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## Literate Data Model

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## Preliminaries

the basic structure of the model

In Literate Data Modeling, the main components of interest are typically Classes, Attributes, Models, and Subjects. However, to streamline the model and promote reusability, we introduce a supertype called Component. By defining common attributes and behaviors in the Component class, we can inherit them in the subclasses, ensuring consistency and reducing duplication throughout the model.

We present the Component class first because it is a best practice in modeling to introduce supertypes before their subtypes. This approach allows readers to understand the general concepts and shared properties before delving into the specifics of each specialized component.

Preliminaries

<b>Component</b>	
An element or building block of the literate data model	

**PLURAL** Components

**IMPLURAL** Components

**DEPENDENTS** [Annotation](#)

**SUBTYPES** [LiterateDataModel](#), [Subject](#), [Class](#), [Key](#), [AttributeSection](#), [Attribute](#), [Constraint](#), [Method](#), [ParameterAnInputToAMethod](#)

<b>Name</b>	the name of the component, not in camel case	
	( <a href="#">String</a> value O_O )	

**warning** This is a warning with emoji

<b>name</b>	The name of the component	
	( <a href="#">CamelName</a> value O_O )	

<b>Name</b>	( <a href="#">QualifiedCamel</a> value O_O )	
-------------	--	--

<b>Name</b>	a short form of the component's name, used for cross references and improved readability.	
	( <a href="#">CamelName</a> value O_O )	

**example** "LDM" is the short form of "Literate Data Model".

**DEFAULT** name - how do you say name in english?  
OCL x.name == y

**CONSTRAINTS** the abbreviated name should be shorter than the actual name  
OCL len(abbreviatedName) < len(name)

**MESSAGE** Why have an abbreviation longer than the name?  
**SEVERITY** Warning

**note** Does this annotation find it's way to the Constraint? YES! It's fixed!

<b>OneLiner</b>	A brief, one-line definition or description of the component, suitable for use in a descriptive table of contents. _	
	( <a href="#">OneLiner</a> value O_O )	

<b>ration</b>	A more detailed explanation or discussion of the component _	
	( <a href="#">RichText</a> value O_O )	

**/** mechanical attributes

<b>ment</b>	Indicates whether this component is an embellishment added during post-parsing processing _	
	( <a href="#">Boolean</a> value O_O )	

**DEFAULT** false

**note**

This attribute is set to true for components that are automatically generated or added during the fleshing out, review, or rendering processes, such as implied attributes or suggested model elements. It helps distinguish embellishments from the core model elements defined in the original LDM source.

### Diagram produced for Component erDiagram

```

Annotation }o--|| Component : based_on
LiterateDataModel ||--|| Component : subtype_of
Subject ||--|| Component : subtype_of
Subject }o--|| LiterateDataModel : based_on
Subject |o--o| Subject : parentSubject
Class_ ||--|| Component : subtype_of
Class_ |o--o| Class_ : basedOn
Key ||--|| Component : subtype_of
Key }o--|| Class_ : based_on
AttributeSection ||--|| Component : subtype_of
AttributeSection }o--|| Class_ : based_on
Attribute ||--|| Component : subtype_of
Attribute }o--|| AttributeSection : based_on
Constraint ||--|| Component : subtype_of
Method ||--|| Component : subtype_of
ParameterAnInputToAMethod ||--|| Component : subtype_of

```

```

erDiagram
Annotation }o--|| Component : based_on
LiterateDataModel ||--|| Component : subtype_of
Subject ||--|| Component : subtype_of
Subject }o--|| LiterateDataModel : based_on
Subject |o--o| Subject : parentSubject
Class_ ||--|| Component : subtype_of
Class_ |o--o| Class_ : basedOn
Key ||--|| Component : subtype_of
Key }o--|| Class_ : based_on
AttributeSection ||--|| Component : subtype_of
AttributeSection }o--|| Class_ : based_on
Attribute ||--|| Component : subtype_of
Attribute }o--|| AttributeSection : based_on
Constraint ||--|| Component : subtype_of
Method ||--|| Component : subtype_of
ParameterAnInputToAMethod ||--|| Component : subtype_of

```



Preliminaries

**AnnotationType**

a kind of note, or aside, used to call attention to additional information about some Component.

**note** Each LDM declares a set of Annotation Types, with defined labels, emojis, and clearly documented purposes. These are *recognized or registered* Annotation Types.

**PLURAL** AnnotationTypes

**IMPL** AnnotationTypes

**BASED ON** [LiterateDataModel](#)

**emoji** an emoji  
( [Emoji](#) value O\_O )

**Name** an emoji  
( [String](#) value O\_O )

**unicode** the Unicode for the emoji  
( [String](#) value O\_O )

**label** A short label to indicate the purpose of the annotation \_  
( [LowerCamel](#) value O\_O )

**plural** the plural form of the label  
( [UpperCamel](#) value O\_O )

**DEFAULT** based on label

**purpose** the intended reason for the annotation.  
( [OneLiner](#) value O\_O )

**depends on LiterateDataModel** A link back to the LiterateDataModel on which this AnnotationType depends.  
( [LiterateDataModel](#) value M\_1 )

**depends on AnnotationType** inverse attribute for Annotation.annotationType from which this was implied.  
( [Annotation](#) value M\_1 )

**INVERSE** [Annotation.annotationType](#)

Diagram produced for AnnotationType  
erDiagram  
AnnotationType }o--|| LiterateDataModel : based\_on  
Annotation ||o--o| AnnotationType : annotationType

```

erDiagram
    AnnotationType }o--|| LiterateDataModel : based_on
    AnnotationType : annotationType

```

Preliminaries

<b>Annotation</b>	
A note or comment associated with a model element	

PLURAL Annotations  
MEDPLURALAnnotations  
BASEDON [Component](#)

<b>AnnotationType</b>	( Optional <a href="#">AnnotationType</a> value O_O )
-----------------------	---

**note** An Annotation is considered to *recognized* if the label is associated with an Annotation Type. otherwise it is *ad hoc* .  
**note** Should be a Value Type

INVERSE [AnnotationType.inverseOfAnnotationType](#)

<b>label</b>	A short label to indicate the purpose of the annotation _ ( <a href="#">CamelName</a> value O_O )
--------------	--

But any short label is valid.

DEFAULT from annotationType

<b>emoji</b>	( Optional <a href="#">Emoji</a> value O_O )
--------------	--

DEFAULT from annotation type

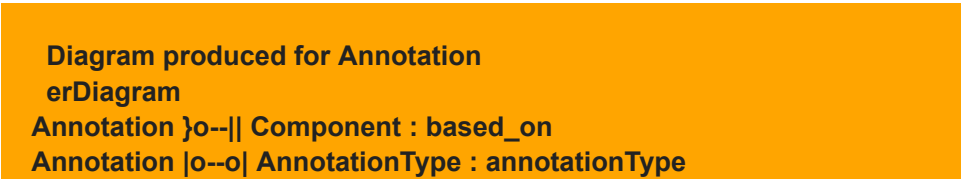
<b>content</b>	The content or body of the annotation ( <a href="#">RichText</a> value O_O )
----------------	---

<b>embellishment</b>	Indicates whether this annotation is an embellishment added during post-parsing processing _ ( <a href="#">Boolean</a> value O_O )
----------------------	---

DEFAULT false

**note** This attribute is set to true for annotations that are automatically generated or added during the fleshing out, review, or rendering processes, such as suggestions, issues, or diagnostic messages. It helps distinguish embellishment annotations from the annotations defined in the original LDM source.

<b>dependsOn</b>	A link back to the Component on which this Annotation depends. ( <a href="#">Component</a> value M_1 )
------------------	---





erDiagram Annotation }o--|| Component : based\_on Annotation |o--o|  
 AnnotationType : annotationType

## The Model and its Subjects

	<b>LiterateDataModel</b> A representation of a domain's entities, attributes, and relationships, along with explanatory text and examples
PLURAL	LiterateDataModels
DEPENDENTS	<a href="#">AnnotationType</a> , <a href="#">Subject</a>
TYPEOF	<a href="#">Component</a>
name	( <a href="#">UpperCamel</a> value O_O )
PRIDES	<a href="#">Component.name</a>
cts	list of all classes in the model, as ordered in the definition of the model. ( List of <a href="#">Classes</a> value O_O )
VERSE	<a href="#">Class.inverseOfAllSubjects</a>
ATION	gathering s.allSubjects over s in subjectAreas
RAINTS	Subject names must be unique across the model.
es	list of all classes in the model, as ordered in the definition of the model. ( List of <a href="#">Classes</a> value O_O )
VERSE	<a href="#">Class.inverseOfAllClasses</a>
ATION	gathering s.allClasses over s in allSubjects.
RAINTS	Class names must be unique across the model.
es	( List of <a href="#">AnnotationTypes</a> value O_O )
Language	the recommended language for expressing derivation, defaults, and constraints ( <a href="#">CodingLanguage</a> value O_O )
DEFAULT	OCL
languages	( Optional List of <a href="#">CodingLanguages</a> value O_O )
Language	the recommended language for expressing derivation, defaults, and constraints ( <a href="#">TemplateLanguage</a> value O_O )
DEFAULT	Handlebars
Languages	( Optional List of <a href="#">TemplateLanguages</a> value O_O )
ns	A list of functions that require sophisticated AI-powered implementation * ( List of <a href="#">String</a> value O_O )
ATION	[ <a href="#">aiEnglishPlural()</a> ]

**Diagram produced for LiterateDataModel  
erDiagram**

**AnnotationType }o--|| LiterateDataModel : based\_on  
LiterateDataModel ||--|| Component : subtype\_of  
Subject ||--|| Component : subtype\_of  
Subject }o--|| LiterateDataModel : based\_on  
Subject |o--o| Subject : parentSubject**

erDiagram AnnotationType }o--|| LiterateDataModel : based\_on  
LiterateDataModel ||--|| Component : subtype\_of Subject ||--|| Component :  
subtype\_of Subject }o--|| LiterateDataModel : based\_on Subject |o--o| Subject :  
parentSubject

**Subject**

A specific topic or theme within the model

Subjects are the chapters an sections of the model.

- A subject need not contain any Classes if it's just expository.

**LURAL** Subjects  
**SEDON** [LiterateDataModel](#)  
**YPOF** [Component](#)  
**YPES** [SubjectArea](#)

**me** ( [UpperCamel](#) value O\_O )

**RIDES** [Component.name](#)

**ect** The parent subject, if any, under which this subject is nested \_  
( [Optional](#) [Subject](#) value O\_O )

**VERSE** [Subject.inverseOfParentSubject](#)

**es** The major classes related to this subject, in the order in which they should be presented \_  
( [List of](#) [Classes](#) value O\_O )

**issue** define chapter, section, subsection as levels?

**VERSE** [Class.inverseOfClasses](#)

**cts** Any child subjects nested under this subject, in the order in which they should be presented \_  
( [List of](#) [Subjects](#) value O\_O )

**DSL** : the Classes within a Subject are always displayed before the childSubjects.

**VERSE** [Subject.inverseOfChildSubjects](#)

**s**  
**Model** A link back to the LiterateDataModel on which this Subject depends.  
( [LiterateDataModel](#) value M\_1 )

**Subject** Inverse attribute for Subject.parentSubject from which this was implied.  
( [Subject](#) value M\_1 )

**VERSE** [Subject.parentSubject](#)

**subjects** Inverse attribute for Subject.childSubjects from which this was implied.  
( [Subject](#) value M\_1 )



INVERSE    [Subject.childSubjects](#)

Diagram produced for Subject

erDiagram

LiterateDataModel ||--|| Component : subtype\_of

Subject ||--|| Component : subtype\_of

Subject }o--|| LiterateDataModel : based\_on

Subject |o--o| Subject : parentSubject

SubjectArea ||--|| Subject : subtype\_of

erDiagram LiterateDataModel ||--|| Component : subtype\_of Subject ||--|| Component : subtype\_of Subject }o--|| LiterateDataModel : based\_on Subject |o--o| Subject : parentSubject SubjectArea ||--|| Subject : subtype\_of

SubjectArea

A main topic or area of focus within the model, containing related subjects and classes

WHERE    parentSubject is absent  
PLURAL    SubjectAreas  
BASEDON    [LiterateModel](#), [Xyz](#)  
BTYPEOF    [Subject](#)

ites  
Model

A link back to the LiterateModel on which this SubjectArea depends.

( [LiterateModel](#) value M\_1 )

ites  
seXyz

A link back to the Xyz on which this SubjectArea depends.

( [Xyz](#) value M\_1 )

Diagram produced for SubjectArea

erDiagram

Subject |o--o| Subject : parentSubject

SubjectArea ||--|| Subject : subtype\_of

erDiagram Subject |o--o| Subject : parentSubject SubjectArea ||--|| Subject : subtype\_of

**Classes**

# Classes

## Class

A key entity or object type in the model, often corresponding to a real-world concept

PLURAL	Classes
DEPENDENTS	<a href="#">Subtyping</a> , <a href="#">Key</a> , <a href="#">AttributeSection</a> , <a href="#">ClassConstraint</a>
BTYEOF	<a href="#">Component</a>
SUBTYPES	<a href="#">ReferenceType</a>
STRAINTS	Within each Class, attribute names must be unique.

**Form** the normal English plural form of the name of the Class

( [UpperCamel](#) value O\_O )

Might be Books for the Book class or other regular plurals.

- But also might be People for Person.

**note** When inputting a model, you will rarely need to specify the plural form. The input program will just look it up.

**DEFAULT** the regular plural, formed by adding "s" or "es".

**basedOn** the Class or Classes on which this class is dependent

( [Set of \[Class\]\(#\)](#) value O\_O )

This is solely based on **Existence Dependency** . A true dependent entity cannot logically exist without the related parent entity. For instance, an Order Item cannot exist without an Order. If removing the parent entity logically implies removing the dependent entity, then it is a dependent entity.

**note** that basedOn and dependentOf are being used synonymously in this metamodel.

**INVERSE** [Class.inverseOfBasedOn](#)

**types** The parent class

( [Es](#) value O\_O )

**typings** the criteria, or dimensions, by which the class can be divided into subtypes

( [List of \[Subtypings\]\(#\)](#) value O\_O )

**example** in a library model, the `Book` class could have subtypings based on genre (e.g., Fiction, Non-fiction), format (e.g., Hardcover, Paperback), or subject (e.g., Science, History).

**INVERSE** [Subtyping.inverseOfSubtypings](#)

**types** Any subtypes or specializations of this class based on its subtypings.

( [List of \[Classes\]\(#\)](#) value O\_O )

example	For instance, using the <code>Book</code> example, the subtypes could include <code>FictionBook</code> , <code>Non-fictionBook</code> , <code>HardcoverBook</code> , <code>PaperbackBook</code> , <code>ScienceBook</code> , and <code>HistoryBook</code> .
VERSE	<a href="#">Class.inverseOfSubtypes</a>
es	<div>The attributes or properties of the class, in the order in which they should be presented _</div> <div>( <i>List of <a href="#">Attributes</a> value O_O</i> )</div>
VERSE	<a href="#">Attribute.inverseOfAttributes</a>
ns	<div>additional attributes or properties of the class, grouped for clarity and elaboration. _</div> <div>( <i>List of <a href="#">AttributeSections</a> value O_O</i> )</div>
VERSE	<a href="#">AttributeSection.inverseOfAttributeSections</a>
nts	<div>Any constraints, rules, or validations specific to this class _</div> <div>( <i>List of <a href="#">Constraints</a> value O_O</i> )</div>
note	Constraints may be expressed on either the <code>Class</code> or the <code>Attribute</code> . Always?
ds	<div>Any behaviors or operations associated with this class _</div> <div>( <i>List of <a href="#">Methods</a> value O_O</i> )</div>
VERSE	<a href="#">Method.inverseOfMethods</a>
s	
nts	<div>the <code>Classes</code> which are basedOn this <code>Class</code></div> <div>( <i>Optional Set of <a href="#">Classes</a> value O_O</i> )</div>
VERSE	<a href="#">Class.basedOn</a>
ys	<div>( <i>Optional Set of <a href="#">UniqueKeys</a> value O_O</i> )</div>
VERSE	<a href="#">UniqueKey.basedOn</a>
s	
ects	<div>Inverse attribute for <code>LiterateDataModel.allSubjects</code> from which this was implied.</div> <div>( <i><a href="#">LiterateDataModel</a> value M_1</i> )</div>
VERSE	<a href="#">LiterateDataModel.allSubjects</a>
ses	<div>Inverse attribute for <code>LiterateDataModel.allClasses</code> from which this was implied.</div> <div>( <i><a href="#">LiterateDataModel</a> value M_1</i> )</div>
VERSE	<a href="#">LiterateDataModel.allClasses</a>
es	<div>Inverse attribute for <code>Subject.classes</code> from which this was implied.</div> <div>( <i><a href="#">Subject</a> value M_1</i> )</div>

INVERSE	<a href="#">Subject.classes</a>	
basedOn	Inverse attribute for Class.basedOn from which this was implied.	( <a href="#">Class</a> value M_1 )
INVERSE	<a href="#">Class.basedOn</a>	
subtypes	Inverse attribute for Class.subtypes from which this was implied.	( <a href="#">Class</a> value M_1 )
INVERSE	<a href="#">Class.subtypes</a>	
classes	Inverse attribute for Subtyping.classes from which this was implied.	( <a href="#">Subtyping</a> value M_1 )
INVERSE	<a href="#">Subtyping.classes</a>	
coreClass	Inverse attribute for SimpleDataTypeSubtpeOfDataType.coreClass from which this was implied.	( <a href="#">SimpleDataTypeSubtpeOfDataType</a> value M_1 )
INVERSE	<a href="#">SimpleDataTypeSubtpeOfDataType.coreClass</a>	

Diagram produced for Class\_  
erDiagram

Class\_ ||--|| Component : subtype\_of

Class\_ }o--o| Class\_ : basedOn

Subtyping }o--|| Class\_ : based\_on

ReferenceType ||--|| Class\_ : subtype\_of

Key ||--|| Component : subtype\_of

Key }o--|| Class\_ : based\_on

AttributeSection ||--|| Component : subtype\_of

AttributeSection }o--|| Class\_ : based\_on

ClassConstraint }o--|| Class\_ : based\_on

erDiagram Class\_ ||--|| Component : subtype\_of Class\_ }o--o| Class\_ :  
basedOn Subtyping }o--|| Class\_ : based\_on ReferenceType ||--|| Class\_ :  
subtype\_of Key ||--|| Component : subtype\_of Key }o--|| Class\_ : based\_on  
AttributeSection ||--|| Component : subtype\_of AttributeSection }o--|| Class\_ :  
based\_on ClassConstraint }o--|| Class\_ : based\_on

**Subtyping**  
a way in which subtypes of a Class may be classified

**PLURAL** Subtypings  
**EDPLURAL**Subtypings  
**SEDON** [Class](#)

**me** ( [LowerCamel](#) value O\_O )

**ive** ( [Boolean](#) value O\_O )

**DEFAULT** true

**ive** ( [Boolean](#) value O\_O )

**DEFAULT** true

**es** ( List of [Classes](#) value O\_O )

**DSL** : Shown in the DSL as

- Subtypes: byBrand - Brand1, Brand2,... (non exclusive, exhaustive)
- on the super class. And as
  - Subtype of: SuperClass byBrand
- on the subclass.

**note** every class can have an unnamed subtyping.  
**VERSE** [Class.inverseOfClasses](#)

**s**  
**ings**  
Inverse attribute for Class.subtypings from which this was implied.  
( [Class](#) value M\_1 )

**VERSE** [Class.subtypings](#)

**ss**  
A link back to the Class on which this Subtyping depends.  
( [Class](#) value M\_1 )

Diagram produced for Subtyping  
erDiagram

Class\_ |o--o| Class\_ : basedOn

Subtyping }o--|| Class\_ : based\_on

Classes

erDiagram Class\_ |o--o| Class\_ : basedOn Subtyping }o--|| Class\_ : based\_on

ReferenceType

A class that is presumed to be used as a reference, rather than a value

PLURAL    ReferenceTypes  
IMEDPLURALReferenceTypes  
BTYPOF    [Class](#)

Diagram produced for ReferenceType

erDiagram

Class\_ |o--o| Class\_ : basedOn

ReferenceType ||--|| Class\_ : subtype\_of

erDiagram Class\_ |o--o| Class\_ : basedOn ReferenceType ||--|| Class\_ : subtype\_of

CodeType

A data type or enumeration used in the model

PLURAL    CodeTypes  
IMEDPLURALCodeTypes  
DEPENDENTS    [CodeValue](#)

the code type was implied by use in an attribute and is only used for that attribute

( [Boolean](#) value O\_O )

Diagram produced for CodeType

erDiagram

CodeValue }o--|| CodeType : based\_on

erDiagram CodeValue }o--|| CodeType : based\_on

CodeValue

A possible value for an enumerated data class

PLURAL    CodeValues  
IMEDPLURALCodeValues  
BASEDON    [CodeType](#)

A short code or abbreviationi for the value \_

( [NameString](#) value O\_O )

an explanation of what the code means

( [RichText](#) value O\_O )

**note** Often, a CodeType will be assigned to just one attribute in the model. In such cases, there's no need to declare a new Code Type and invent a name for it. Instead:

A link back to the CodeType on which this CodeValue depends.

( CodeType value M\_1 )

Diagram produced for CodeValue

erDiagram

CodeValue }o--|| CodeType : based\_on

erDiagram CodeValue }o--|| CodeType : based\_on



## Classes

**Key**  
a list of attributes of a class

**PLURAL** Keys  
**IMPLURAL** Keys  
**BASED ON** [Class](#)  
**BTYPED OF** [Component](#)  
**SUBTYPES** [UniqueKey](#)

**Attributes**  
the attributes of the base Class.  
( [List of Attributes](#) value **O\_O** )

**INVERSE** [Attribute.inverseOfKeyAttributes](#)  
**CONSTRAINTS** each attribute must be a direct or inherited of the base class.  
**CONSTRAINTS** no repetitions allowed in keyAttributes

👉 **Issue** : introduce PureLists?

**issue** need ascending descending to support index keys or ordering keys.

**Class**  
**Class**  
A link back to the Class on which this Key depends.  
( [Class](#) value **M\_1** )

Diagram produced for Key  
erDiagram  
Class\_ ||--|| Component : subtype\_of  
Class\_ }o--|| Class\_ : basedOn  
Key ||--|| Component : subtype\_of  
Key }o--|| Class\_ : based\_on  
UniqueKey ||--|| Key : subtype\_of

erDiagram Class\_ ||--|| Component : subtype\_of Class\_ }o--|| Class\_ :  
basedOn Key ||--|| Component : subtype\_of Key }o--|| Class\_ : based\_on  
UniqueKey ||--|| Key : subtype\_of

**UniqueKey**

a list of attributes on which instances of the base class may be keyed.

note order unimportant for Unique Keys.

LURAL UniqueKeys  
DPLURAL UniqueKeys  
YPEOF [Key](#)

Diagram produced for UniqueKey

erDiagram

UniqueKey ||--|| Key : subtype\_of

erDiagram UniqueKey ||--|| Key : subtype\_of

## Attributes

**AttributeSection**  
a group of attributes for a class that merit a shared explanation.

**LURAL** AttributeSections  
**ADPLURAL** AttributeSections  
**SEDON** [Class](#)  
**DENTS** [Attribute](#)  
**YPOF** [Component](#)

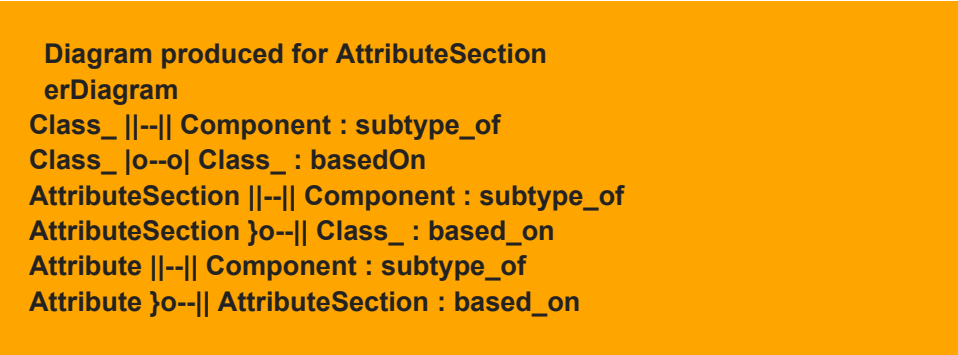
whether the attributes in this section, taken together, are optional.  
( [Boolean](#) value **O\_0** )

If the Attribute Section is required, then each Attribute within the sectional is optional or required, depending on how it is marked.

- But if the Attribute Section is optional each attribute in the section is only required if any attribute in the section is present.

**AttributeSections** reverse attribute for Class.attributeSections from which this was implied.  
( [Class](#) value **M\_1** )  
**VERSE** [Class.attributeSections](#)

**Class** A link back to the Class on which this AttributeSection depends.  
( [Class](#) value **M\_1** )



erDiagram Class\_ ||--|| Component : subtype\_of Class\_ }o--o| Class\_ : basedOn AttributeSection ||--|| Component : subtype\_of AttributeSection }o--|| Class\_ : based\_on Attribute ||--|| Component : subtype\_of Attribute }o--|| AttributeSection : based\_on

## Attributes

### Attribute

A property or characteristic of a class

**PLURAL**    Attributes  
**BASED ON**    [AttributeSection](#)  
**DEPENDENTS**    [AttributeConstraint](#)  
**BTYPED OF**    [Component](#)

**name**    ( [LowerCamel](#) value O\_O )

**OVERRIDES**    [Component.name](#)

**dataType**    The kind of object to which the attribute refers. \_  
( [DataType](#) value O\_O )

But,

- ◦ List of Editions
- ◦ Set of Edition
- ◦ ... and more complicated cases.

see    [the section below on Data Type Specifiers.](#)

**optional**    Indicates whether the attribute must have a value for every instance of the class \_  
( [Boolean](#) value O\_O )

**DEFAULT**    \*\*\* False

**cardinality**    The cardinality of the relationship represented by the attribute \_  
( [CardinalityCode](#) value O\_O )

**DEFAULT**    \*\*\* For a singular attribute, the default cardinality is N:1. If the attribute is 1:1, it must be stated explicitly. For a collective attribute, the default is 1:N. If the attribute is N:M, it must be stated explicitly.

**Example**

**author**    ( [InventedName](#) value O\_O )

**books**    ( [Optional](#) [InventedName](#) value O\_O )

**note**    [how this works with optionality](#)

**isInherited**    ( [Boolean](#) value O\_O )

**DERIVATION**    true if the data type is a class or a simple collection of members of a class.

class	the class which contains, or would contain the inverse attribute ( Optional <a href="#">Class</a> value O _ O )
validation	from the data type. Null unless attribute is invertible.
attribute	( Optional <a href="#">Attribute</a> value O _ O )
constraint	( Optional <a href="#">Attribute</a> value O _ O )
rule	The rule or formula for calculating the value, if no value is supplied Now running to a second line with the parenthetical on yet a third line ( Optional <a href="#">Derivation</a> value O _ O )
note	even when an Attribute has a default derivation, there's no guarantee that every instance will have an assigned value. Example needed.
derivation	For derived attributes, the rule or formula for calculating the value _ ( Optional <a href="#">Derivation</a> value O _ O )
issue	on insert vs on access?
constraints	Any validation rules specific to this attribute _ ( List of <a href="#">Constraints</a> value O _ O )
note	from Class.constraints
inverse	Inverse attribute for Class.attributes from which this was implied. ( <a href="#">Class</a> value M _ 1 )
inverse	<a href="#">Class.attributes</a>
inverse	Inverse attribute for Key.keyAttributes from which this was implied. ( <a href="#">Key</a> value M _ 1 )
inverse	<a href="#">Key.keyAttributes</a>
depends on	A link back to the AttributeSection on which this Attribute depends. ( <a href="#">AttributeSection</a> value M _ 1 )

Diagram produced for Attribute  
erDiagram

AttributeSection ||--|| Component : subtype\_of  
Attribute ||--|| Component : subtype\_of  
Attribute }o--|| AttributeSection : based\_on  
Attribute |o--o| DataType : dataType

**AttributeConstraint }o--|| Attribute : based\_on**

erDiagram AttributeSection ||--|| Component : subtype\_of Attribute ||--|| Component : subtype\_of Attribute }o--|| AttributeSection : based\_on Attribute |o--o| DataType : dataType AttributeConstraint }o--|| Attribute : based\_on

**Value Type Derivation**  
A rule or formula for deriving the value of an attribute

**PLURAL** Derivations

**Comment** An English language statement of the derivation rule \_  
( [RichText](#) value O\_O )

**Expression** The formal expression of the derivation in a programming language \_  
( [CodeExpression](#) value O\_O )

No diagram produced for Derivation

**Value Type Constraint**  
A rule, condition, or validation that must be satisfied by the model

**PLURAL** Constraints

**BTYPOF** [Component](#)

**SUBTYPES** [ClassConstraint](#) , [AttributeConstraint](#)

**Comment** An English language statement of the constraint \_  
( [RichText](#) value O\_O )

**Expression** The formal expression of the constraint in a programming language  
( [InventedName](#) value O\_O )

**Verity** ( [Code](#) value O\_O )

Warning, nothing fatal; just a caution  
Error, serious. Fix now

Diagram produced for Constraint  
erDiagram  
Constraint ||--|| Component : subtype\_of  
ClassConstraint ||--|| Constraint : subtype\_of  
AttributeConstraint ||--|| Constraint : subtype\_of

erDiagram Constraint ||--|| Component : subtype\_of ClassConstraint ||--||

Constraint : subtype\_of AttributeConstraint ||--|| Constraint : subtype\_of

Type **Message**

LURAL Messages

PLURAL Messages

Message is trivial; no diagram

Type **ClassConstraint**

LURAL ClassConstraints

PLURAL ClassConstraints

BASED ON [Class](#)

TYPE OF [Constraint](#)

A link back to the Class on which this ClassConstraint depends.  
( [Class](#) value M\_1 )

Diagram produced for ClassConstraint  
erDiagram  
Class\_ ||o--o|| Class\_ : basedOn  
ClassConstraint ||--|| Constraint : subtype\_of  
ClassConstraint }o--|| Class\_ : based\_on

erDiagram Class\_ ||o--o|| Class\_ : basedOn ClassConstraint ||--|| Constraint :  
subtype\_of ClassConstraint }o--|| Class\_ : based\_on

Type **AttributeConstraint**

LURAL AttributeConstraints

PLURAL AttributeConstraints

BASED ON [Attribute](#)

TYPE OF [Constraint](#)

A link back to the Attribute on which this AttributeConstraint depends.  
( [Attribute](#) value M\_1 )

Diagram produced for AttributeConstraint  
erDiagram  
AttributeConstraint ||--|| Constraint : subtype\_of



**AttributeConstraint }o--|| Attribute : based\_on**

erDiagram AttributeConstraint ||--|| Constraint : subtype\_of AttributeConstraint  
}o--|| Attribute : based\_on

Value Type **CodeExpression**

**PLURAL** CodeExpressions

**MEDPLURAL**CodeExpressions

**language** the programming language

( Code value O\_O )

OCL, Object Constraint Language  
Java, Java

**ession**

( String value O\_O )

**CodeExpression is trivial; no diagram**

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## Methods

	<b>Method</b>	
	A behavior or operation associated with a class	
LURAL	Methods	
TYPEOF	<a href="#">Component</a>	
ers	The input parameters of the method _	( <i>List of <a href="#">Parameters</a> value O_O</i> )
VERSE	<a href="#">ParameterAnInputToAMethod.inverseOfParameters</a>	
pe	The data type of the value returned by the method _	( <i><a href="#">DataType</a> value O_O</i> )
s		
ds	Inverse attribute for Class.methods from which this was implied.	( <i><a href="#">Class</a> value M_1</i> )
VERSE	<a href="#">Class.methods</a>	

Diagram produced for Method  
erDiagram  
Method ||--|| Component : subtype\_of  
Method |o--o| DataType : returnType

erDiagram Method ||--|| Component : subtype\_of Method |o--o| DataType : returnType

Methods

**ParameterAnInputToAMethod**

**PLURAL** Parameters  
**BTYPOF** [Component](#)

**type** The data type of the parameter \_  
( [DataType](#) value O\_O )

**inality** The cardinality of the parameter  
( [InventedName](#) value O\_O )

**rites**  
**imeters**  
**thod** Inverse attribute for Method.parameters from which this was implied.  
( [Method](#) value M\_1 )

**INVERSE** [Method.parameters](#)

Diagram produced for ParameterAnInputToAMethod  
erDiagram  
ParameterAnInputToAMethod ||--|| Component : subtype\_of  
ParameterAnInputToAMethod |o--o| DataType : type

erDiagram ParameterAnInputToAMethod ||--|| Component : subtype\_of  
ParameterAnInputToAMethod |o--o| DataType : type

BLANK

## Data Types

Type	<b>DataType</b>
PLURAL	DataTypes
CDPLURAL	DataTypes
	<div>Diagram produced for DataType erDiagram Attribute  o--o  DataType : dataType Method  o--o  DataType : returnType ParameterAnInputToAMethod  o--o  DataType : type</div> <div>erDiagram Attribute  o--o  DataType : dataType Method  o--o  DataType : returnType ParameterAnInputToAMethod  o--o  DataType : type</div>
Type	<b>SimpleDataTypeSubtpeOfDataType</b>
PLURAL	SimpleDataTypeSubtpeOfDataTypes
CDPLURAL	SimpleDataTypeSubtpeOfDataTypes
Class	( <u>Class</u> value O_O )
VERSE	<u>Class.inverseOfCoreClass</u>
	<div>SimpleDataTypeSubtpeOfDataType is trivial; no diagram</div>
Type	<b>ComplexDataType</b>
PLURAL	ComplexDataTypes
CDPLURAL	ComplexDataTypes
on	( <u>AggregatingOperator</u> value O_O )
es	( List of <u>DataTypes</u> value O_O )
	<div>Diagram produced for ComplexDataType erDiagram</div> <div>erDiagram</div>
Type	<b>AggregatingOperator</b>
PLURAL	AggregatingOperators
CDPLURAL	AggregatingOperators
me	( <u>Code</u> value O_O )



Data Types

SetOf  
ListOf  
Mapping

arity

( Integer value O\_O )

elling

( Template value O\_O )

AggregatingOperator is trivial; no diagram

BLANK

## Low level Data Types

insert Camel Case.md

Type **Emoji**

LURAL    Emojis

EDPLURALEmojis

Emoji is trivial; no diagram

Type **String**

LURAL    Strings

EDPLURALStrings

String is trivial; no diagram

Type **CamelName**

A short string without punctuation or spaces, suitable for names, labels, or identifiers and presented in camel case.

LURAL    CamelNames

EDPLURALCamelNames

TYPEOF    [String](#)

TYPES    [UpperCamel](#), [LowerCamel](#)

ng ( [String](#) value 0\_0 )

RAINTS    Must follow the camel case naming convention and not be empty.

ample    "firstName", "orderDate", "customerID"

ngNote

- *CamelName* is presented here, just after its first usage by another class (Component), to provide context and understanding before it is used further in the model.

CamelName is trivial; no diagram

Type **UpperCamel**

a CamelName that begins with a capital letter

ample    \_ "Customer", "ProductCategory", "PaymentMethod"

WHERE    content begins with an upper case letter.

Low level Data Types

**PLURAL** UpperCamels  
**IMMEDPLURAL** UpperCamels  
**BTYPEOF** [CamelName](#)

UpperCamel is trivial; no diagram

**Value Type** LowerCamel  
a CamelName that begins with a lower case letter

**example** "firstName", "orderTotal", "shippingAddress"

**WHERE** content begins with a lower case letter.  
**PLURAL** LowerCamels  
**IMMEDPLURAL** LowerCamels  
**BTYPEOF** [CamelName](#)

LowerCamel is trivial; no diagram

**Value Type** QualifiedCamel  
an expression consisting of Camel Names separated by periods

**PLURAL** QualifiedCamels  
**IMMEDPLURAL** QualifiedCamels  
**BTYPEOF** [String](#)  
**CONSTRAINTS**

content consists of CamelNames, separated by periods. Each of the camel names must be Upper Camel except, possibly, the first.

QualifiedCamel is trivial; no diagram

	<div><div>ValueTypeRichText</div><div>A string with markup for block level formatting.</div></div>
TYPE	ValueTypeRichTexts
PLURAL	ValueTypes
TYPEOF	<a href="#">String</a>
Value	<div><div>the string content</div><div>( <a href="#">String</a> value 0_0 )</div></div>
Annotation	<div><div>the rich text coding language used</div><div>( <a href="#">Code</a> value 0_0 )</div><div><div>HTML</div><div>MarkDown</div></div><div>ValueTypeRichText is trivial; no diagram</div></div>
Type	<div><div>OneLiner</div><div>String with markup for line level formatting.</div></div>
TYPE	OneLiners
PLURAL	OneLiners
TYPEOF	<a href="#">RichText</a>
Value	<div><div>the string content</div><div>( <a href="#">String</a> value 0_0 )</div></div>
CONSTRAINTS	must not contain a line break or new line character
MESSAGE	A line can't span two lines
	<div>OneLiner is trivial; no diagram</div>
Type	<div><div>PrimitiveType</div><div>A basic, built-in data type</div></div>
TYPE	PrimitiveTypes
PLURAL	PrimitiveTypes
TYPES	<a href="#">String</a> , <a href="#">Integer</a> , <a href="#">Decimal</a> , <a href="#">Boolean</a> , <a href="#">Date</a> , <a href="#">Time</a> , <a href="#">DateTime</a>
	<div>PrimitiveType is trivial; no diagram</div>
Type	<div><div>String</div></div>

Low level Data Types

PLURAL Strings  
IMEDPLURALStrings  
BTYPEOF [PrimitiveType](#)  
SUBTYPES [CamelName](#), [QualifiedCamel](#), [ValueTypeRichText](#)

String is trivial; no diagram

Value Type Integer

PLURAL Integers  
IMEDPLURALIntegers  
BTYPEOF [PrimitiveType](#)

Integer is trivial; no diagram

Value Type Decimal

PLURAL Decimals  
IMEDPLURALDecimals  
BTYPEOF [PrimitiveType](#)

Decimal is trivial; no diagram

Value Type Boolean

PLURAL Booleans  
IMEDPLURALBooleans  
BTYPEOF [PrimitiveType](#)

Boolean is trivial; no diagram

Value Type Date

PLURAL Dates  
IMEDPLURALDates  
BTYPEOF [PrimitiveType](#)

Date is trivial; no diagram

Value Type Time

PLURAL Times

IDPLURALTimes  
TYPEOF [PrimitiveType](#)

Time is trivial; no diagram

Type **DateTime**  
LURAL    DateTimes

IDPLURALDateTimes  
TYPEOF [PrimitiveType](#)

DateTime is trivial; no diagram



## Annotation Types Used

These are the recognized Annotation Types for the LDM model.

And this is how you register the AnnotationTyped for a model. By including this sort of array in the DSL document for the model.

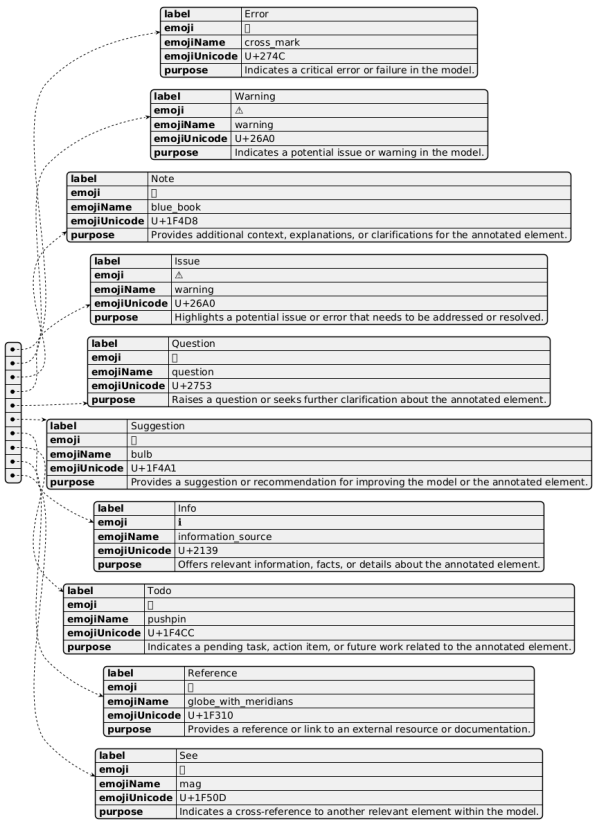
```

@startjson

[
  {
    "label": "Error",
    "emoji": "✖",
    "emojiName": "cross_mark",
    "emojiUnicode": "U+274C",
    "purpose": "Indicates a critical error or failure in the model."
  },
  {
    "label": "Warning",
    "emoji": "⚠",
    "emojiName": "warning",
    "emojiUnicode": "U+26A0",
    "purpose": "Indicates a potential issue or warning in the model."
  },
  {
    "label": "Note",
    "emoji": "📘",
    "emojiName": "blue_book",
    "emojiUnicode": "U+1F4D8",
    "purpose": "Provides additional context, explanations, or
clarifications for the annotated element."
  },
  {
    "label": "Issue",
    "emoji": "⚠",
    "emojiName": "warning",
    "emojiUnicode": "U+26A0",
    "purpose": "Highlights a potential issue or error that needs to be
addressed or resolved."
  },
  {
    "label": "Question",
    "emoji": "?",
    "emojiName": "question",
    "emojiUnicode": "U+2753",
    "purpose": "Raises a question or seeks further clarification about
the annotated element."
  },
  {
    "label": "Suggestion",
    "emoji": "💡",

```

# Annotation Types Used



label	Error
emoji	✖
emojiName	cross_mark
emojiUnicode	U+274C
purpose	Indicates a critical error or failure in the model.

label	Warning
emoji	⚠
emojiName	warning
emojiUnicode	U+26A0
purpose	Indicates a potential issue or warning in the model.

label	Note
emoji	📌
emojiName	blue_book
emojiUnicode	U+1F4D8
purpose	Provides additional context, explanations, or clarifications for the annotated element.

label	Issue
emoji	⚠
emojiName	warning
emojiUnicode	U+26A0
purpose	Highlights a potential issue or error that needs to be addressed or resolved.

label	Question
emoji	?
emojiName	question
emojiUnicode	U+2753
purpose	Raises a question or seeks further clarification about the annotated element.

label	Suggestion
emoji	💡
emojiName	bulb
emojiUnicode	U+1F4A1
purpose	Provides a suggestion or recommendation for improving the model or the annotated element.

label	Info
emoji	ℹ
emojiName	information_source
emojiUnicode	U+2139
purpose	Offers relevant information, facts, or details about the annotated element.

label	To do
emoji	📌
emojiName	pushpin
emojiUnicode	U+1F4CC
purpose	Indicates a pending task, action item, or future work related to the annotated element.

label	Reference
emoji	📄
emojiName	globe_with_meridians
emojiUnicode	U+1F310
purpose	Provides a reference or link to an external resource or documentation.

label	See
emoji	👉
emojiName	mag
emojiUnicode	U+1F50D
purpose	Indicates a cross-reference to another relevant element within the model.

Annotation types as CSV

**Annotation types as CSV**

label,emoji,emojiName,emojiUnicode,purpose

Error,✖,cross\_mark,U+274C,Indicates a critical error or failure in the model.

Warning,⚠,warning,U+26A0,Indicates a potential issue or warning in the model.

Note,📘,blue\_book,U+1F4D8,"Provides additional context, explanations, or clarifications for the annotated element."

Issue,⚠,warning,U+26A0,Highlights a potential issue or error that needs to be addressed or resolved.

Question,❓,question,U+2753,Raises a question or seeks further clarification about the annotated element.

Suggestion,💡,bulb,U+1F4A1,Provides a suggestion or recommendation for improving the model or the annotated element.

Info,ℹ,information\_source,U+2139,"Offers relevant information, facts, or details about the annotated element."

Todo,📌,pushpin,U+1F4CC,"Indicates a pending task, action item, or future work related to the annotated element."

Reference,🌐,globe\_with\_meridians,U+1F310,Provides a reference or link to an external resource or documentation.

See,🔍,mag,U+1F50D,Indicates a cross-reference to another relevant element within the model.

	label	emoji	emojiName	emojiUnicode	purpose
0	Error	✖	cross_mark	U+274C	Indicates a critical error or failure in the model.
1	Warning	⚠	warning	U+26A0	Indicates a potential issue or warning in the model.
2	Note	📘	blue_book	U+1F4D8	Provides additional context, explanations, or clarifications for the annotated element.
					Highlights a potential issue

## Appendices

various sidebars to include Insert More Sidebars.md Insert Overrides.md insert LDM Intro.md Insert OCL.md Insert Camel Case.md

== content to add