## SSN COLLEGE OF ENGINEERING RECORD SHEET

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Logic Programming Assignment-11

Griven the following stadements.

Laxman is Wherever Ram is

Ram is at Ayodhya.

Where is Laxman?

answer using logic programming.

Laxman is wherever Ram is.

Vx At (Ram, oc) -> At (Laxmoun, x)

TAE (Roem, De) V At (Lax man, De)

Oclause: {TAt (Ram, a), At (Laxman, 2)),

· Ram is at Ayochya.

AL (Ram, Ayodhya)

@ clause: { At (Ram, Ayodhy a) ].

Good clause; where is Laxmon? => At ( Laxmon, y)

(hegaution)

@ clause : { TAt (Laxman 14), Answer (4)}

·O {7 At (Ram, 2), At(Laxman, 2)} @ {7 At (Laxman, y),

Answer (y) ].

2/4

{TAt(kam, y), Answer(y)]. @ {At(kam, Ayodhya,

g I Agodhya.

is By Answer genon action, we find that Laxman is ad Agodhya { Answer (Ay ochya)}

i. temule ancestor of george ancestor (George, w) A female (w) Negation: Tancestor (Gleorge, w) V7 female (w). Tana estor (Greorge 100) V Tremale (w) can cestor (212) V Tporod ( x1y ) v Tancestor (ソイン). oc George Themale (w) V Trooper (yearge 14) parent (george, andy). V Tan Cestor (y,w). ylandy. 7 female (w) v Tan Lestor (andy, a), ancestor (x12) v 712 word (213) 11 ance storly, 2) zlw. I female (w) V T present (Andey y) Pavierd (andy, mary v 7 ancestorly w). y massy female (many) Terrale (w) N dancestory (mary, w) w mary. ancertor (x, oc). 7 an Cestor (mary, mory). oc movey Answer: w: Mary, ii. male ancestor of george. ancestor(21x) 7 ancestor (george a) v male (Q) Il goorge male (george, male (george)

'ancestore george (Q) 1 male (Q). Goal clause: Tancestor (Greorgera) v tmale (a) Tancestor (Gleong e. Q) vamable a) aparent (Xiy) vancestor (yz) v cuncestor (xiz) 210 George -imale(a) v7 parent(georgeig) v parient (george, Sam). Tan Lestorly, a) ylsam thate (a) v Tancestor (Sam, a). ancestor(x,x) x/sam ,Qx. male(sam) Tmale (sam). Tancestor(george, a) v7male(e) Travout (x14) v7ancestor(y,z) al George Vancestor (242) -male(a) v spowert (George, y) v Basish (george, andy). rancestor (y, a) y lardy. ancestor (x,x) -made (a) V7 ancestor (andy, a) al andy · elx. Tmale (andy) male (andy) Male ancestors of george ane george, som and andy.

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P(x,z):- Q(x,y), p(g,z) 0
3-
     P(u, w) @
     a(aib) 3
     Croal clause! G = {7p(v,b)}.
     [87@(N,y),7P(y,b)3,[x|v].[z|b].). (1],[v|b]).
solution 1)
     [ ? TP(b,b)], [2/N][2/b][V/a][4/b] . (276(Nb)], [2/V][2/b]
                                    B. []. [alv] [z/b][y/b][v/k])
     (27@(b,4),7p(y,b)3,[2/W[2/b]
                                      ([],[x|v][z16],[v|a](y|b)
              [कार्यात्राधी (याधीट्याधी).
                                                  [UIB].
                                                  Solution 2.
      (१७७(७))3, (२/४)(२/६)(४)
            [416](216](216)
            Jailwie
      Solution were obtained;
     SolutionA: U=b => Plbib)
     solution a : V = a =>p(a1b).
    Procedural semantics:
4.
    1. male (philip)
     2. female (elizabeth)
     3. Provent (elizabeth, charles).
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4. parent (elizabeth, anne)

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5. parent (philip, anne).
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6. foother (XIX): - powent (XIX) , male (I).

Quory

? - father (x, Anne).

Good clause =) Totalher (XIAnne) After Frectification

7 father (Q, Anne).

3. QI Elizabeth B Annel Fire. 6 Amalama -mule philip) Ame ichcolomale (Elizabeth) Elizabeth! constant cannot

be substituted by

a constant

Attemp to unity, Acriled

D | Philip!

The refere by procedural semantic, we assive at the conclusion that philip is Anne's father

Declarative semantics: Let p be a logic program. 5.

- 1. male (philip)
- 2. female (Flizabeth)
- 3. povent (elizabeth, charless)
- 4. Pasont (elizabeth, anne).
- 5. parcent (phipip canne).
- 6. Tpoolant (X, Y) V7 male (x) & father (X, Y) Model theoretic sematics based on following Principles.

1. Herbrand universe. U(p) = & philip, elizabeth, chantes, anna] [u(p)] = 4.

## 2. Herbrand Base:

B(p) = { made (philip), made (elizabeth).... female (philip), female (elrabeth)... Provoid (philip, philp), parout (philip, elieute). parant l'elizabeth, charles).. father (philip, Philip), father (philip, annel].

IB(P) = 2 predicate \* tour = 2x4 + 2x42 => 8 +32 = 40 ground goals.

3. Model and Interpretation: M(p) := { male (philip), female (elizabeth, parent ( elizabeth, charless), parant (elizabeth, curre), parant (

philip, anne), of other (philipt, anne)3.

M(p) EB(p). forther (philip , anne ) EM(p) Since each Bi B2, B3 .... in A & B1, B2, B3... i's in The interpretation

i.e. porent (philip, ann e), male (philip) EM(p)

p(aia) 0 2-p(a12) 1 p(2, a), Good clause: 7P(a12) V7172,a) P (a1b) @ 12 (21,4):- P(y,x)& 7 P(y, 2) v P (34) =

model.

produced interpretation: 7p(a12) V7p(21a). xla [zla] O @ 216 7p(bia) 70(2A) V P(a12) TP (a)a) infinite × TP(a1b) Tplain) intivite writy Solution obtained: 1) 2=0 2) Z=b Model theoretic interpretation: Let p be the logic program. \* U(p) = {aib3 |U(p)|=2 =) Herbrand universe \* B(P) = { P(a,a), P(a,b), P(b,a), P(b,b)3=) Herbrand 1 B(p) 1 = 1 x22 = 4. \* Model M(P) = { P(a,a), P(a,b), P(b,a)]. pcdibl is in the

7. Logic program P.

1. paront/tukul i budi).

2. parant/budi, doni).

3. parent I doni, harto).

4. parant (harto, tomi).

5. ancestor (xix):- Provent (xix) rancestor (xix)

6. ancestor (\$12):- parant (x1y), ancestor (y, 2) Tpoolent (xix) V 7 ancestor (yiz) V ancestor (x12) descendant of budi- ancestor (Budia) Y/a Tancestor (Budince)

Y/a 6 210 . Travent (Budi, Q). Trovour (Budi, y) v an (extor (Y,Q). 0/ @ yldow Tancestor (doni Q). not possible. TPODENT (don's Q) of of 100 al house Arower: first & descendants of Budi dwing DES Traversal core. 1) doni.

2) harto.