seen $(x$, bad$)$
has (y, z)
{ y/good V bad }
{ z/black cat V
Pointed

seen $(x$, good$)$ V seen $(x$, bad$)$
has (good pointed
hats V get$(x$, candy$)$

Seen $(x$, good$)$ v has (good,
pointed hat) v gets
$(x$, candy$)$
Seen $(x$, good$)$ V
gets $(x$, candy$)$

gets $(x$, candy$)$

get $(x$, candy

2) Example 2:

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

1) $\forall x$ (boy (x) or girl (x) $\rightarrow$ child (x))
2) $\forall y$ (child (y) $\leftrightarrow$ gets (y, doll) or gets (y, train) or gets (y, coal)).

3) $\forall w$ (boy (w) $\rightarrow$! gets (w, doll))
4) for all z (child (z) and bad (z)) $\rightarrow$ gets (z, coal)) $\forall y$ child (y) $\rightarrow$! get (y, train)
5) child (ram) $\rightarrow$ get (ram, coal)

To prove (child (ram) $\rightarrow$ bad (ram))

CNF clauses.

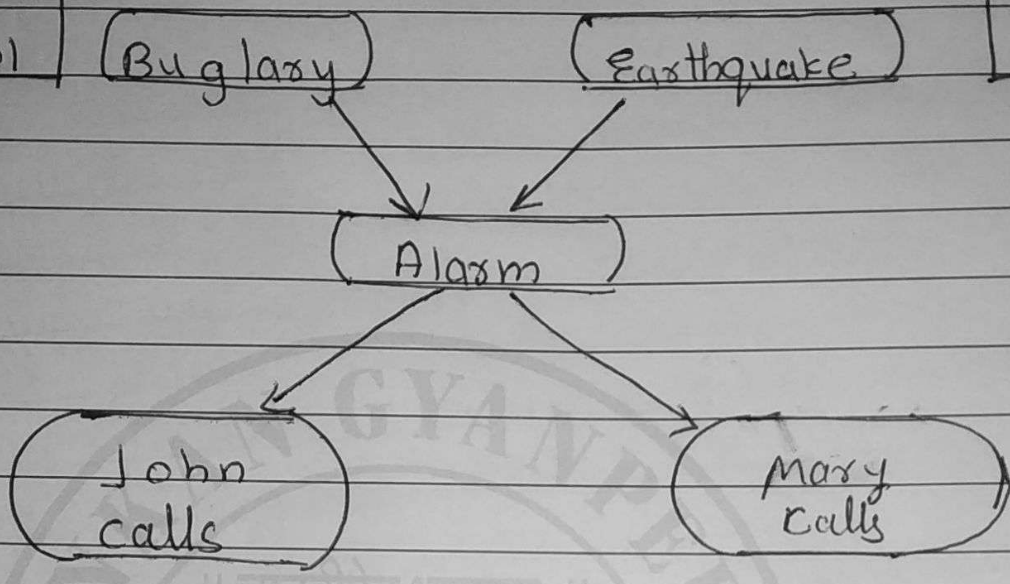
1) ! boy (x) or child (x)
   ! girl (x) or child (x)
2) ! child (y) or gets (y, doll) or get (y, train) or gets (y, coal)
4) ! child (z) or ! bad (z) or gets (z, coal)
5) ! child (ram) $\rightarrow$ gets (ram, coal)
6) bad (ram)

STRIPs language	ADL
Only allow positive literals in the states for eg:- A valid setence is STRIPS is expressed Intelligent ^ Beautiful	Can support both positive & negative literal for eg:- Same sentence is expressed
STRIPS stand for standard Research Institute Problem Solver	Stands for Action Description Language
Makes use of closed world assumption (i,e) un mentioned literals are false	3) Makes use of open world assumption (i,e) unmentioned literals are Unknown

Q.4

P(B)
0.001

P(E)
0.002



B	E	P(A)
F	T	0.95
T	F	0.94
F	T	0.29
F	F	0.001

A	P(J)
T	0.09
F	0.05

A	P(M)
T	0.70
F	0.01

The topology of the network indicates that Burglary and earthquake affect the probability.

of the alarms going off.
whether John and mary call depends only on alarm
They do not perceive any burglaries directly they do not notice minor earthquakes and they do not confer before calling
Mary listening to loud music and john confusing phone n ringing to sound of alarm can be read from network only implicity as uncertainly associated to calling at work.

The probability actually Summarise potentialy infinite Set of circumstances
The alarm might full to go off due to high humidy, power failure, dead battery cut wries a dead mouse steick unside the bell, etc.
The condition probability tables in n/w gives probability for values of random variable depending an combination of value for the parent nodes

In general a table for a Boolean variable with k parents contain 2^k independently specific probabilities.

A generic enty in joint distribution is probability of a conjuction of particular assigment to each variable $P(X_1 = x_1 \cap \ldots \cap X_n = x_n)$ abbreviated as $P(x_1, \ldots, x_n)$

The value of this entry is $P(x_1 \ldots x_n) = \Pi_{i=1,n} P(i, \text{Parents}(x_i))$

$= P(j \cap m \wedge a \cap \sim b \cap \sim e)$

$= P(j|a)\,(P(m|a)\,P(a|\sim b \cap \sim e)\,P(\sim b)\,e\,(\sim e)$

$= 0.09 \times 0.07 \times 0.001 \times 0.999 \times 0.998$

$= 0.000628$

Bayesian Network