

IV B.Tech II Semester Regular Examinations, Apr/May 2008
NATURAL LANGUAGE PROCESSING
(Computer Science & Engineering)

Time: 3 hours**Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Explain with an example the augmented transition Matrix (ATN).
 (b) “Archie as broken the window with the massive stone “ Parse and represent the sentence in ATN. [8+8]
2. (a) Given the prolog based grammar, show a trace in the format with all the steps, current steps, backup states of the proof that the following is a legal sentence

“the john ate the cat”

- i. $s(p1, p3) :- np(p1, p2), vp(p2, p3)$
- ii. $np(p1, p3) :- art(p1, p2), n(p2, p3)$
- iii. $np(p1, p3) :- name(p1, p3)$
- iv. $pp(p1, p3) :- p(p1, p2), np(p2, p3)$
- v. $vp(p1, p2) :- v(p1, p2)$
- vi. $vp(p1, p3) :- v(p1, p2), np(p2, p3)$
- vii. $vp(p1, p3) :- v(p1, p2), pp(p2, p3)$
- (b) Consider the following grammar
 $S \rightarrow ADJS\ N$
 $S \rightarrow N$
 $ADJS \rightarrow ADJS\ ADJ$
 $ADJS \rightarrow ADJ$
 Lexicon : ADJ :red, N:House
 - i. What happens to the top-down depth-first parser operating on this grammar Trying to parse the input red? In particular, state whether the parser Succeeds, fails or never stops.
 - ii. How about a top-down breadth -first parser operating on the same input red red?
 - iii. How about a top-down breadth first parser operating on the input red house?
 - iv. How about a bottom-up depth-first parser on red house? [8+8]
3. (a) What are Auxiliary or Helping Verbs?
 (b) Discuss all the kinds of Auxiliaries with example?
 (c) Give some examples of multiple auxiliary? [4+6+6]
4. (a) Explain in detail the forward chaining & backward chaining in IF then reasoning

- (b) Explain
 - i. Abduction
 - ii. Resolution [10+6]
- 5. Give the steps involved in a tree search algorithm. [16]
- 6. (a) What are the two fundamental operations to the discourse model?
(b) With the help of diagram, Explain the operation & relationships of discourse model. [8+8]
- 7. Explain with Examples
 - (a) Simplification Rules
 - (b) Translation Rules [8+8]
- 8. (a) What do you mean by Natural Language generation (NLG)?
(b) What is Canned Text? Give Examples.
(c) What is template filling? Explain?
(d) What is Aggregation? [3+4+4+5]

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1. (a) What do you mean by Black Box Evaluation?
(b) What do you mean by White Box Evaluation?
(c) Explain with an example “Evaluating Language Understanding systems”?
[4+4+8]
2. (a) Draw the parse tree for the following sentences?
“the visitor saw the old painting in the den”
(b) Discuss the steps involved in eliciting the meaning from the sentences? [8+8]
3. Explain briefly about
 - (a) Language Knowledge
 - (b) Background Knowledge
 - (c) General World Knowledge
 - (d) Context Knowledge [4×4=16]
4. (a) What do you mean by Unification of two literals?
(b) Discuss the resolution refutation procedure?
(c) List the steps involved in answering questions by using resolution? [4+6+6]
5. (a) Describe in detail with an example a set of primitives acts?
(b) List & Explain the set of conceptual tenses proposed by Schank. [8+8]
6. (a) What are the two fundamental operations to the discourse model?
(b) With the help of diagram, Explain the operation & relationships of discourse model.
[8+8]
7. Write short notes on:
 - (a) Analysis of the input
 - (b) Transfer
 - (c) Generation of the Output
 - (d) Interlingua [4×4=16]
8. (a) Explain why RSST has had a greater influence on NLG?

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Set No. 2

- (b) What information the knowledge base need to contain to make the appropriate choices in your network? [8+8]

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1. (a) Discuss in detail the different forms of Knowledge relevant for Natural Language Understanding?
(b) Explain Syntax, Semantics & Pragmatics. [10+6]
2. (a) What is GAP Threading?
(b) What are extra position grammar?
(c) Distinguish between bounded (Local) movement and unbounded (non local) movement? [4+4+8]
3. (a) Explain the two kinds of grammar Equivalence?
(b) What do you Mean by Domain specific knowledge? Explain with example. [8+8]
4. (a) Discuss in detail procedural inference techniques and declarative inference Technique found in knowledge representation?
(b) Discuss with example knowledge representation based on First-order predicate calculus. [8+8]
5. (a) Define Pragmatics? Give example.
(b) What is
 - i. Disclosure
 - ii. Monologue
 - iii. Dialogue
 - iv. HCI
(c) Explain the two fundamental reference operations & relationships of Disclosure model? [4+8+4]
6. (a) Describe the steps taken to resolve a pronoun.
(b) Illustrate the operation of the above by example
John saw a beautiful Acura Integra at the dealership.
He showed it to bob. He brought it . [8+8]
7. (a) Write . (((, . (b,[])) , .(c,[])) in ordinary list notation (with square brackets and commas and draw a tree diagram of it?

- (b) Draw both a tree diagram ,and a cell and pointer diagram like the diagram above ,for each of the following terms

$F(a+b)+g(c,d)$ $f(f(f(f(f(g))))))$ $2+3*4$

Note that to represent a number, prolog does not use a pointer instead it stores the number itself in the cell, note also that unlike the symbol table, the tree diagram of $f(f(a))$ contains f in two different places. [16]

8. (a) What do you mean by Natural Language generation (NLG)?
(b) What is Canned Text? Give Examples.
(c) What is template filling? Explain?
(d) What is Aggregation? [3+4+4+5]

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1. (a) Discuss in detail the different forms of Knowledge relevant for Natural Language Understanding?
(b) Explain Syntax, Semantics & Pragmatics. [10+6]
2. (a) Discuss the two Useful tasks that the language processing problems are divided?
(b) Explain Lexical Processing (Lexicon) with example.
(c) What is Lexical disambiguation? [4+4+8]
3. Describe in detail the complex notations of syntax & grammar with examples.
 - (a) Consistency
 - (b) Grammatical Relations
 - (c) Sub categorization & dependencies
 - (d) Relationships [4×4=16]
4. Explain in detail about
 - (a) Semantics of FOPC
 - (b) Variables & Quantifiers
 - (c) Complete
 - (d) Plausibility Reasoning [4×4=16]
5. Explain in detail the five types of referring expressions? Give example to each. [16]
6. Describe in detail with an example
 - (a) Indefinite noun phrases
 - (b) Definite Noun Phrases [16]
7. Write short notes on:
 - (a) Analysis of the input
 - (b) Transfer
 - (c) Generation of the Output
 - (d) Interlingua [4×4=16]

8. (a) List & Explain in detail the three fundamental concerns in generations?
(b) Explain the procedure for generation in a fully specified system networks.

[6+10]
