DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
ONLINE SESSIONAL EXAMINATION

B.Tech (CE) sem→7
Subject : Artificial Intelligence

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signature → Parakruti

Date : 23/10/2020
Time: 8:15 pm to 9:30 pm
total pages: 11

(Q.1)

(a) "There is someone to love anyone who loves all living things"

$$Ex : \forall y : love(x,y) \rightarrow \forall z\ love(y,z) \wedge living(z)$$

here we construct like.

q: y loves all living things

p: there exist some x to love all y

(b) **Model**

→ Possibility or belief based sentence

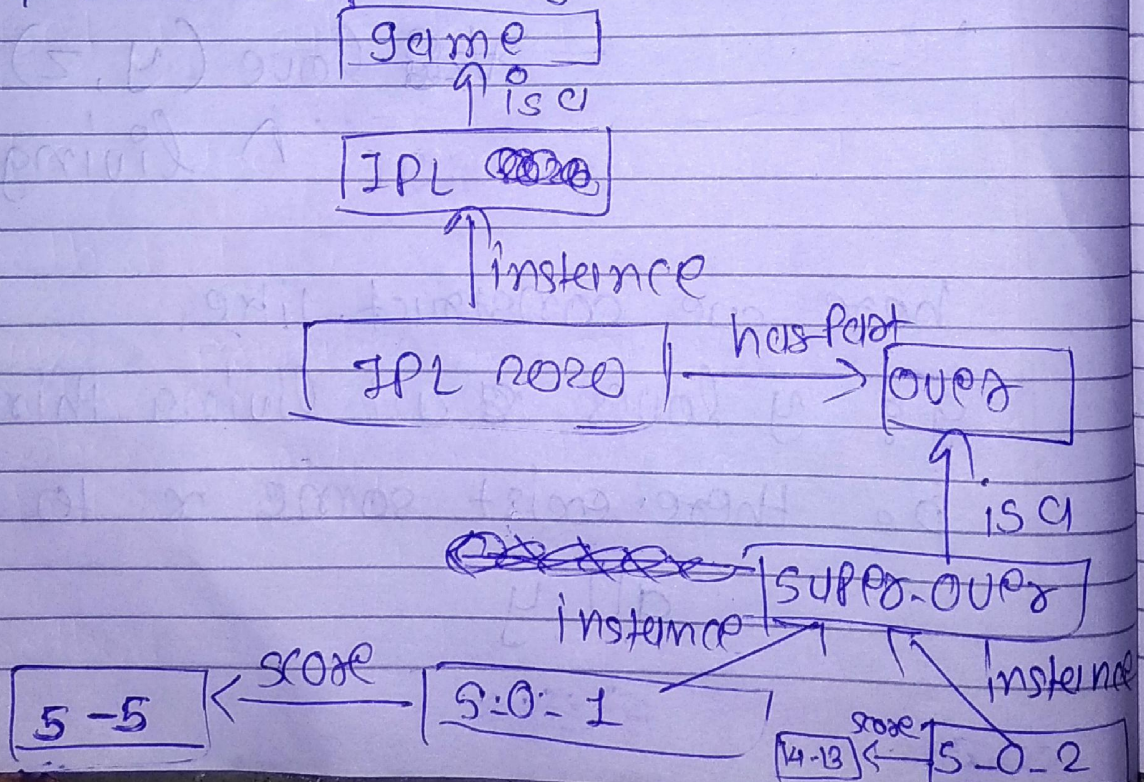
here size of KB goes on increasing & never decreases.

counter-model

→ here size of KB may increase or decrease.

→ asserted fact may be deleted later

(c) "There were two super overs in an IPL 2020 game with scores 5-5 & 14-13 respectively"



(d)

network ↓ n[illegible]rk ↓ NT[illegible]RK ↓ N362	Henary ↓ [illegible]Hnr ↓ HNR ↓ H56 ↓ H560
Ashcroft ↓ ASCRFT ↓ A22613 ↓ A2613 ↓ A261	Water ↓ WTR ↓ W36 ↓ W360

(e) using trigram

<s> Do I like ?

$w_{i-2} = I$ $w_{i-1} = like$

$P(school / I, like) = \frac{2}{3}$

$P(Trishu / I, like) = \frac{1}{3}$

for others probability = 0

∴ school is more probable.

(f) methods of conflict resolution used in rule based expert system.

There are 3 methods for it.

method 1

Rules are given priority levels & when conflict is there, rule that has highest priority is fired.

method 2 : (longest matching strategy)

→ conclusion derived from the longest rule is fired.

method -3

The rule that has matched the facts most recently added to the database, is fired.

Q.2

(A)

word	frequency
<s>	4
heavy	2
rain	4
in	3
coastal	2
area	2
</s>	4
long	1
today	1
having	1
fun	1
seasons	1
starts	1
	27

unigram

① P(<s>) x P(rain) x P(in) x P(coastal) x P(area) x P(</s>)

$= \frac{4 \times 4 \times 3 \times 2 \times 2 \times 4}{(27)^6}$

② P(<s>) x P(having) x P(fun) x P(in) x P(coastal) x P(area) x P(</s>)

$= \frac{4 \times 1 \times 1 \times 3 \times 2 \times 2 \times 4}{(27)^7}$

bigram

<s> rain in coastal area </s>

$= P(rain / <s>) \times P(in / rain) \times P(coastal / in) \times P(area / coastal) \times P(</s> / area)$

$= \frac{1}{4} \times \frac{1}{4} \times \frac{2}{3} \times \frac{2}{2} \times \frac{2}{4}$

$= \boxed{\frac{1}{48}}$

(7)

<s> having fun in costal area </s>

$P(\text{having}/\langle s\rangle) \times P(\text{fun}/\text{having}) \times P(\text{in}/\text{fun}) \times P(\text{costal}/\text{in}) \times P(\text{area}/\text{costal}) \times P(\langle /s\rangle / \text{area})$

$$= \frac{1}{4} \times \frac{1}{1} \times \frac{1}{1} \times \frac{2}{3} \times \frac{2}{2} \times \frac{2}{2}$$

$$= \boxed{\frac{1}{6}}$$

(B) (I) I saw a bat → Homophone ambiguity (similar sounding) — sentence

(II) I saw the star with a telescope → structural ambiguity (possibility of multiple phrase attachment)

(III) watch what you want, when you want. → lexical (sense) ambiguity (2 senses of watch)

(IV) Rahul & NIRUA both are married. → sense ambiguity (both are married to eachother or to different persons)

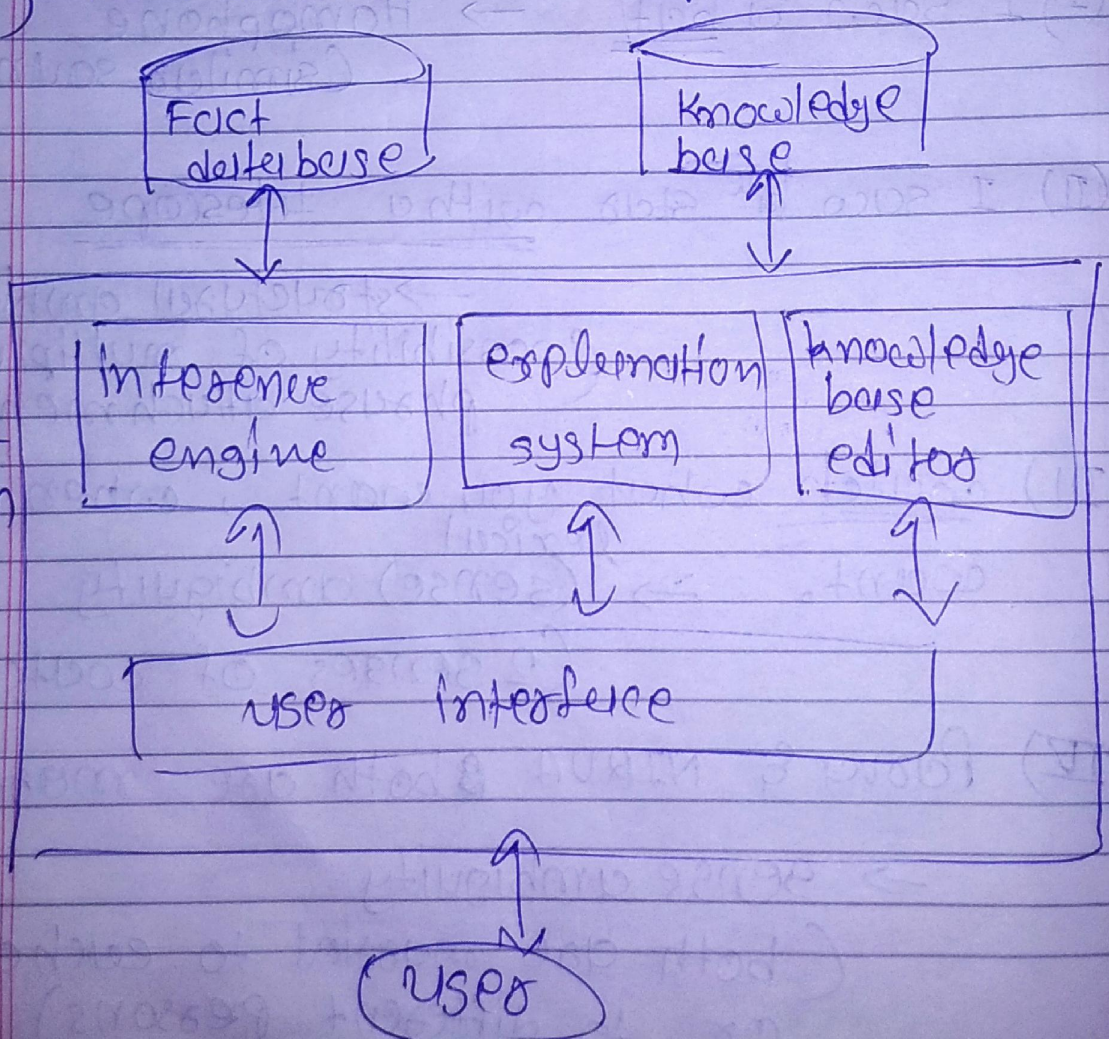
(v) I went to hospital & they told me to go home & rest

→ ambiguity with pragmatics (sentences influence each other)

(VI) adjacency

→ word boundry ambiguity (phonetic)

(c) Architecture of expert system



Q.3

(A) what food does sue eat?

clauses

~~food. like (John, x)~~

① $\forall x$: like (John, x) $\Rightarrow$ V $\neg$ food (x)

② food (apple)

③ food (chiken)

④ food (x) :

$\forall$ y : eat (y, x) v $\neg$ alive (y)

⑤ eat (Bill, peanut) $\wedge$ alive (Bill)

⑥ $\forall$y : killed (y) v alive (y)

⑦ $\forall$x : eats (Bill, x)

$\rightarrow$ eats (Sue, x)

⑤ & ④

food (peanut) ~~eats (Bill)~~

$\wedge$ alive (Bill)

∴ eats (Bill, peanut)

∴ from (7) eats (Sue, peanut)

(B) added clauses

(8) ∀y : ∃x : eat(y, x) ∨ die(y)

(9) ∀x : die(x) ∨ alive(x)

(10) alive(Bill)

→ logic : Bill is alive
so Bill eats something.
& as Bill is alive & also eats something.
Bill eats some food.
so Bill eats something from food
& as apples & chicken are food, Bill must eat all or one of them.

So Sue eats everything or something from them.
but we can't decide, so ambiguity is there.

(8), (9) if you dont eat anything you are not alive.

(8) $\wedge \neg$ (9)

$(eat(y,x) \vee die(x)) \wedge (\underset{(x)}{die} \vee \underset{(x)}{alive})$

(11) $eat(y,x) \vee \neg alive(x)$

(10) $alive(Bill)$

(10), (11) $\exists x : eat(Bill, x)$ ← (12)

(12), (7) $\exists x : eat(Sue, x)$

end of answer sheet