Models and Domains

Dave Dubin

January 28, 2019

- This class is called "Information Modeling."

- This class is called "Information Modeling."
- That suggests the course is about modeling information.

- This class is called "Information Modeling."
- That suggests the course is about modeling information.
- But we're actually going to learn about modeling parts of the world.

- This class is called "Information Modeling."
- That suggests the course is about modeling information.
- But we're actually going to learn about modeling parts of the world.
- It's more accurate to say we'll be modeling *with* information,

- This class is called "Information Modeling."
- That suggests the course is about modeling information.
- But we're actually going to learn about modeling parts of the world.
- It's more accurate to say we'll be modeling *with* information,
- or modeling for purposes of keeping track of information.

- We will introduce formal definitions of a domain of discourse later.

- We will introduce formal definitions of a domain of discourse later.
- For today, we'll define a domain of discourse as some part of reality that we wish to represent in a model.

Reality and Domains of Discourse

- We will introduce formal definitions of a domain of discourse later.
- For today, we'll define a domain of discourse as some part of reality that we wish to represent in a model.
- Consider three categories of things we might believe are real: physical things, abstract things, and social things (Jubien 1997; Ferraris 2011).

Physical things

Physical things exist in space and time: if they exist, then there is some place and time where we can find them. Examples include:

- the particular chair you're sitting in right now,

Physical things exist in space and time: if they exist, then there is some place and time where we can find them. Examples include:

- the particular chair you're sitting in right now,
- particular sound waves reaching your ears at this moment,

Physical things exist in space and time: if they exist, then there is some place and time where we can find them. Examples include:

- the particular chair you're sitting in right now,
- particular sound waves reaching your ears at this moment,
- the electric current circulating through wires in this room,

Physical things exist in space and time: if they exist, then there is some place and time where we can find them. Examples include:

- the particular chair you're sitting in right now,
- particular sound waves reaching your ears at this moment,
- the electric current circulating through wires in this room,
- the seat back that is part of your chair

Physical things exist in space and time: if they exist, then there is some place and time where we can find them. Examples include:

- the particular chair you're sitting in right now,
- particular sound waves reaching your ears at this moment,
- the electric current circulating through wires in this room,
- the seat back that is part of your chair
- any specific atomic particle from which the chair is composed.

Social things

Social things exist in time, but not in space. Examples include:

- my marriage,

Social things

Social things exist in time, but not in space. Examples include:

- my marriage,
- the mortgage on my house,

Social things exist in time, but not in space. Examples include:

- my marriage,
- the mortgage on my house,
- the promise I made to my wife to remember to pay the mortgage on time,

Social things exist in time, but not in space. Examples include:

- my marriage,
- the mortgage on my house,
- the promise I made to my wife to remember to pay the mortgage on time,
- the University of Illinois School of Information Sciences.

Abstract things

Abstract things are not found in the physical universe. They don't come into existence, nor are they destroyed or modified. Examples include:

- The number eleven,

Abstract things

Abstract things are not found in the physical universe. They don't come into existence, nor are they destroyed or modified. Examples include:

- The number eleven,
- Every physically possible configuration of Lego building blocks,

Abstract things

Abstract things are not found in the physical universe. They don't come into existence, nor are they destroyed or modified. Examples include:

- The number eleven,
- Every physically possible configuration of Lego building blocks,
- The property of being red,

Abstract things

Abstract things are not found in the physical universe. They don't come into existence, nor are they destroyed or modified. Examples include:

- The number eleven,
- Every physically possible configuration of Lego building blocks,
- The property of being red,
- the proposition that I am employed by the University if Illinois,

Abstract things

Abstract things are not found in the physical universe. They don't come into existence, nor are they destroyed or modified. Examples include:

- The number eleven,
- Every physically possible configuration of Lego building blocks,
- The property of being red,
- the proposition that I am employed by the University if Illinois,
- the relationship "employed by the University of Illinois,"

Abstract things

Abstract things are not found in the physical universe. They don't come into existence, nor are they destroyed or modified. Examples include:

- The number eleven,
- Every physically possible configuration of Lego building blocks,
- The property of being red,
- the proposition that I am employed by the University if Illinois,
- the relationship "employed by the University of Illinois,"
- the state of affairs "Dave's being employed by the University of Illinois."

Properties

Michael Jubien (1997) offers an accessible introduction to the Platonistic conception of abstract things like properties. A property, he says, is "a way something can be." His examples include:

- green

Properties

Michael Jubien (1997) offers an accessible introduction to the
Platonistic conception of abstract things like properties. A property,
he says, is "a way something can be." His examples include:

- green
- hot

Properties

Michael Jubien (1997) offers an accessible introduction to the Platonistic conception of abstract things like properties. A property, he says, is "a way something can be." His examples include:

- green
- hot
- slimy

Properties

Michael Jubien (1997) offers an accessible introduction to the Platonistic conception of abstract things like properties. A property, he says, is "a way something can be." His examples include:

- green
- hot
- slimy
- hungry

Michael Jubien (1997) offers an accessible introduction to the Platonistic conception of abstract things like properties. A property, he says, is "a way something can be." His examples include:

- green
- hot
- slimy
- hungry
- four-legged

Properties

Michael Jubien (1997) offers an accessible introduction to the Platonistic conception of abstract things like properties. A property, he says, is "a way something can be." His examples include:

- green
- hot
- slimy
- hungry
- four-legged
- dead

Properties

Michael Jubien (1997) offers an accessible introduction to the Platonistic conception of abstract things like properties. A property, he says, is "a way something can be." His examples include:

- green
- hot
- slimy
- hungry
- four-legged
- dead
- married

Properties

Michael Jubien (1997) offers an accessible introduction to the Platonistic conception of abstract things like properties. A property, he says, is "a way something can be." His examples include:

- green
- hot
- slimy
- hungry
- four-legged
- dead
- married
- flat

Properties

Michael Jubien (1997) offers an accessible introduction to the Platonistic conception of abstract things like properties. A property, he says, is "a way something can be." His examples include:

- green
- hot
- slimy
- hungry
- four-legged
- dead
- married
- flat
- soluble

Properties

Michael Jubien (1997) offers an accessible introduction to the
Platonistic conception of abstract things like properties. A property,
he says, is "a way something can be." His examples include:

- green
- hot
- slimy
- hungry
- four-legged
- dead
- married
- flat
- soluble
- "having been a female US President before 1997"

Relationships

Jubien uses the term "relation" for a part of abstract reality that I'll call "relationship," so as to keep it distinct from a mathematical object that might or might not be the same thing. Jubien's examples of relation(ships) include:

- the "betweenness" relationship that can obtain among integers (like 4 is between 3 and 5);

Relationships

Jubien uses the term "relation" for a part of abstract reality that I'll call "relationship," so as to keep it distinct from a mathematical object that might or might not be the same thing. Jubien's examples of relation(ships) include:

- the "betweenness" relationship that can obtain among integers (like 4 is between 3 and 5);
- the "betweenness" relationship that can obtain physical objects in space;

Relationships

Jubien uses the term "relation" for a part of abstract reality that I'll call "relationship," so as to keep it distinct from a mathematical object that might or might not be the same thing. Jubien's examples of relation(ships) include:

- the "betweenness" relationship that can obtain among integers (like 4 is between 3 and 5);
- the "betweenness" relationship that can obtain physical objects in space;
- the instantiation relationship that can link a property to a particular thing that exemplifies the property;

- Jubien distinguishes between the "love" relationship obtaining between Jack and Jill and the relational properties "being loved by Jack," and "being loved by Jill."

- Jubien distinguishes between the "love" relationship obtaining between Jack and Jill and the relational properties "being loved by Jack," and "being loved by Jill."
- In several of the models we shall examine in this class, all properties are *reduced* to relationships.

Relational properties

- Jubien distinguishes between the "love" relationship obtaining between Jack and Jill and the relational properties "being loved by Jack," and "being loved by Jill."
- In several of the models we shall examine in this class, all properties are *reduced* to relationships.
- In models such as RDF, these relational properties can only obtain between exactly two individuals (binary relationships only).

- **Domain of discourse**: some part of reality that we wish to represent in a model.

Summary of concepts

- **Domain of discourse**: some part of reality that we wish to represent in a model.
- **Physical object**: Something that's bounded in both time and space.

- **Domain of discourse**: some part of reality that we wish to represent in a model.
- **Physical object**: Something that's bounded in both time and space.
- **Abstract object**: Something that's bounded in neither time nor space, but may have a physical expression or instantiation.

Summary of concepts

- **Domain of discourse**: some part of reality that we wish to represent in a model.
- **Physical object**: Something that's bounded in both time and space.
- **Abstract object**: Something that's bounded in neither time nor space, but may have a physical expression or instantiation.
- **Social object**: Something bounded in time, but not space, and is essentially connected to the context of its creation.

Summary of concepts

- **Domain of discourse**: some part of reality that we wish to represent in a model.
- **Physical object**: Something that's bounded in both time and space.
- **Abstract object**: Something that's bounded in neither time nor space, but may have a physical expression or instantiation.
- **Social object**: Something bounded in time, but not space, and is essentially connected to the context of its creation.
- **Property**: A way something could be.

Summary of concepts

- **Domain of discourse**: some part of reality that we wish to represent in a model.
- **Physical object**: Something that's bounded in both time and space.
- **Abstract object**: Something that's bounded in neither time nor space, but may have a physical expression or instantiation.
- **Social object**: Something bounded in time, but not space, and is essentially connected to the context of its creation.
- **Property**: A way something could be.
- **Relationship**: A way two or more things could be with respect to each other.

Summary of concepts

- **Domain of discourse**: some part of reality that we wish to represent in a model.
- **Physical object**: Something that's bounded in both time and space.
- **Abstract object**: Something that's bounded in neither time nor space, but may have a physical expression or instantiation.
- **Social object**: Something bounded in time, but not space, and is essentially connected to the context of its creation.
- **Property**: A way something could be.
- **Relationship**: A way two or more things could be with respect to each other.
- **Relational property**: A way something could be in virtue of its particpation in a relationship.

Ferraris, Maurizio. 2011. "Social Ontology and Documentality." In *Approaches to Legal Ontologies: Theories, Domains, Methodologies*, edited by Giovanni Sartor, Pompeu Casanovas, Mariangela Biasiotti, and Meritxell Fernández-Barrera, 83–97. Dordrecht: Springer.

Jubien, Michael. 1997. "Platonism." In *Contemporary Metaphysics: An Introduction*, 36–62. Cambridge MA: Blackwell.