object models: semantics

Daniel Jackson
an object model

› for discussion groups
› what does it denote?
object model semantics
object model semantics

meaning = set of instances
› an instance is an object diagram
object model semantics

meaning = set of instances
› an instance is an object diagram

non-instances
› violate some rule in the object model
semantics examples
semantics examples

Ceramics (Moderated Group)

Alice (Moderator)
Bob (Member)

M1 (Message)
M2 (Message)

moderators
members
messages
posts
respondsTo

∈

Group
Member
Moderated Group
Moderator
Message

messages
members
posts
moderators
respondsTo
approves
semantics examples

Ceramics (Moderated Group)

Alice (Moderator)

Bob (Member)

M1 (Message)

messages

? ∈

Group

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Moderated Group

Moderator

Message

members

posts

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? respondsTo

*+

? approves
semantics examples

Alice (Moderator)
Bob (Member)
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Ceramics (Moderated Group)

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Moderated Group

+ +
semantics examples
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- Ceramics (Moderated Group)
  - Alice (Moderator)
    - M1 (Message)
  - Bob (Member)
    - M2 (Message)

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semantics examples

Ceramics (Moderated Group)

- Alice (Moderator)
  - M1 (Message)

- Bob (Member)
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moderators

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✗

Group

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Moderator

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? approves
graphical limitations
graphical limitations

consider this instance

› Alice is not a member of Ceramics
graphical limitations

consider this instance
› Alice is not a member of Ceramics

can we say moderators should be members?
› not in this graphical notation
delving into semantics
delving into semantics

A group's moderators must be in the set Moderator.
only a group in ModeratedGroup can have moderators

a group’s moderators must be in the set Moderator

delving into semantics
only a group (ie, not a message, eg) can have members

only a group in ModeratedGroup can have moderators

a group’s moderators must be in the set Moderator
only a group (ie, not a message, eg) can have members

only a group in ModeratedGroup can have moderators

a group’s members must be in the set Member

a group’s moderators must be in the set Moderator
only a group (ie, not a message, eg) can have members

a group’s members must be in the set Member

every Moderator is a Member

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a group’s moderators must be in the set Moderator

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a group’s moderators must be in the set Moderator
only a group (i.e., not a message, e.g.) can have members

every ModeratedGroup is a Group

only a group in ModeratedGroup can have moderators

a group’s members must be in the set Member

every Moderator is a Member

a group’s moderators must be in the set Moderator

only a group in ModeratedGroup can have moderators
A group's members must be in the set Member.

Every Moderator is a Member.

But not every moderator of $g$ is a member of $g$.

Only a group (i.e., not a message, eg) can have members.

Every ModeratedGroup is a Group.

Only a group in ModeratedGroup can have moderators.

A group's moderators must be in the set Moderator.

Only a group in ModeratedGroup can have moderators.

Delving into semantics.
textual constraints

- moderators must be members of the group
- member only posts message in group she belongs to
- moderators approve messages in groups they moderate
- message only responds to message in same group
textual constraints

- moderators must be members of the group
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in this course, just informal text; more advanced: express in Alloy