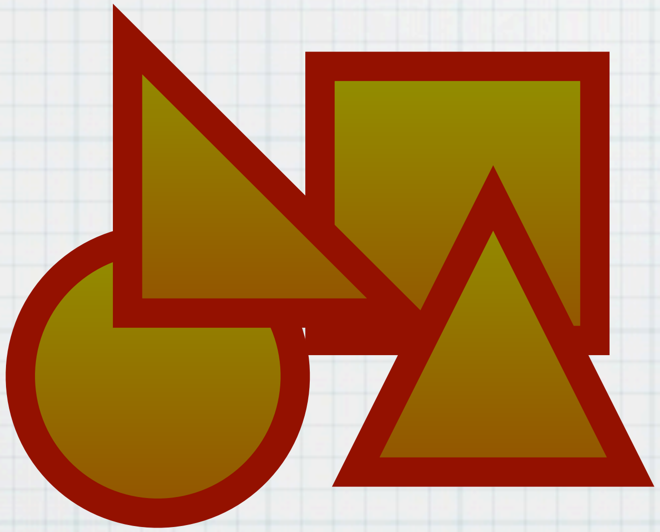
“The World of Objects”

an ontology of the object-oriented paradigm

Les Waguespack, Ph.D.



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* ontology: the branch of metaphysics dealing with the nature of being new oxford dictionary
* metaphysics: the branch of philosophy that deals with the first principles of things, including abstract concepts such as being, knowing, substance, cause, identity, time, and space.
* "what exists, how do we understand it, what explains it, what does it explain?"

What does an ontology do for us?

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  * a common terminology shared by the community
  * shared rationale explaining properties

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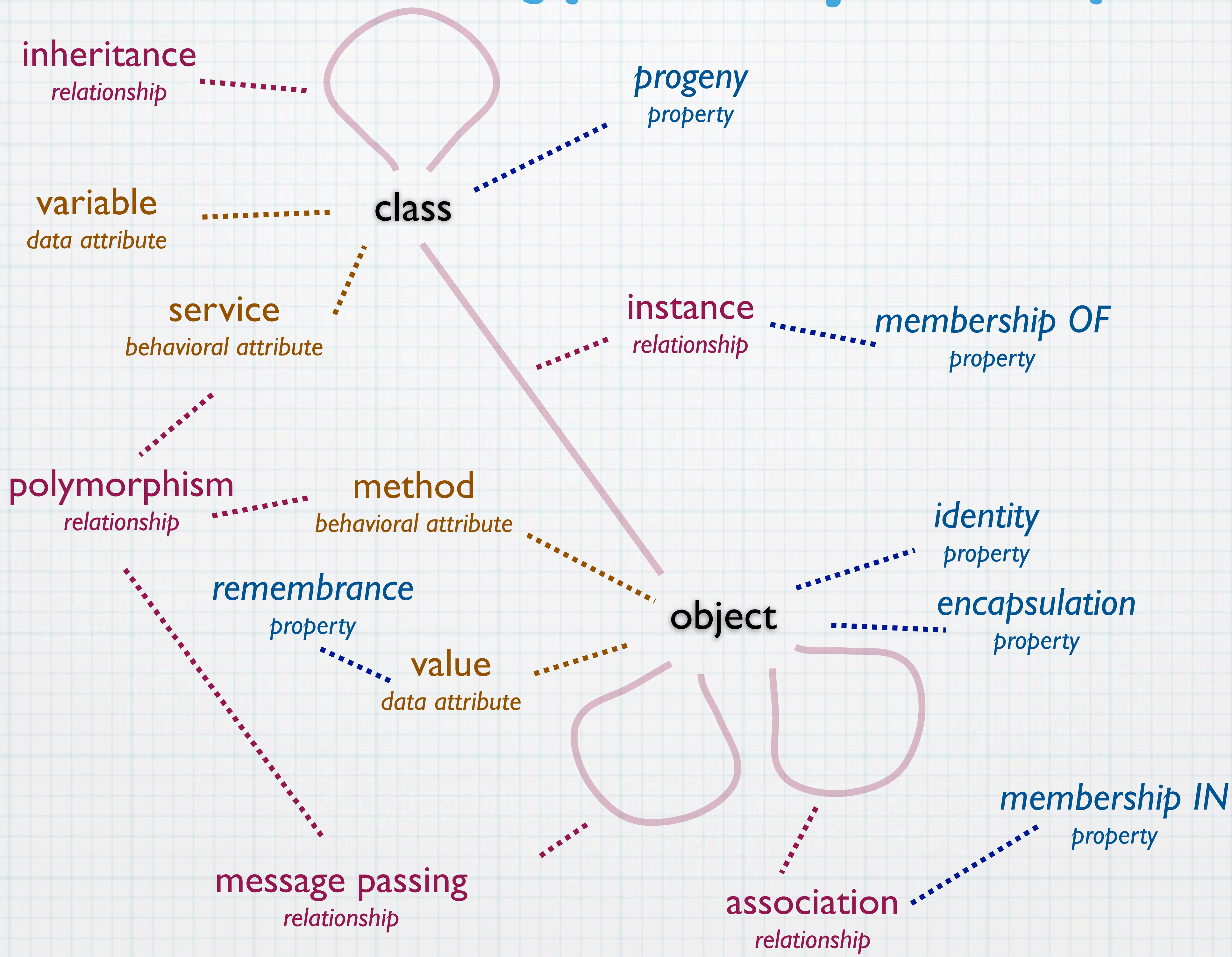
* It helps us describe the "world!"
  * a common terminology shared by the community
  * shared rationale explaining properties
* What questions does an ontology answer?
  * what are the things? - "individuals"
  * how are they described? - "attributes"
  * what things go together? - "classes"
  * how do things relate to one another? - "relationships"

OO Ontology - Graphically



Once over quickly!

Once over quickly!

object

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identity
property

object

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object

identity
property

encapsulation
property

Once over quickly!

identity
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encapsulation
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object

value
data attribute

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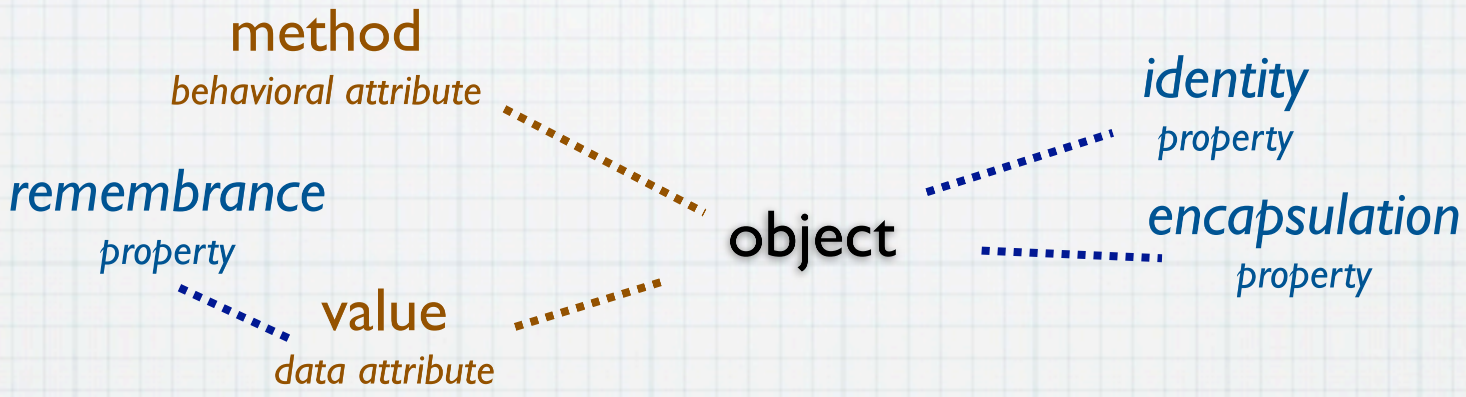

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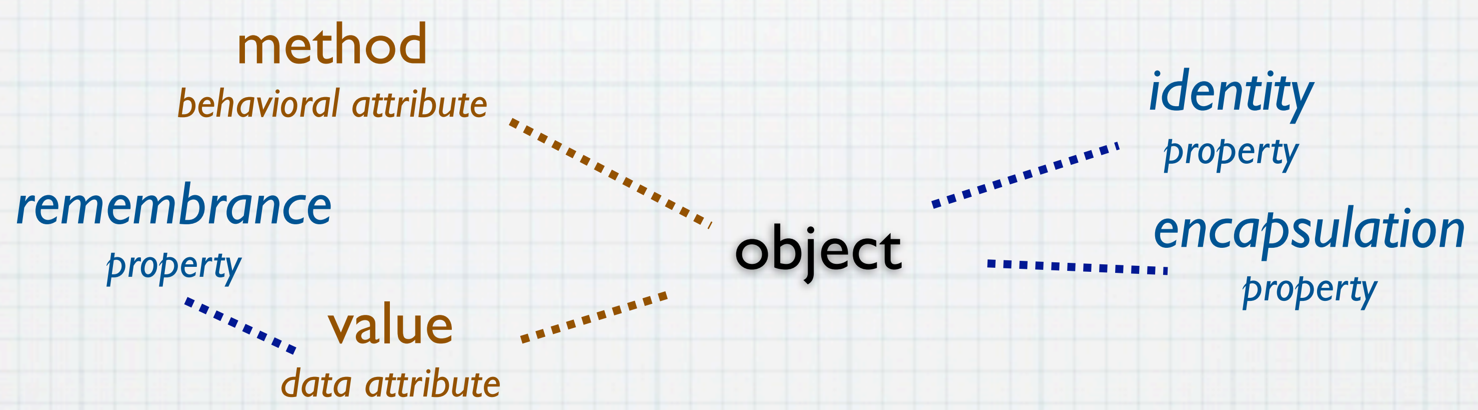
class



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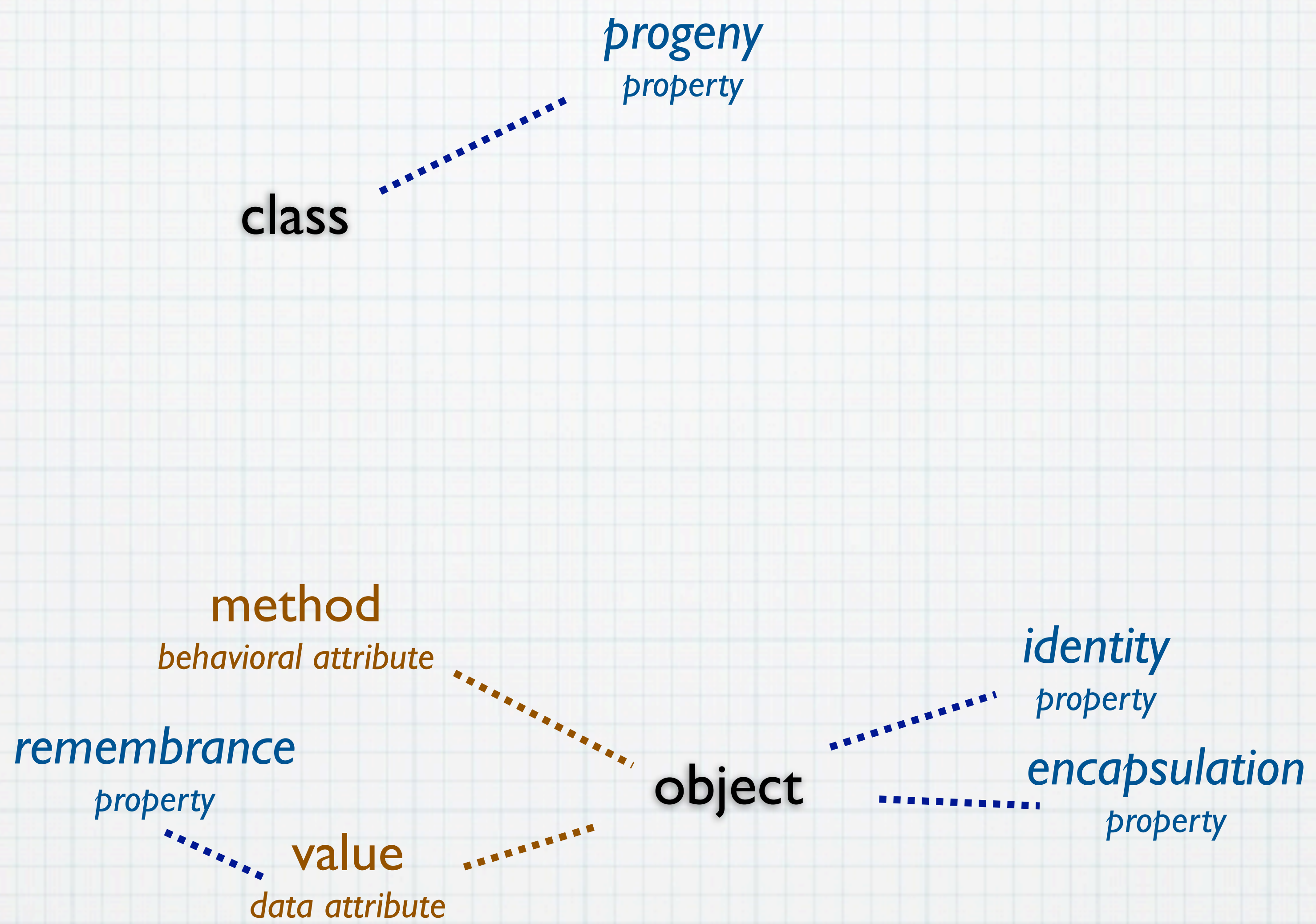

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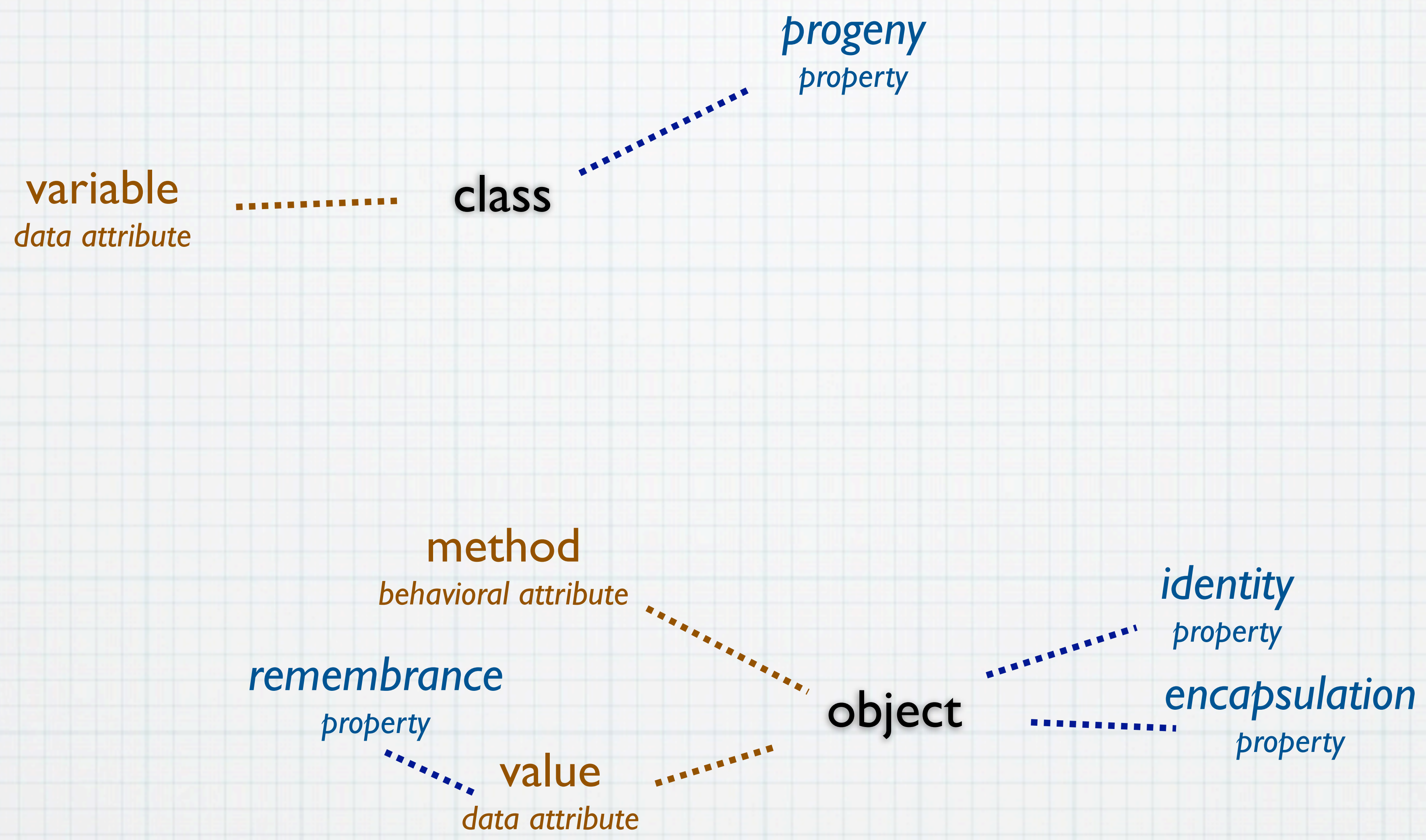

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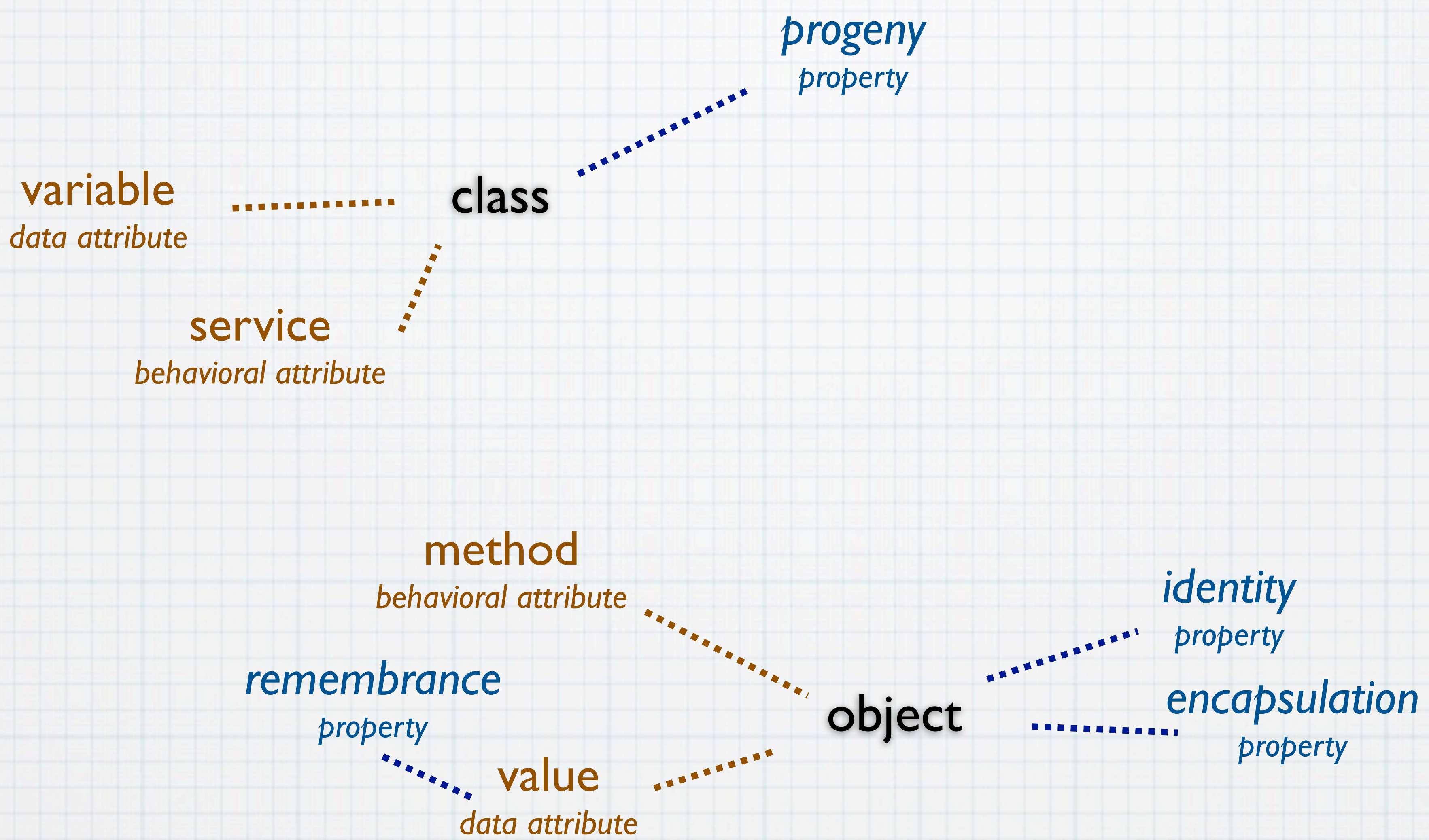

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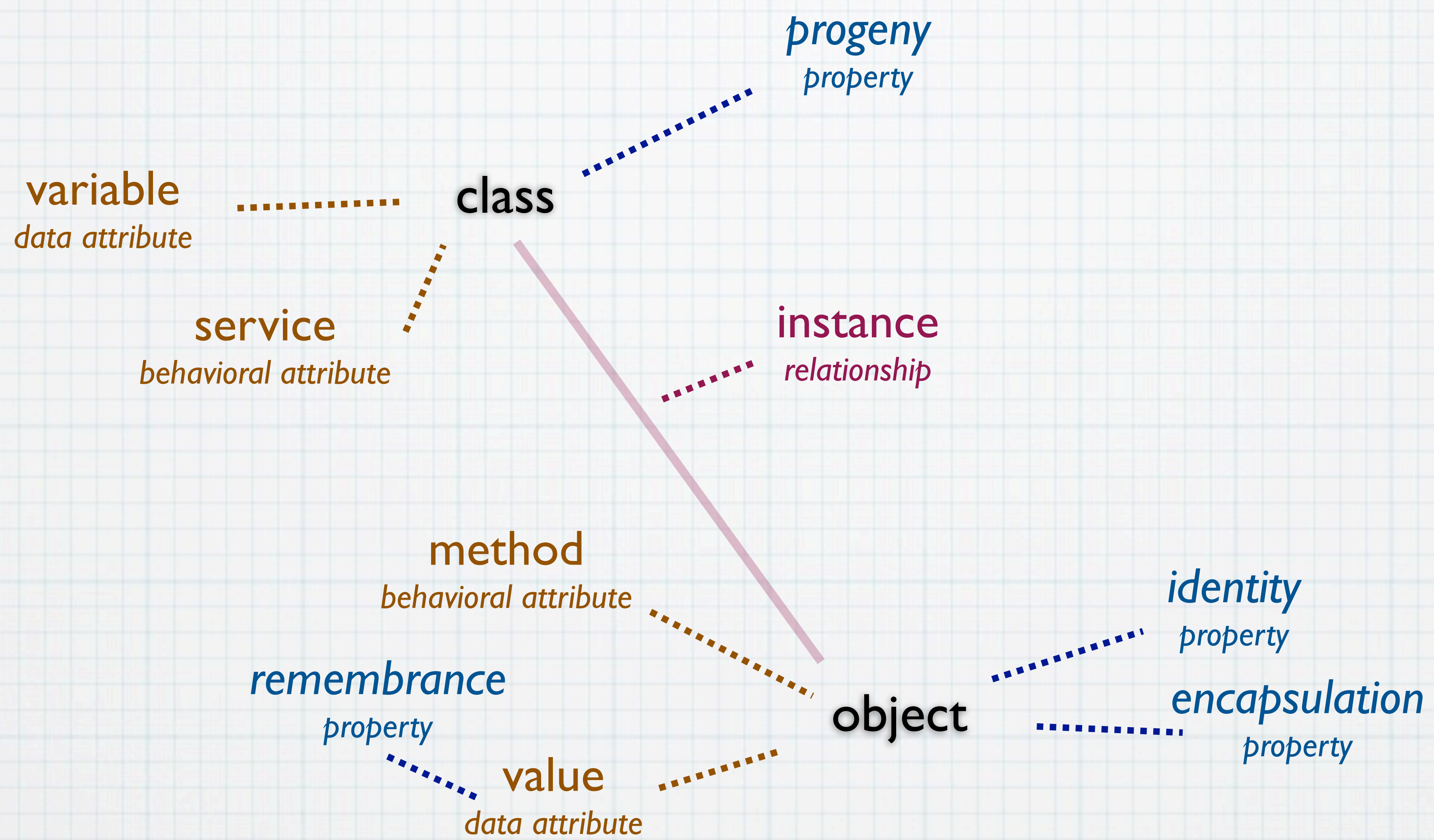

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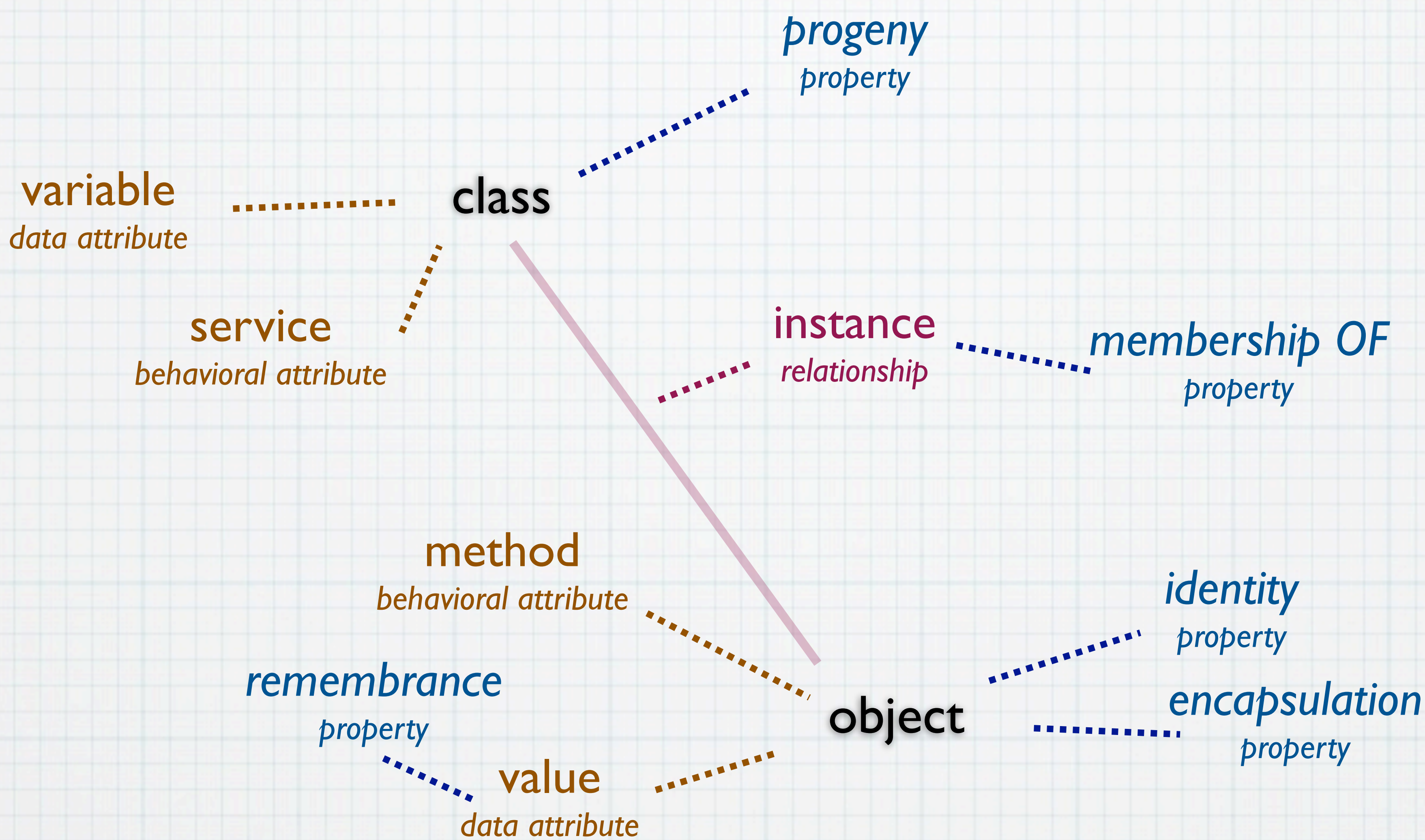

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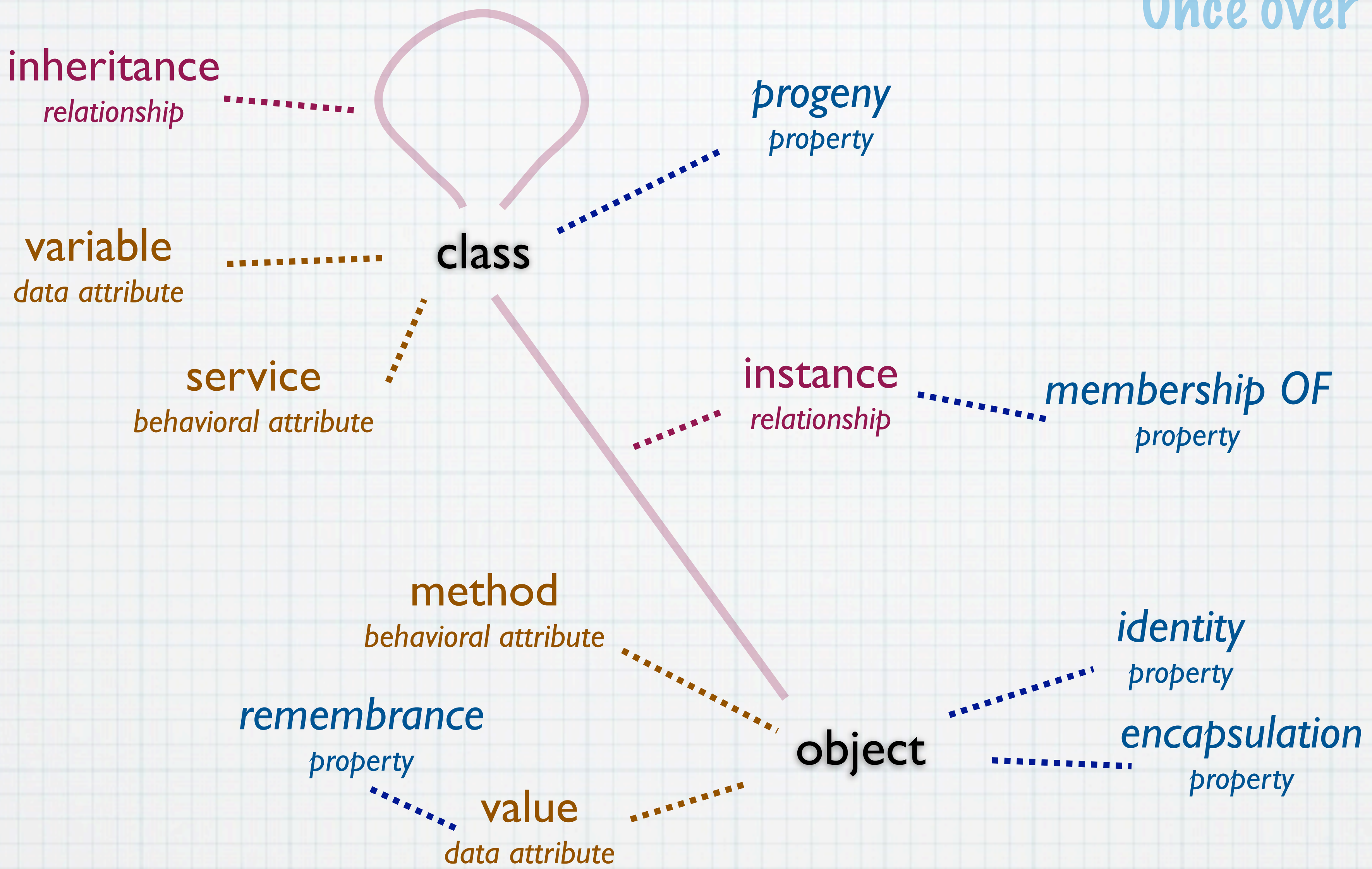

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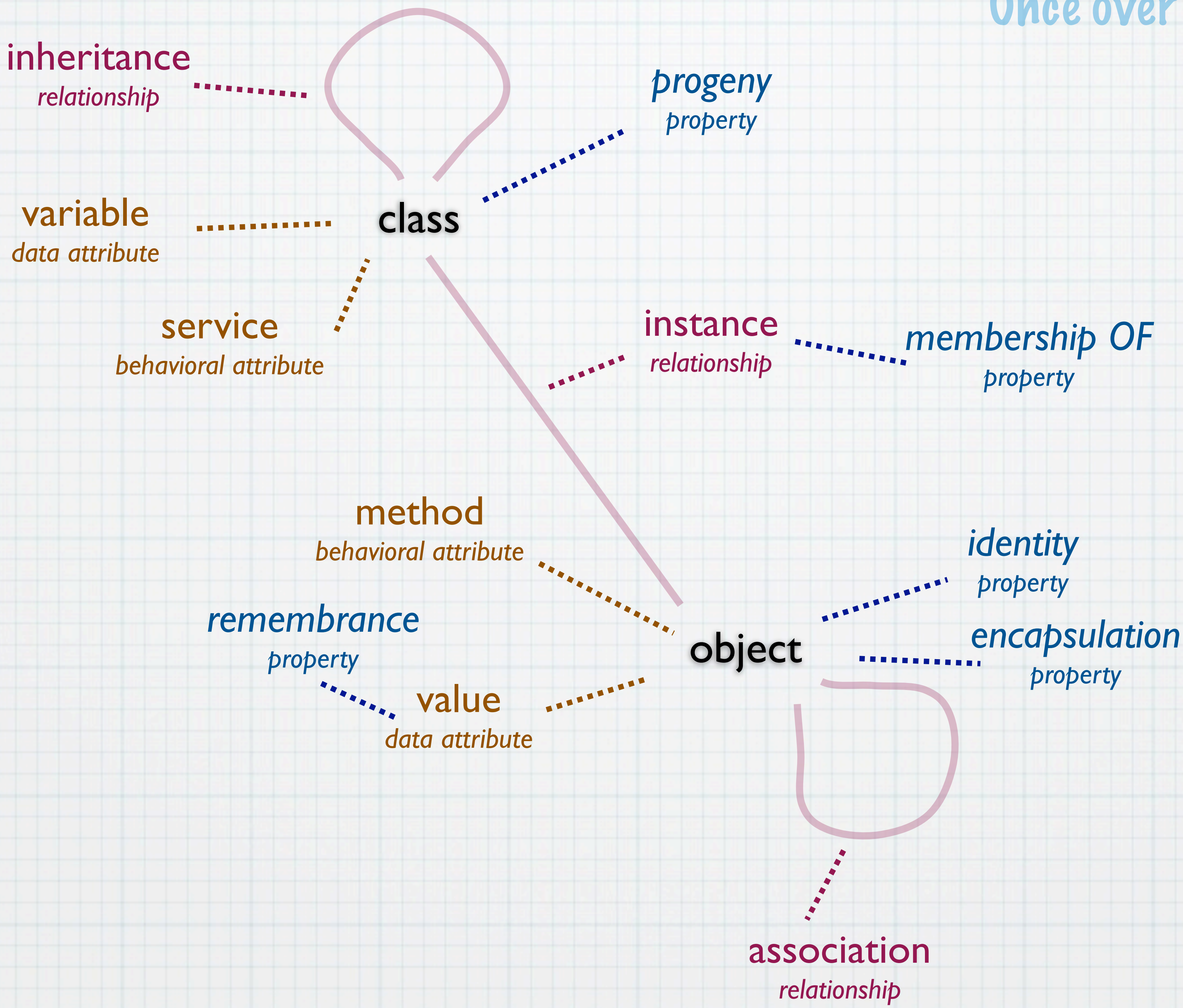

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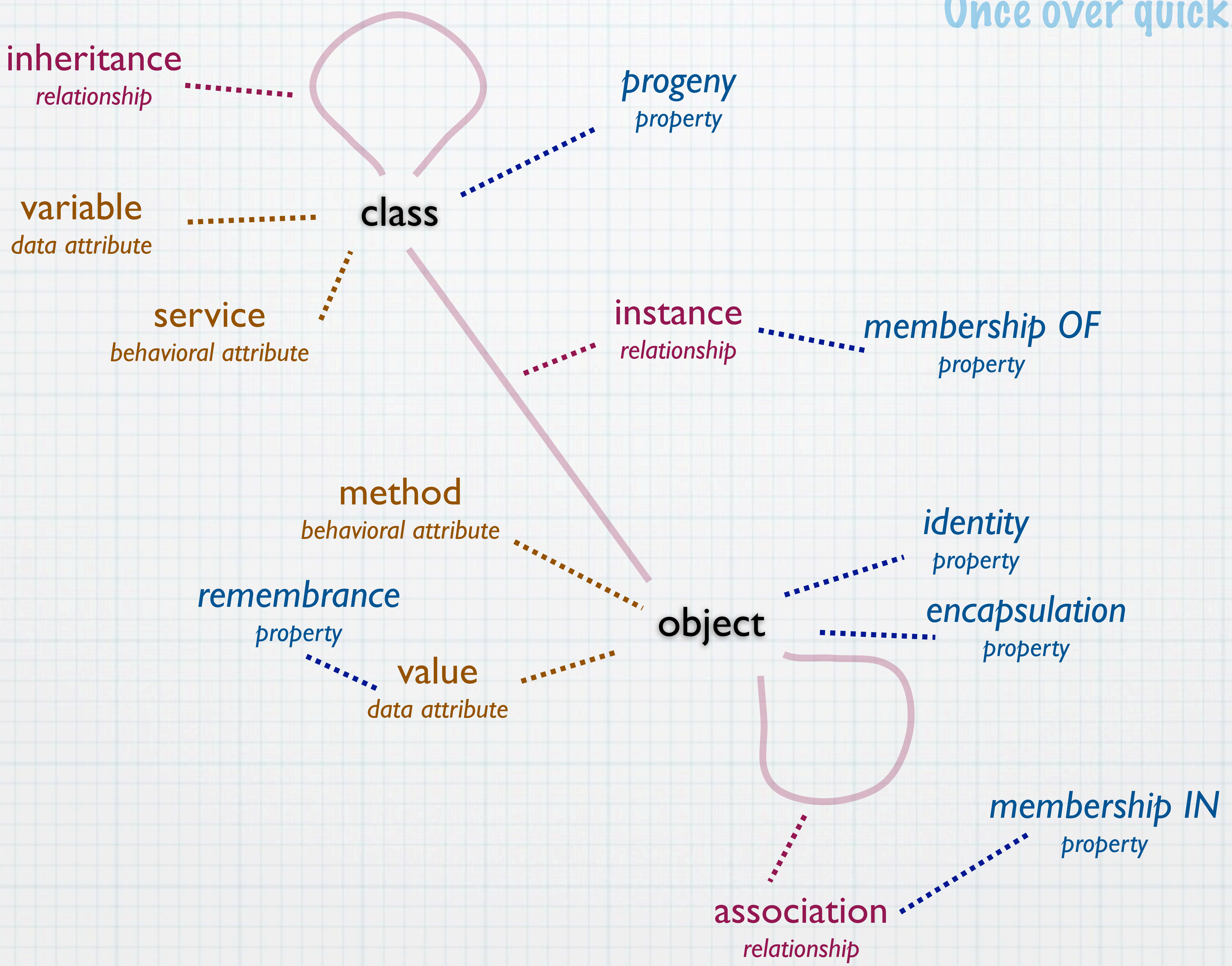

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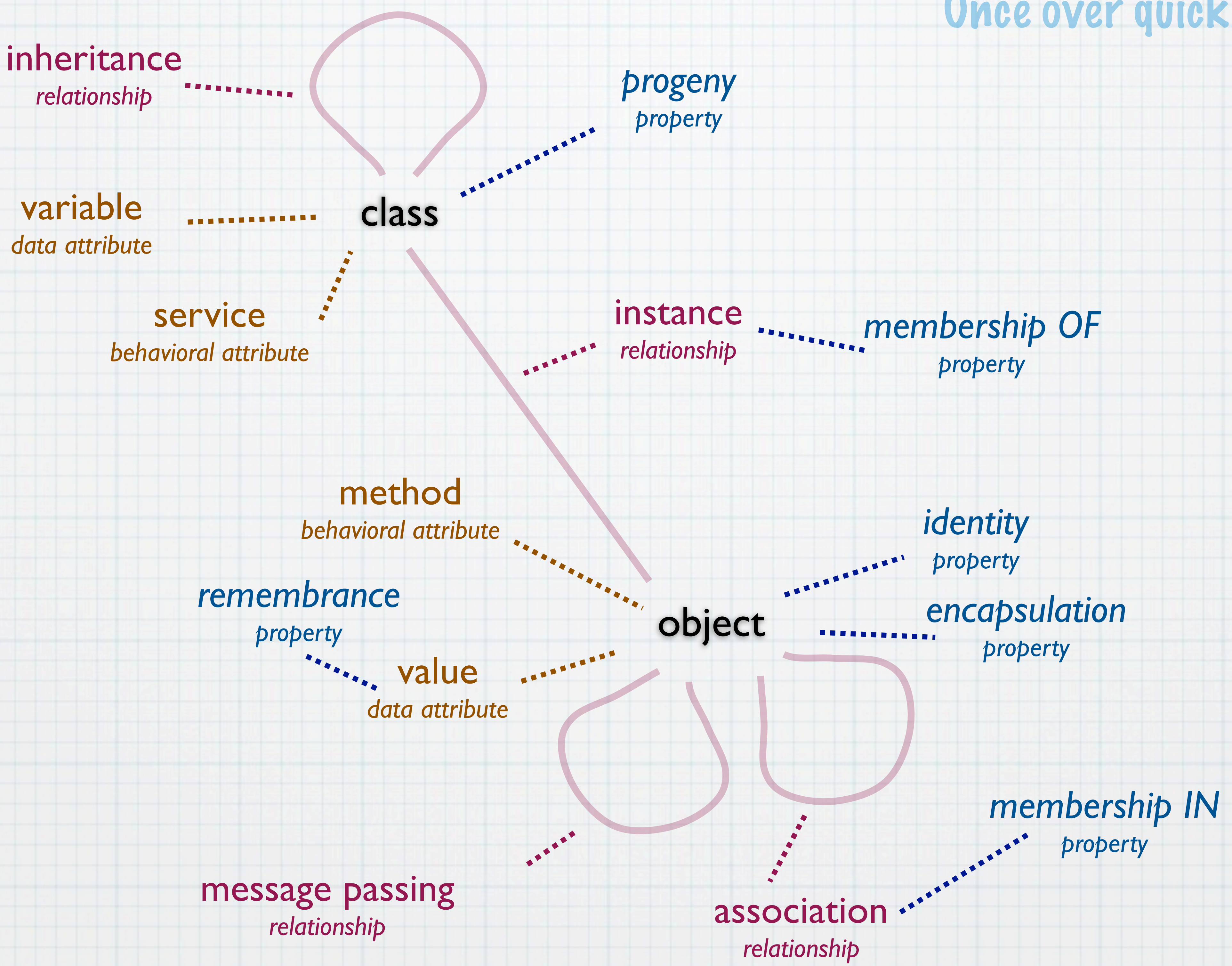

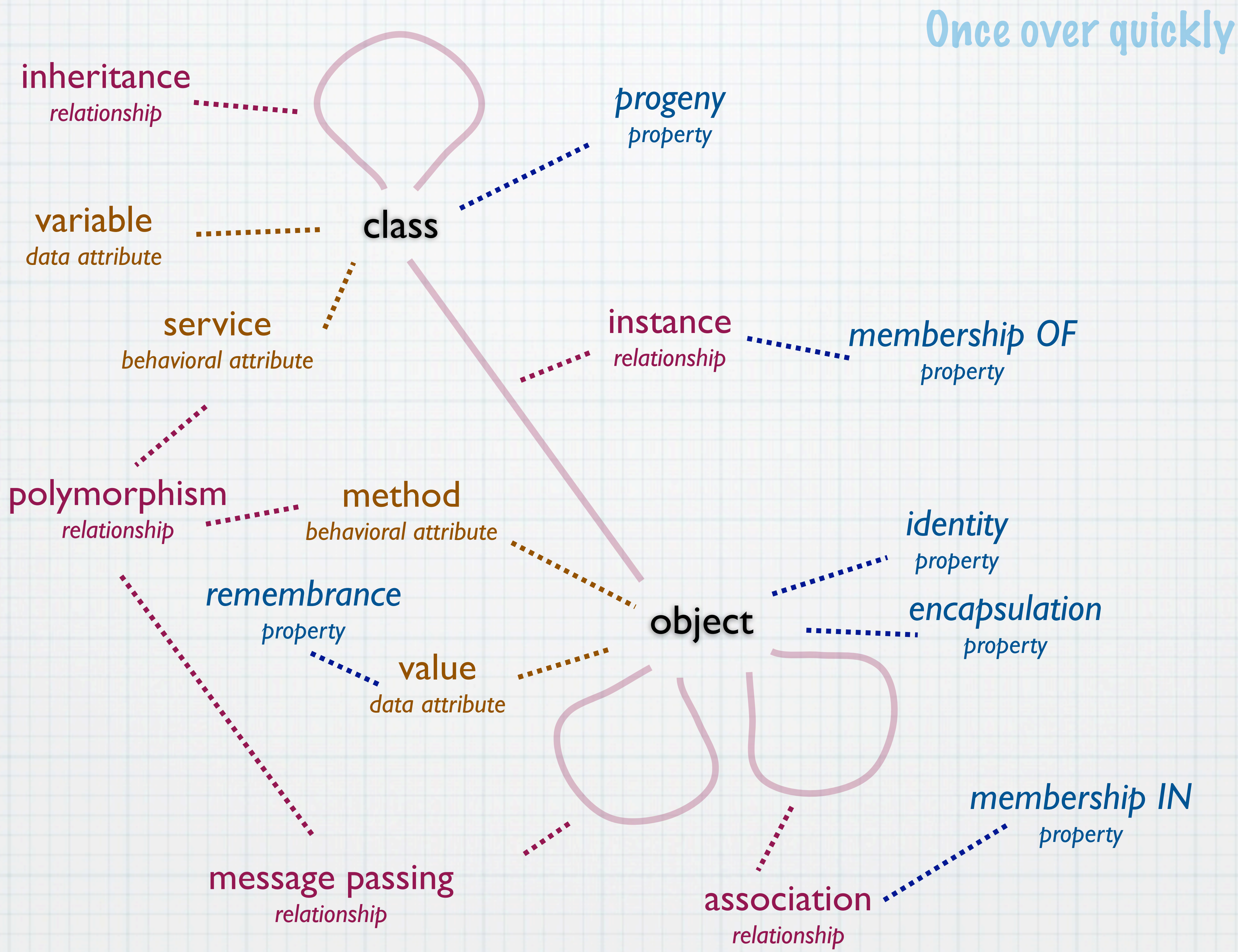
Once over quickly!
inheritance
relationship
progeny
property
variable
data attribute
class
service
behavioral attribute
instance
relationship
membership OF
property
polymorphism
relationship
method
behavioral attribute
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    * the inside is not visible or directly accessible from the outside

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* Services are "visible" at the surface of objects and (preserving encapsulation) provide the accessibility to the object's inside - to access individually its remembrance or by collaboration with other objects to accomplish the service.

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* Class structure - data and behavior
    * Static data and behavioral attributes are defined in the class
    * The corresponding dynamic behavioral attribute of method may also be defined in the class (see structural relationship inheritance below)

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    * Successive uses of inheritance to define related classes results in a **class hierarchy**

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            * if one member in an association (or the other or both) would not exist if it were not related to the other then the relationship is called a **composition** (existential dependence)

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        * unless explicitly designated otherwise a message results in an **asynchronous** activity by the receiver without response

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    - if the method (corresponding to the service) is defined in the class of the receiver object that method is used; if the service of the receiver's class is inherited (and not overridden) the corresponding method defined in the nearest ancestor class of the receiver object is used.

One more time!

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object

One more time!

identity
property

object

One more time!

object

identity
property

encapsulation
property

One more time!

identity
property

encapsulation
property

object

value
data attribute

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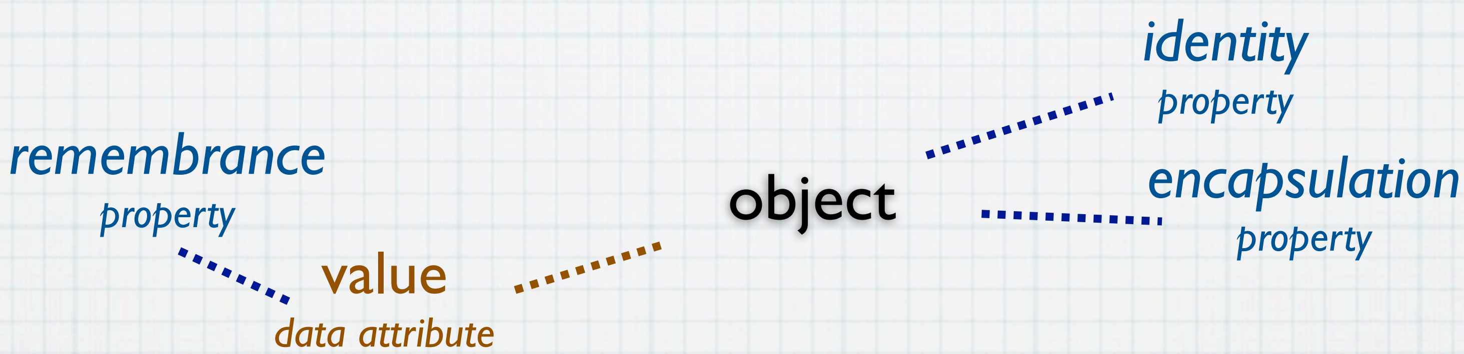

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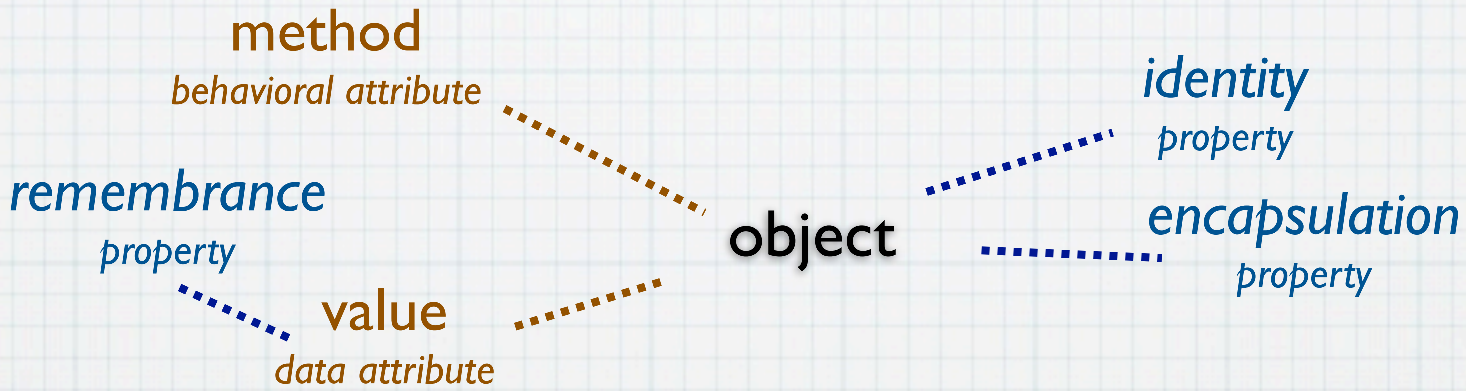


One more time!

class

method
behavioral attribute

remembrance
property

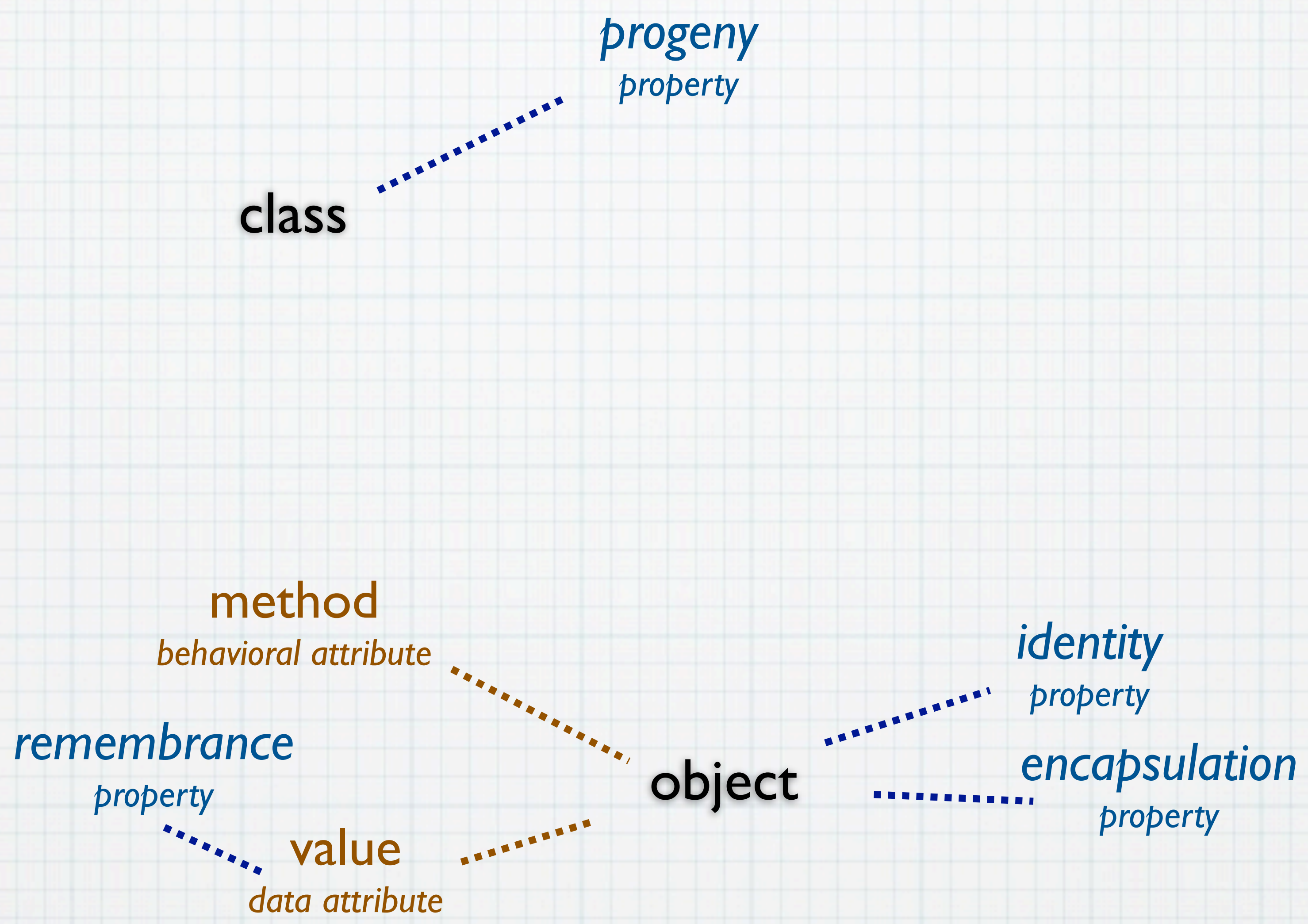
value
data attribute

object

identity
property

encapsulation
property

One more time!



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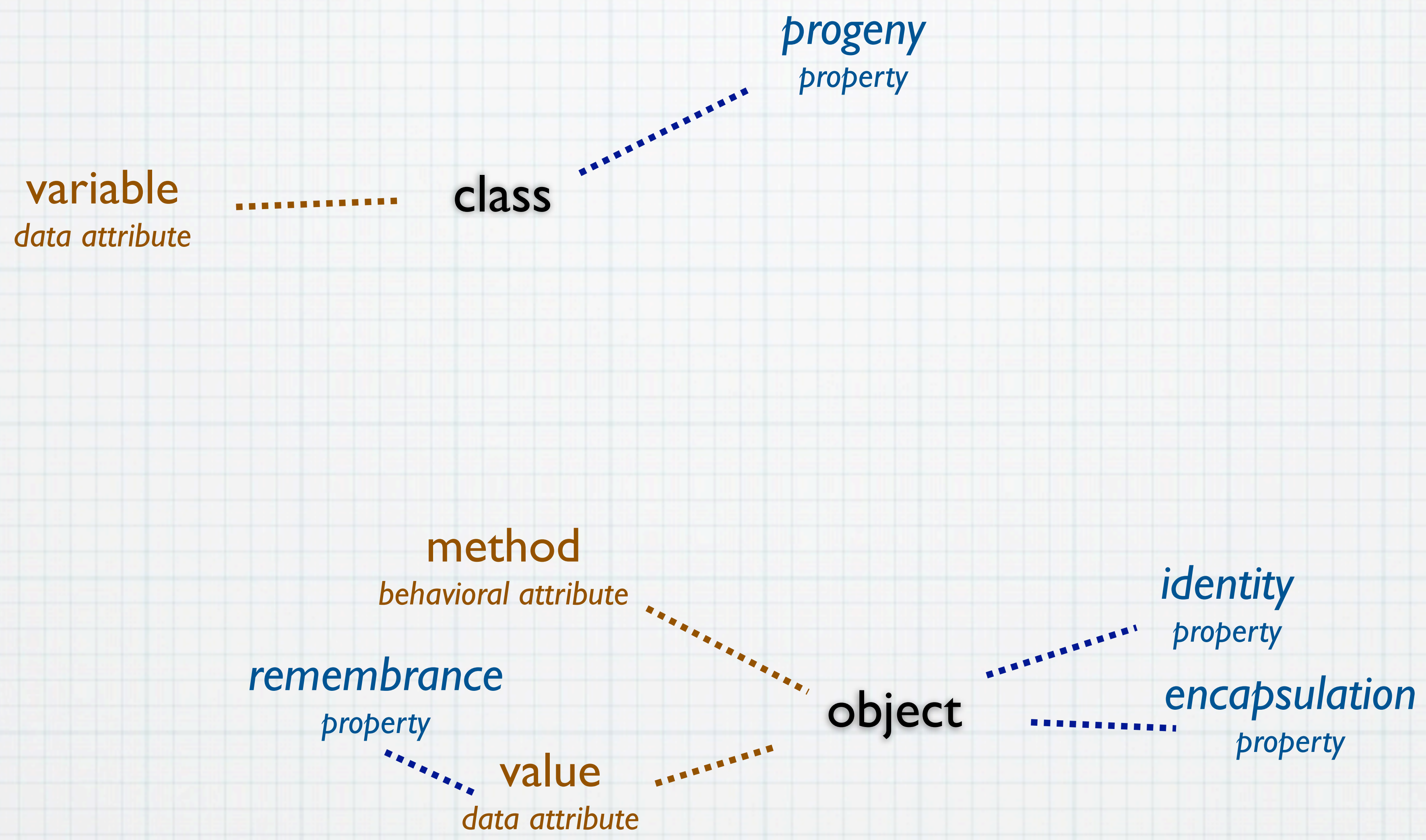

One more time!

progeny
property

variable
data attribute

class

service
behavioral attribute

method
behavioral attribute

identity
property

remembrance
property

object

encapsulation
property

value
data attribute

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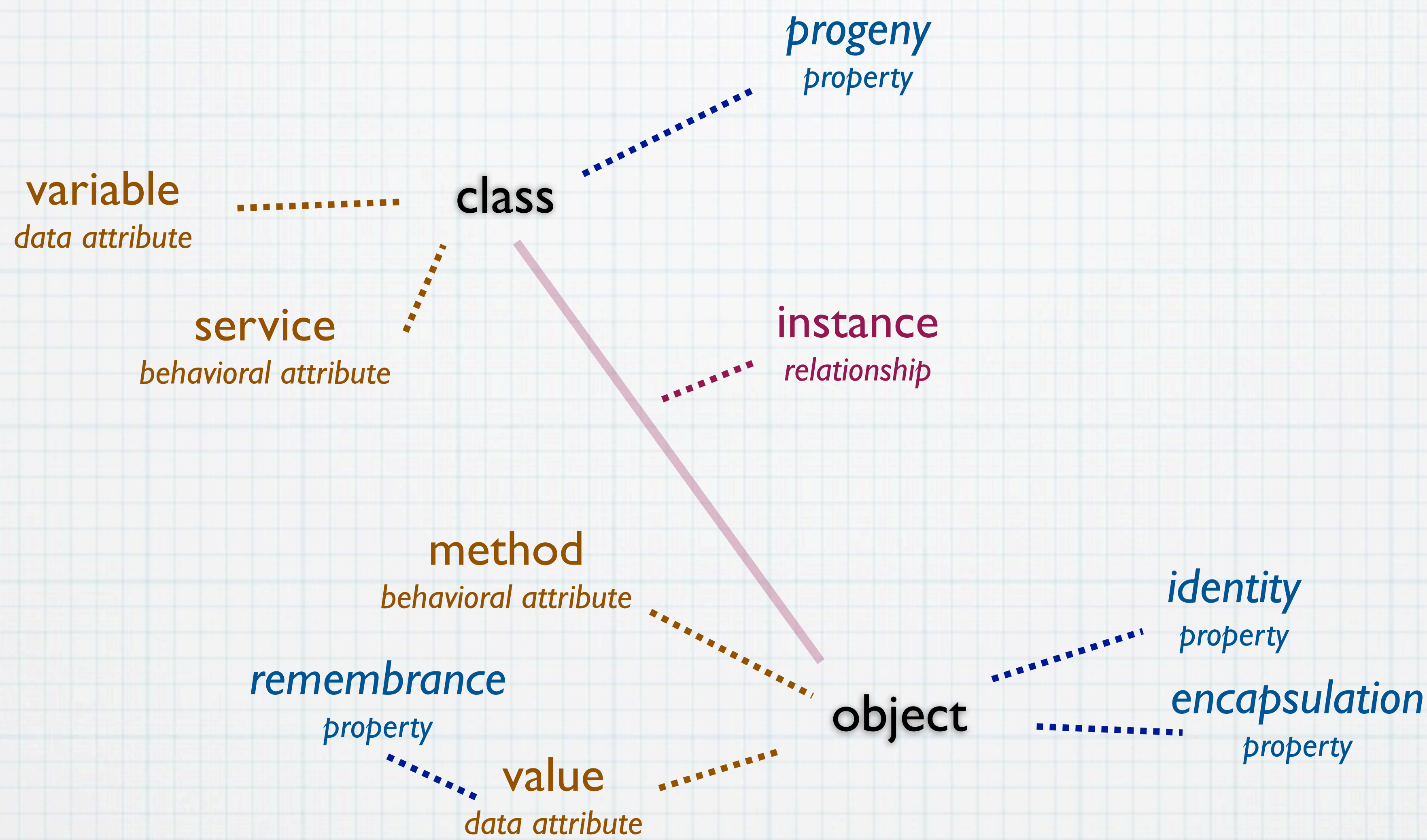

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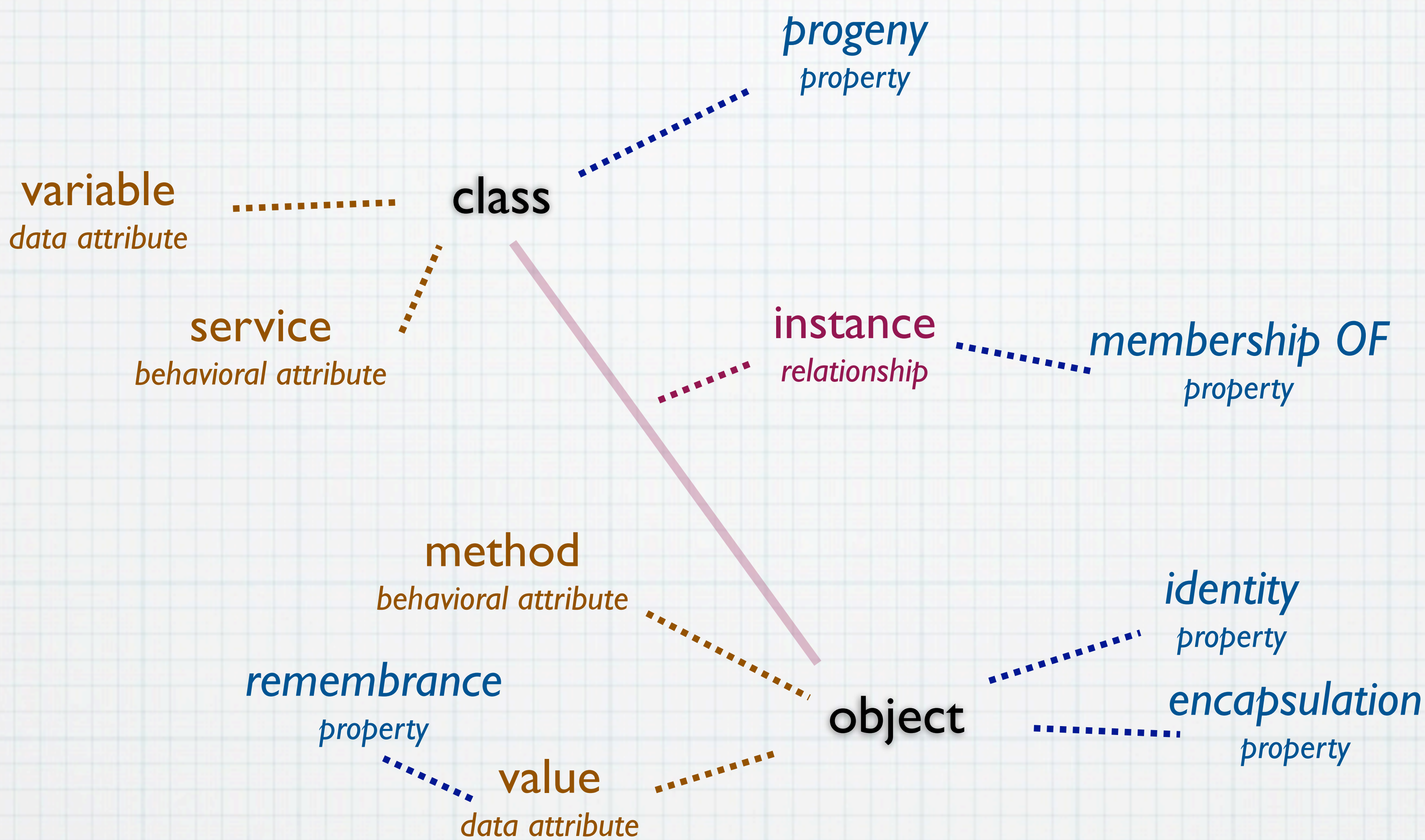

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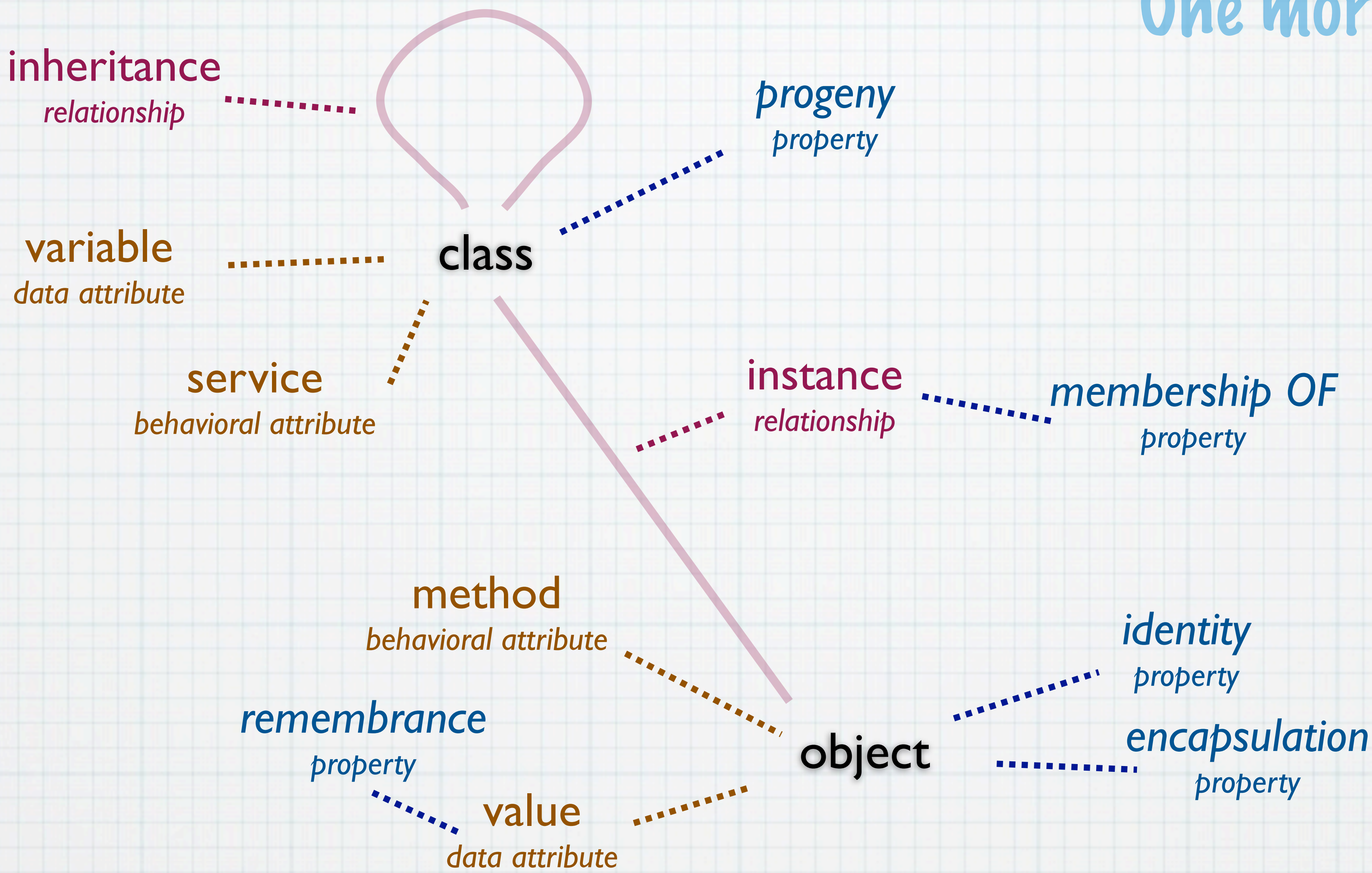

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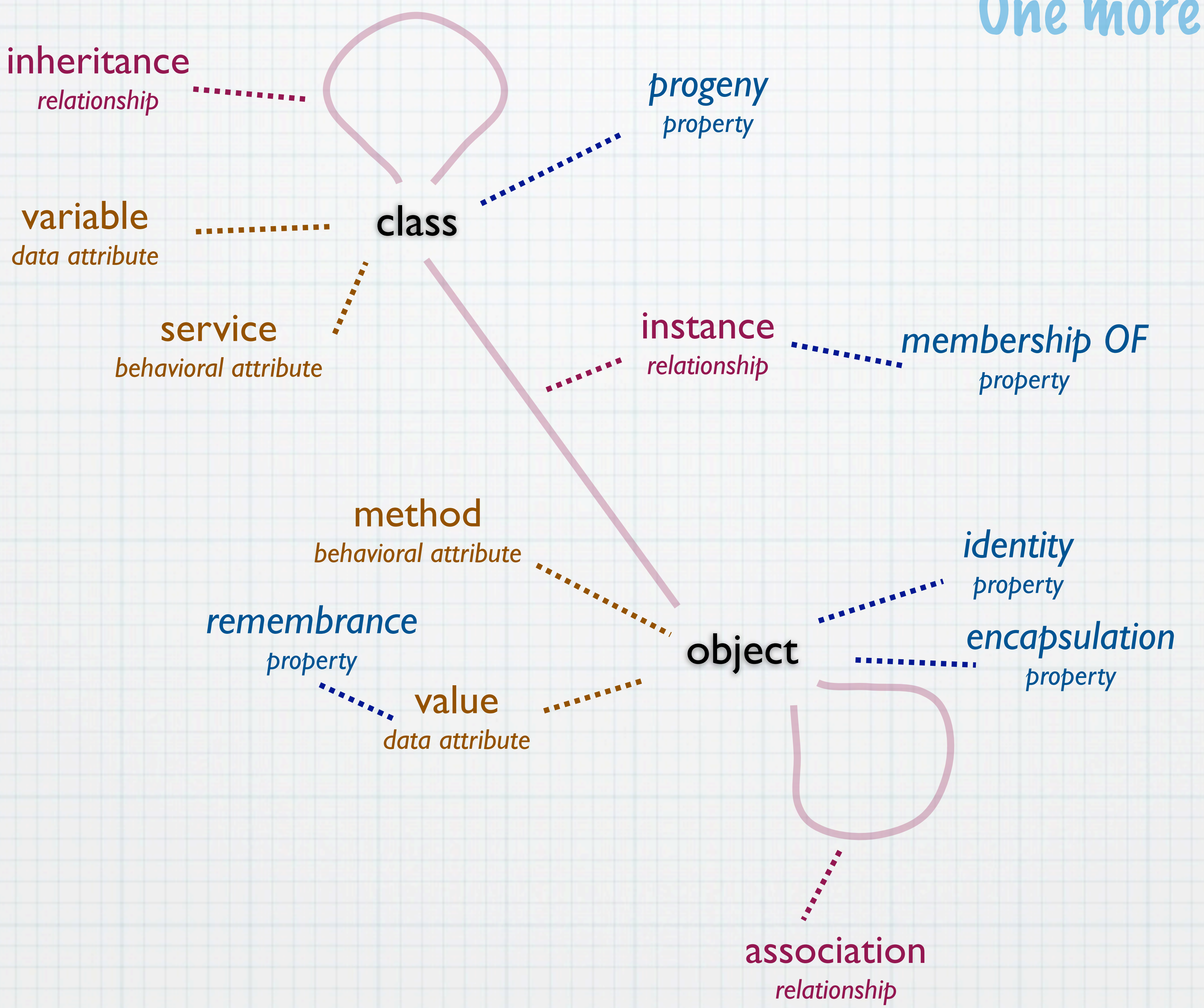

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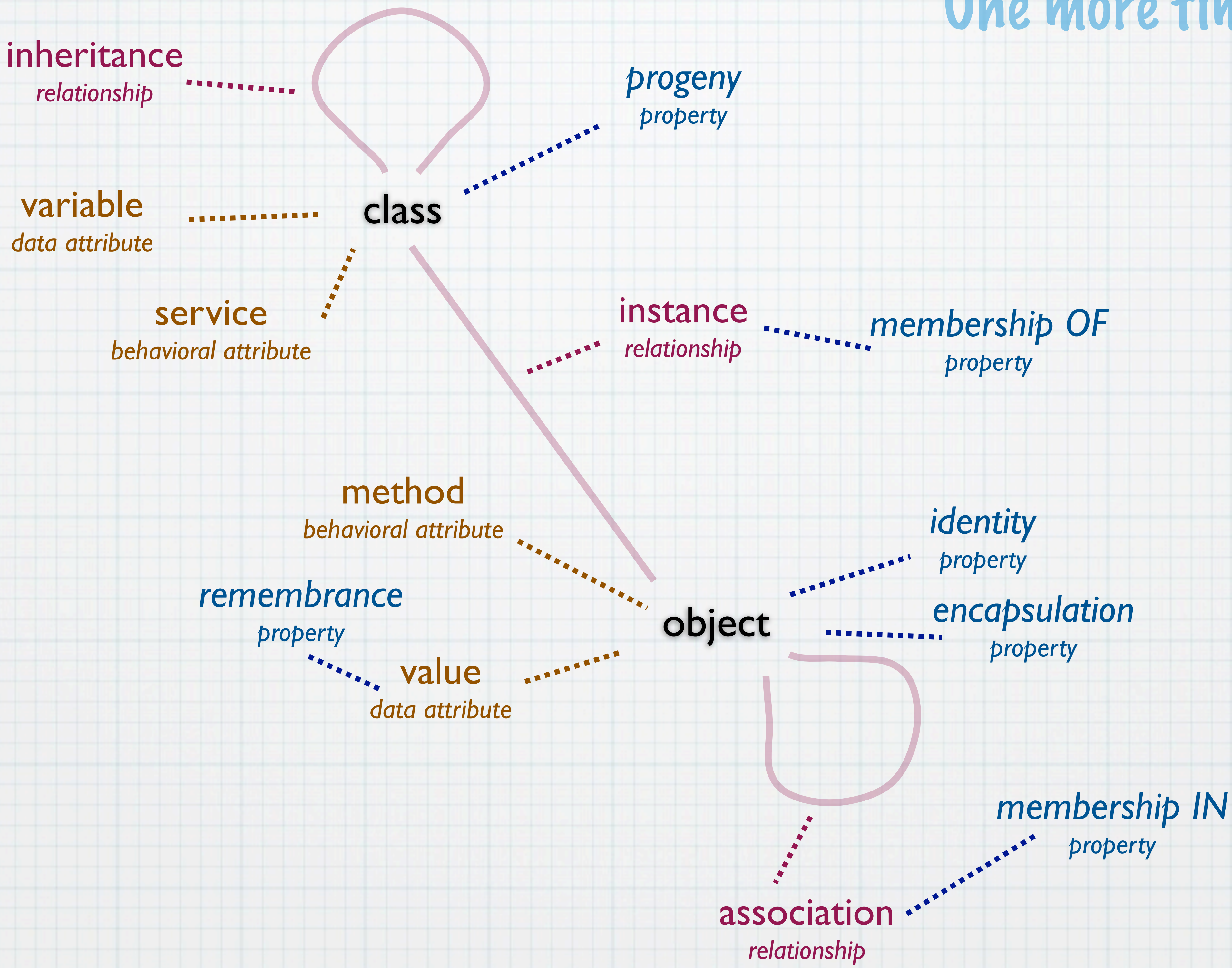

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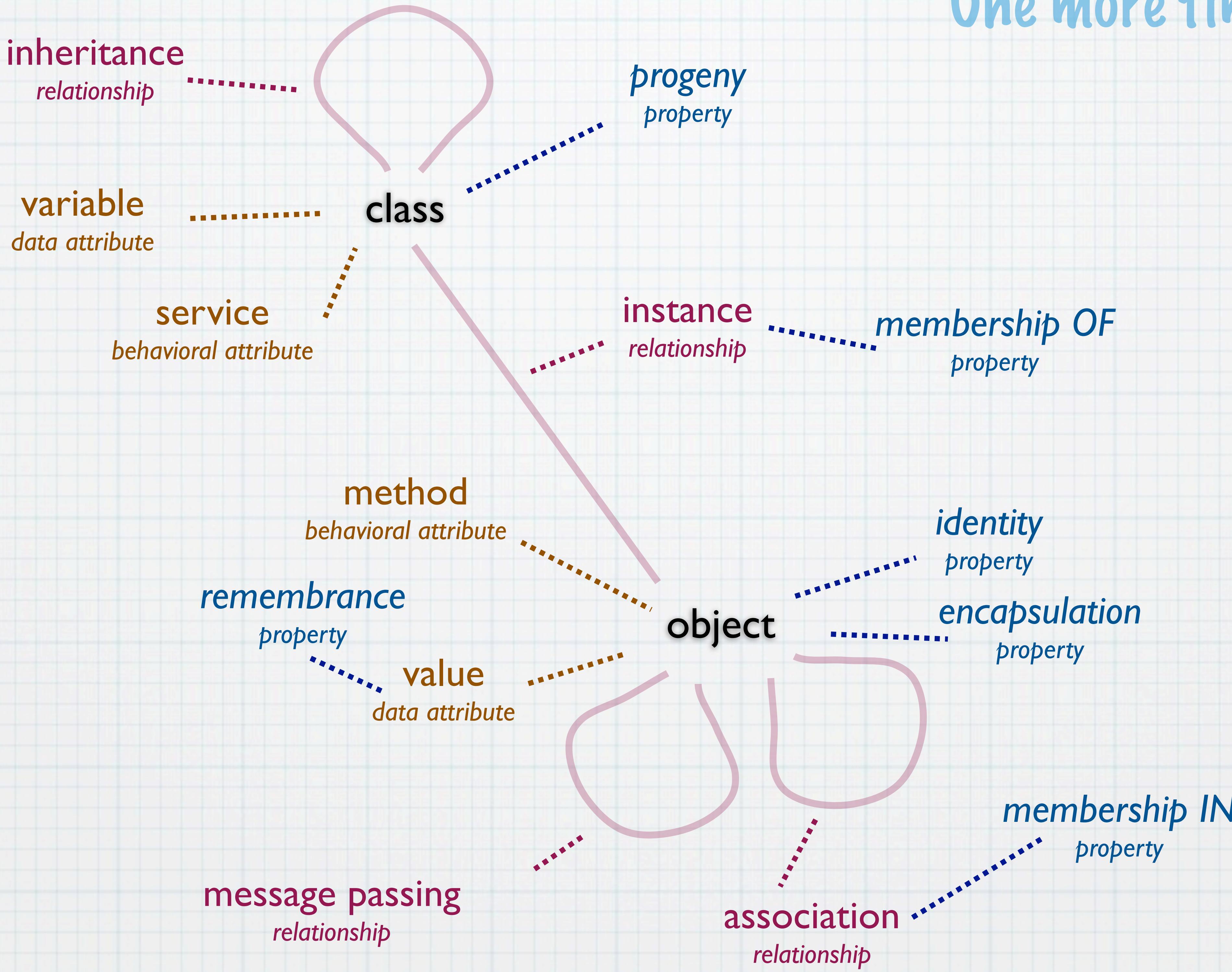

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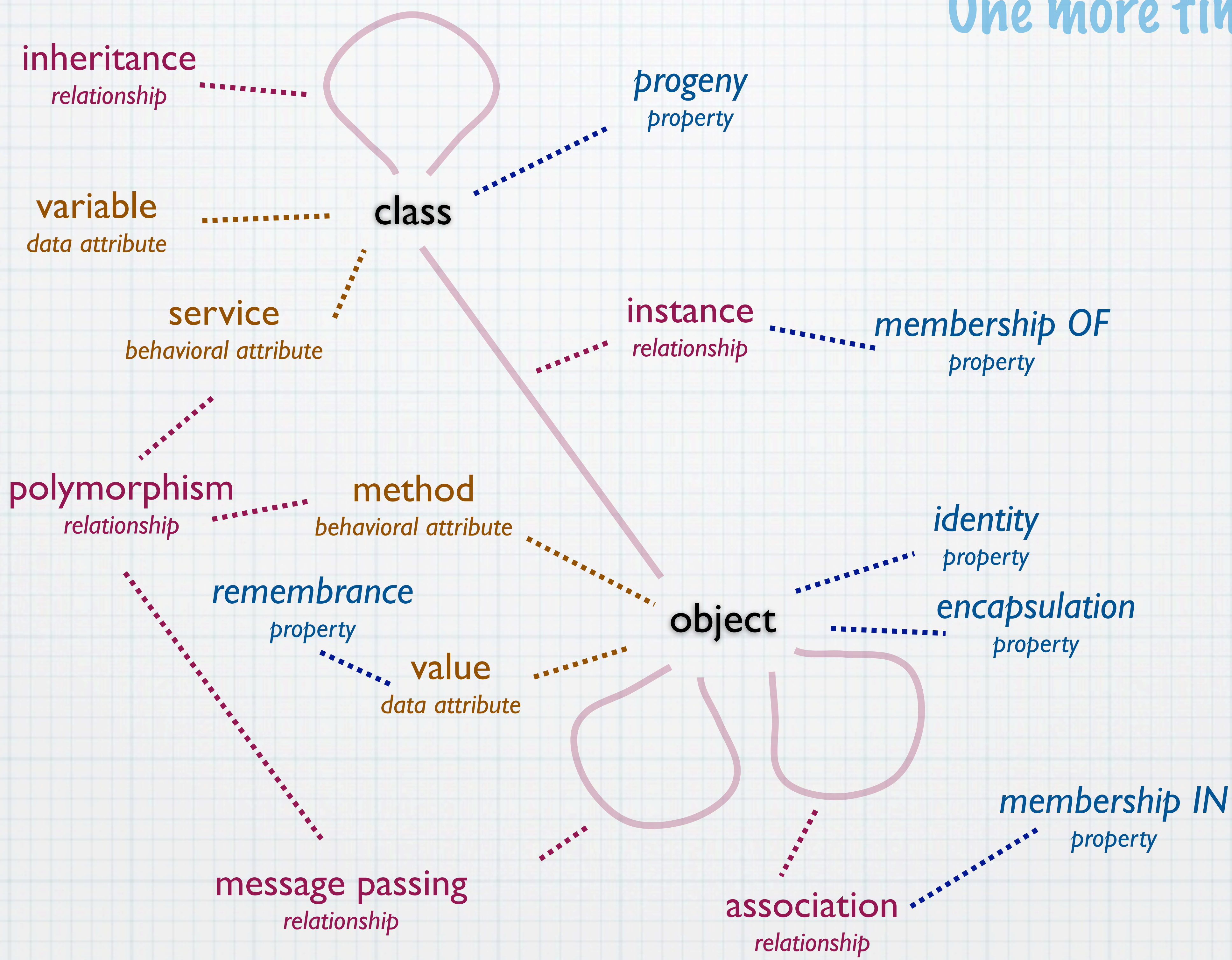

You Need to be able to Explain:

* object - (identity, encapsulation)
* attribute
  * data - (remembrance)
    * static
      * data attribute variable
    * dynamic
      * data attribute value
  * behavioral
    * static
      * service
    * dynamic
      * method (operation)
* class - (instance, membership OF)
* relationships
  * structural
    * inheritance - (override, parent class/child class, class hierarchy)
  * behavioral
    * association - (composition, membership IN)
    * message passing - (sender, receiver, message, parameters)
    * polymorphism - (binding)

Object-Oriented Concepts