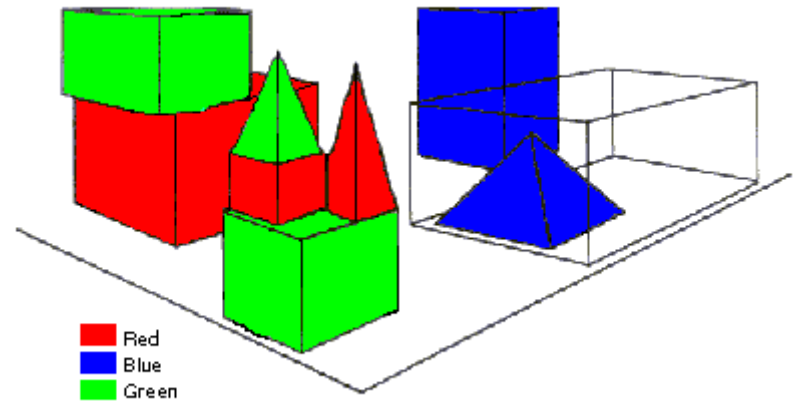


Natural Language Understanding

- Natural languages such as English are inherently ambiguous
- Examples:
 - *I saw the Grand Canyon flying to New York*
 - *Time flies like an arrow*
 - *Fruit flies like a banana*
 - *The astronomer married the star*
- Syntax + semantics + knowledge is necessary for understanding

SHRDLU

- A program that “understands” natural language in a world of toy blocks
- Written in LISP by Terry Winograd at MIT in 1970 for his PhD thesis
- System consists of
 - grammar for English
 - parser
 - semantic analyzer
 - problem-solving subsystem for creating plans



SHRDLU

- Creates plans
- Remembers contexts
- Represents knowledge as procedures, not as rules or fixed patterns
- Procedural versus declarative knowledge
 - Where were you born? (declarative)
 - How many chairs are there in your living room? (procedural)

SHRDLU

- Remains one of the most impressive AI natural language programs to date
- Extending and generalizing the techniques to other domains proved difficult
- AI research moved away from microworlds to more knowledge-intensive projects
- A conversation with SHRDLU
- Computer demo