

Lec7: Lexicon

HUL 242

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- How do we mentally represent word forms?
- How are those representations organized?
- How are word meanings represented in the mind?
- How do we go about searching our memories for a matching form?
- ...

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Lexical semantics

- Words convey meaning from speaker to listener

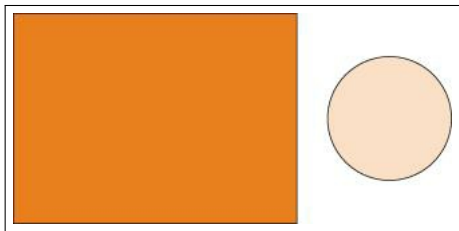
Lexical semantics

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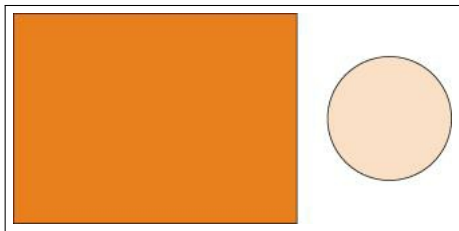
- Words convey meaning from speaker to listener
- Sense: what a word actually mean (dictionary meaning, without context)
- Reference: what a word refers to (meaning in context)

Lexical semantics



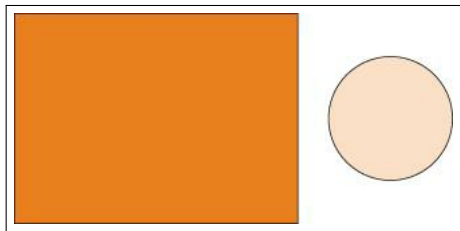
- *The dark orange one*: sense of *dark orange* helps us select the appropriate object in the universe

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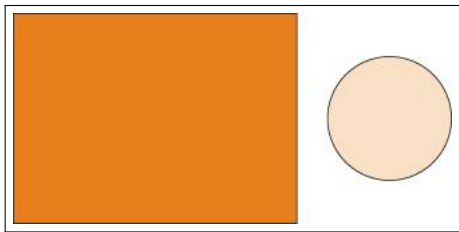
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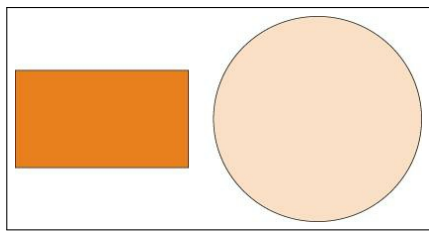
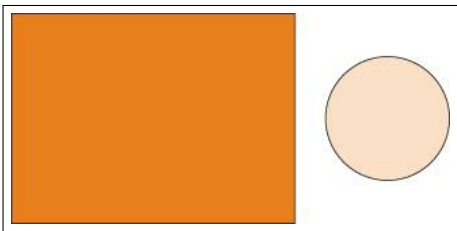
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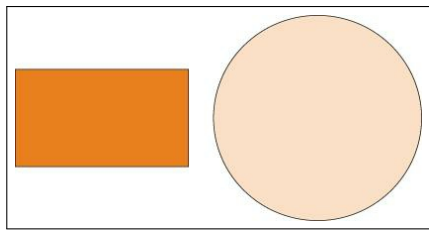
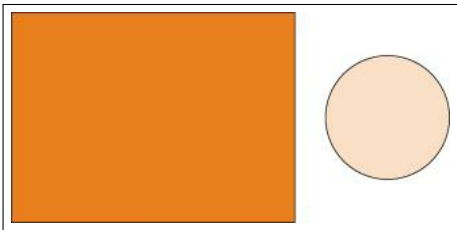
- *The dark orange one*: sense of *dark orange* helps us select the appropriate object in the universe
- *The one on the left*: Also picks the same object
- Both expressions refer to the same entity, mean the same thing
- but have distinct senses: being dark orange is not the same thing as being on the left; they 'mean' different things at the level of sense

Lexical semantics



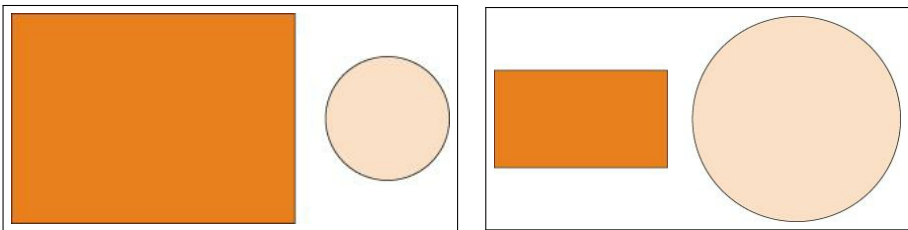
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Lexical semantics



- different expression with same sense can refer to different entity
- *the bigger one*

Lexical semantics



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- *the bigger one*
- We focus on the 'sense' meaning of words

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- Include core properties, a prototypical image?

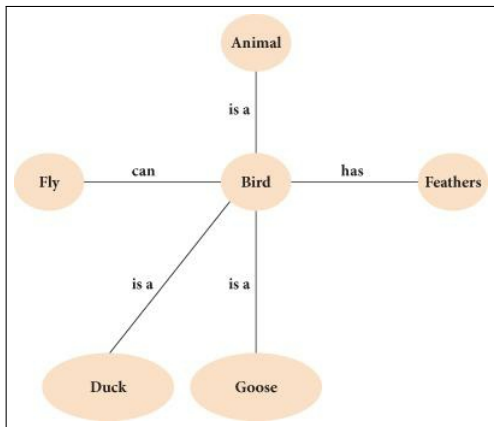
Word representation

- What do we do for such words?
- the “core feature” approach to lexical semantics is problematic

Exercise

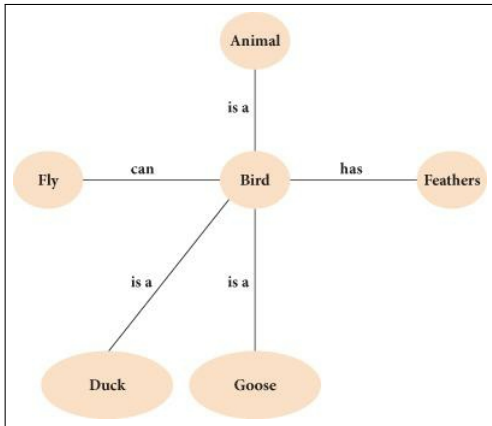
- Think of words associated with the noun 'castle'

Semantic network



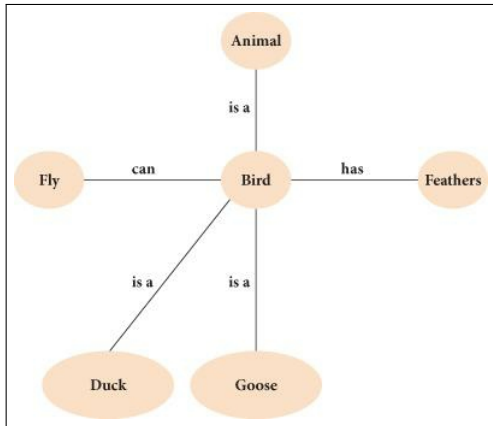
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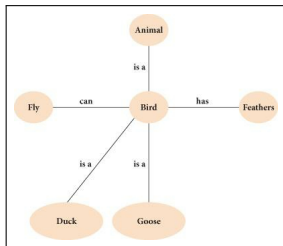
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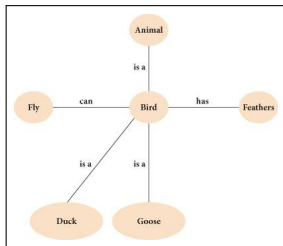
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- Semantic network: whatever comes to mind when someone says the word
- to explain certain behavioural pattern, and encoding of meaning

Semantic network



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 - Node: concepts that a word represents,
 - links: relationship between concepts

Collins and Quillian (Sentence Verification Task)

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- A crow is a bird

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- A crow is a bird
- A crow can fly

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Collins and Quillian (Sentence Verification Task)

- A crow is a bird
- A crow can fly
- A crow has skin
- A crow can sing
- A crow lays eggs
- A crow is an animal

Sentence Verification Task

- More time to retrieve the concept *A crow is an animal* or *A crow has skin*
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Sentence Verification Task

- More time to retrieve the concept *A crow is an animal* or *A crow has skin*
- In contrast, *A crow can fly* or *A crow is a bird* is faster
- Each item in the tree for *crow* is connected to its superset and its subset
- Slower responses indicate searching through more links in the hierarchy

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- *is a*: encodes relationship between general categories and concepts that fall under the category
- subordinate categories inherit properties of superordinate nodes via transitive inference (a goose is a waterfowl, a waterfowl is a bird, therefore a goose is a bird)
- no need to connect goose to bird; helps conserve memory resources.

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- It happens fast and we cannot control it
- It diminishes away from the node in question

Spreading Activation

- meaning of a word = activated nodes and links

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- how does semantic network explain this?

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- But why should this be so?
- Diminishes beyond one or two links
- Total amount of activation that can be spread across the network is limited

What about linguistic analysis?

- Similar organizing principle can be used
- Idea of a lexicon as a semantic network
- Different from an alphabetically organized dictionary
- Conceptual organization of senses

A lexical network

- WordNet at Princeton University (Miller, Felbaum etc)
- Organization based on a division into 5 categories: nouns, verbs, adjectives and adverbs (no function words)
- Within these categories, words are hierarchically arranged

A lexical network

- English WordNet, followed by many others- Hindi WordNet (IndoWordNet)
- Useful as an experiment in itself: can we create such networks for all languages?
- Next: Lexical relations in networks

Slides

- Some of the material on these slides was taken from Samar Husain