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Department of Computer science
Module : Natural language Processing and pattern recognition
Level / Year: M2 AI(2024/2025)

Assignment N° 1

Exercise 1

Using the finite state transducer, get the root of the following words:

- Studying, running
- Got, went, played
- Men, do, glasses
- Dog sleeps

Exercise 2

Using context free grammar, create parse trees for the following sentences:

1- The dog sleeps
2- Does the dog run?
3- The cat sleeps on the mat
4- The man who runs is tired
5- Old men and women

Modifying the first parsing tree by adding new rules, create a parse tree of the following sentence:

Where does the cat sleep?

Exercise 3

Analyze the semantic roles and dependencies in the following mini-dialogue.

- **A:** "Can you pass me the salt?"
- **B:** "Sure, here you go."

1. What are the ACT performed by A and B?
2. Give the conceptual dependency representation of this dialogue?

Exercise 4

Analyze the following CD representation.

Sentence: "The baby drank milk from the bottle."

- **Given Representation:**
  - ACT: PTRANS
  - Agent: Bottle
  - Object: Milk

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- Recipient: Baby

Question: is there a mistake in this CD representation? If yes, how would you correct it?

Exercise 5

Give the CD diagrams of the following sentences.

Sentences:

- "After eating lunch, Tom went to the park and played football."

- "Anna borrowed a book from the library and returned it the next day."

- "Mark wrote an email to his boss and asked for a day off."

- “John was sad because marry hit him”

Exercise 6

Design an FST with appropriate states and transitions for the given sentences providing a normalized sentence as the output for each input sentence (normalize the contractions)

1. I can’t go to the party.
2. She’s already there.
3. I’d’ve called you if I had known
4. The car isn’t moving quickly

Give the parse tree of these sentences using CFG, then, give their CD representation.

Exercise 7

Choosing the domain of restaurant orders, we want to design a conceptual dependency representation scheme. For that give:

1. A list of primitive ACTs relevant to the domain
2. A set of conceptual categories (e.g., objects, locations, times)
3. Examples of how at least five different sentences in this domain would be represented using your scheme