SEMANTIC NETS & FRAMES

SEMANTIC NETS

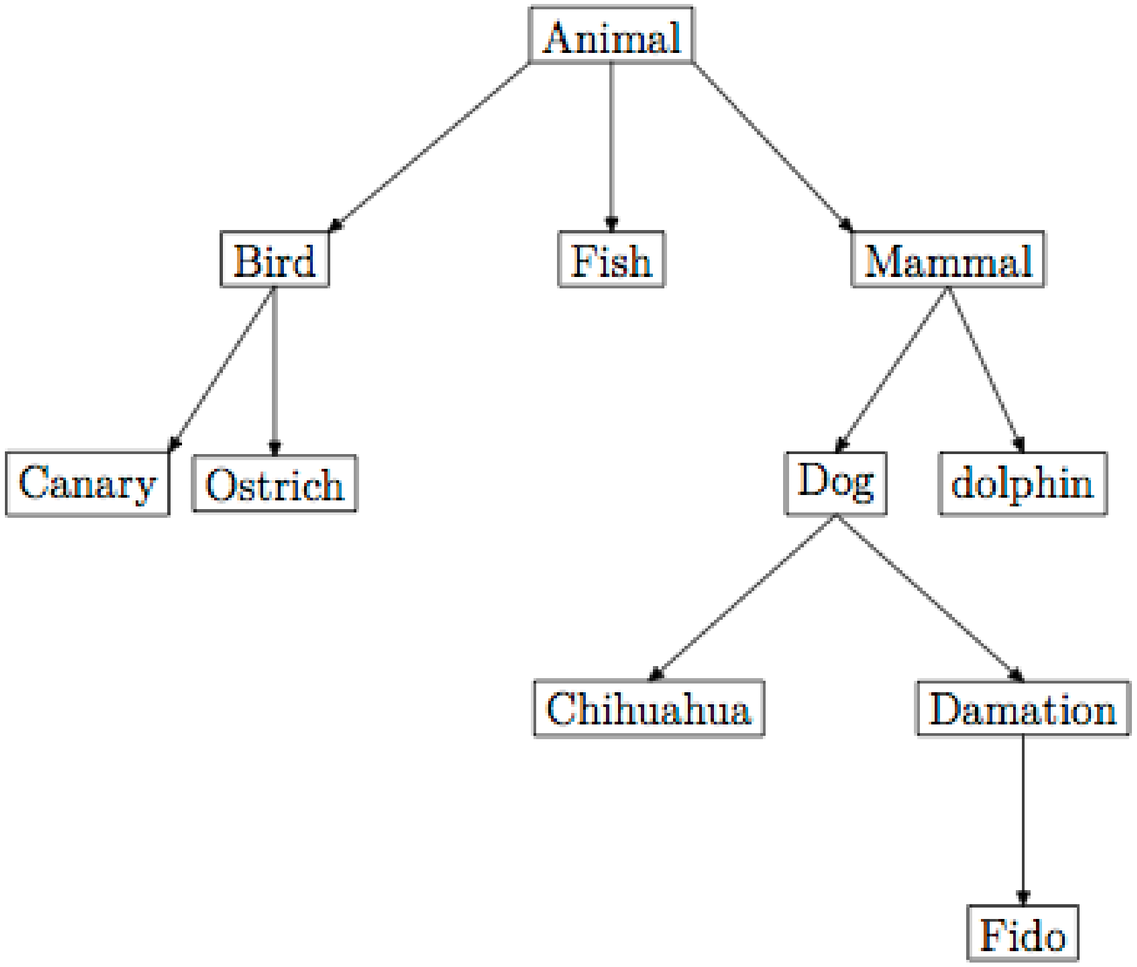
- Semantic nets are graphical representations used in artificial intelligence and knowledge representation.
- **Structure:** They consist of nodes (concepts or entities) connected by labeled edges (relationships).
- **Usage:** Semantic nets help model and represent knowledge in a structured and visual form.

TYPES OF RELATIONS IN SEMANTIC NETS

- **Is-A Relation:** Indicates a subclass or superclass relationship (e.g., "Car is-a Vehicle").
- **Part-Of Relation:** Shows a whole-part relationship (e.g., "Wheel is part of a Car").
- **Instance-Of Relation:** Connects instances to their respective categories (e.g., "My car is an instance of a Car").

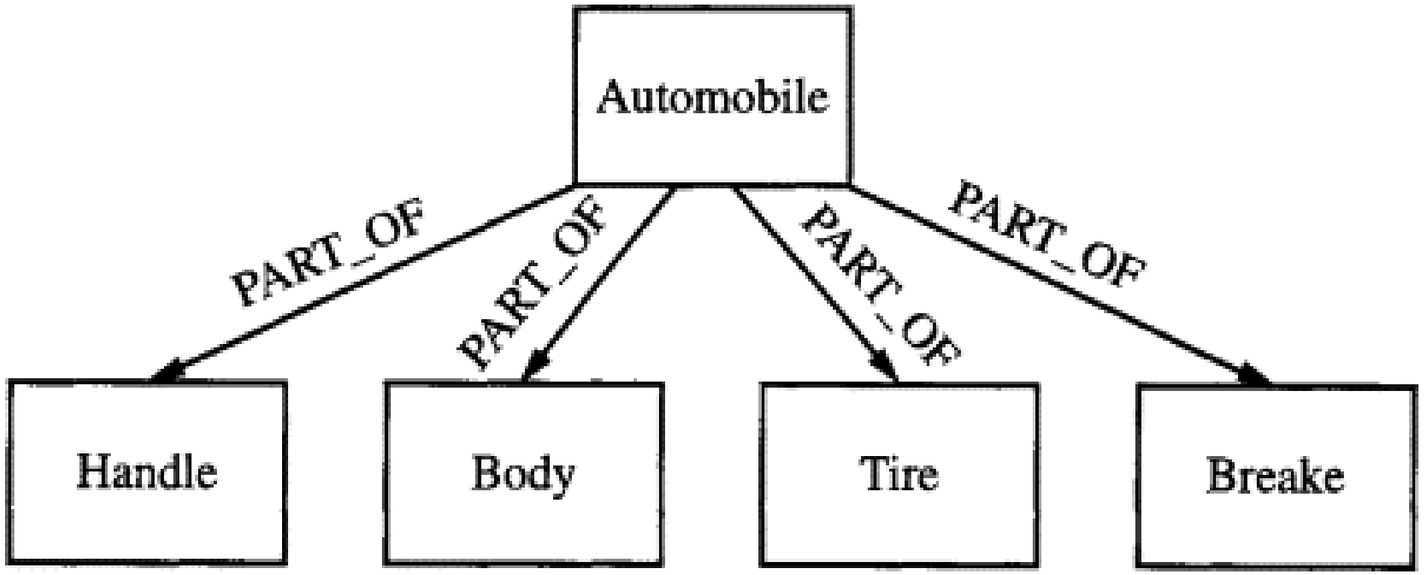
EXAMPLES OF SEMANTIC NETS

EXAMPLE 1 : Representing the Animal Kingdom hierarchy.



EXAMPLES OF SEMANTIC NETS

EXAMPLE 2 : Representing the Automobile.



ADVANTAGES OF SEMANTIC NETS

- **Visual Representation**: Easy to understand and visualize knowledge.
- **Modularity**: Facilitates the addition or removal of concepts.
- **Inference**: Supports logical reasoning and querying.

DRAWBACKS OF SEMANTIC NETS

- **Complexity:** Can become unwieldy for large knowledge bases.
- **Ambiguity:** Handling complex relationships may lead to ambiguity.
- **Lack of Context:** May not capture contextual information effectively.

FRAMES

- Introduction: Frames are a knowledge representation technique, extending semantic nets.
- **Structure:** Frames consist of slots (facets) that store information about an object.
- **Usage:** Frames help represent complex entities and their attributes.

FRAME REPRESENTATION

- **Slot and Value:** Each frame has slots (facets) representing attributes, and each slot has values.
- **Inheritance:** Frames can inherit attributes and values from other frames, allowing for hierarchical organization.
- **Prototypes:** Frames can serve as prototypes for creating new objects.

FACETS IN FRAMES

- Facets are the slots in frames that store specific attributes.

Examples:

1. In a "Car" frame, facets may include "Color," "Model," and "Manufacturer."
2. Demonstrating a "Person" frame with facets for "Name," "Age," "Occupation," and "Address."

ADVANTAGES OF FRAME REPRESENTATION

- **Structured Information:** Effectively organizes data and attributes.
- **Inheritance:** Supports attribute reuse and simplifies knowledge representation.
- **Contextual Detail:** Allows for rich description of objects and their properties.

DRAWBACKS OF FRAME REPRESENTATION

- **Complexity:** Complex frames can become challenging to manage.
- **Inefficiency:** Inefficient for large-scale knowledge bases.
- **Knowledge Engineering:** Requires significant effort for frame design and maintenance.

THANK YOU