Lesson #1: Models

What's It All About?

The concept of "model" will be used to frame this course on formal systems and abstract machines. This lesson provides an informal introduction to models and the role that modeling plays in working with formal systems.

What is a Model? What do you think?

In just one sentence, answer this question: What is a "model"?

What is a Model? Concrete Conception

A model can be viewed as an example, often as a prime example, of a class of things. In fact, you can think of an example as a **concrete model** of something. Some examples:

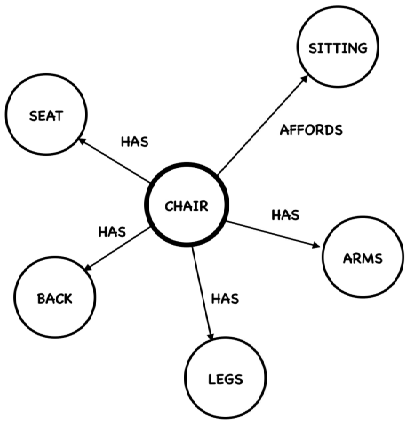
1. Dylan is a model of (an example of) a singer/songwriter.
2. The Buffalo Bills are a model of (an example of) of an NFL football team.
3. Blue is a model of (an example of) a color.
4. What you are sitting on is a model of (an example of) a chair.

What is a Model? Abstract Conception

A model can be viewed as a **representation** of something. In fact, you can think of a representation as an **abstract model** of something.

Relating this definition to the previous definition, you might imagine a set of examples (concrete models) being abstracted into a representation (abstract model).

For example: The following **semantic network** representation of a chair (next page) can be viewed as an abstract model of a chair:



Another example: `{(x,y) | y = 2x+3}` is a **set comprehension** representation of a stright line.

Two Questions

1. In just one sentence, answer this question: What is a **knowledge representation?**
2. In just one sentence, answer this question: What is a **semantic network**?
3. In just one sentence, answer this question: What is a **set comprehension**?

What is a Model? Functional Conception

1. A model can be used to recognize that something is an instance of the class of things that the model represents. In short, models can be used to **recognize** things.
2. A model can be used to render an instance of the class of things that the model represents. In other words, models can be used to **generate** things.
3. A model might be good or bad, in this way or that, but at least a model provides some basis for thinking seriously about, for contemplating, the concept the model purports to capture. Thus, a model can be used reflectively as a **cognitive tool** with which to study a concept.

Motivations for Thinking About Models

1. A great number of models are sometimes developed in order to study phenomena surrounding a concept. Each may contribute significant insights. Each may be useful in certain respects.
2. Generative processes, which constitute the featured theme of this course, can be viewed through the lens of model building. You build a model, and then you use it for purposes of recognition or generation.