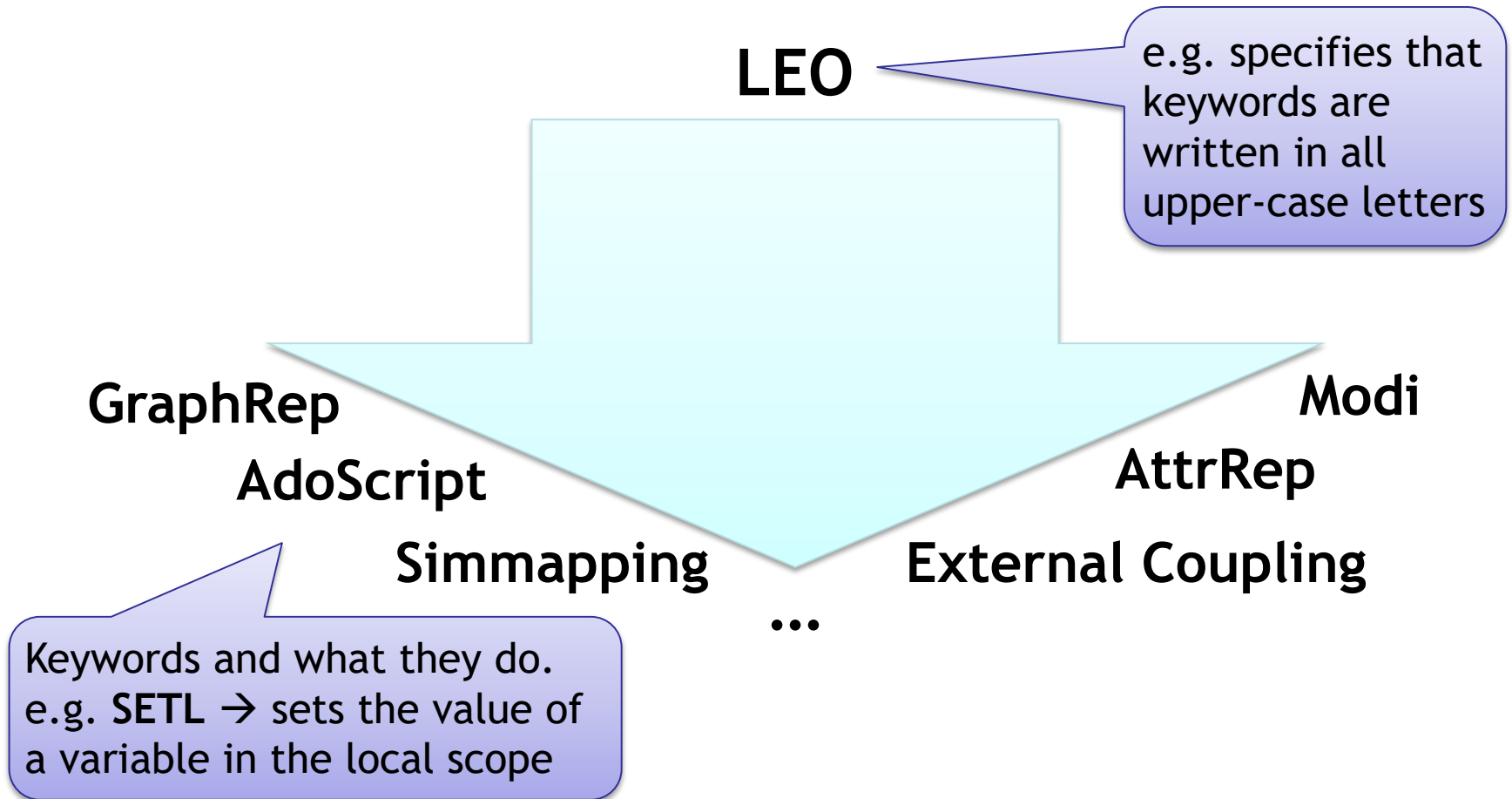


The LEO Language(s)

The LEO Language(s)



The LEO Language(s) – Short overview

- Two important levels
 - Programs
 - Expressions
- LEO-Programs
 - Execute commands in given order
 - Sometimes call procedures
 - Can contain LEO-Expressions
- LEO-Expressions
 - Are evaluated to return a value
 - Typically found inside parentheses,
(x + (INT y) + 3)

LEO Grammar

```
LEO_Program:      { Element | IncludeDirective } .
Element:          Keyword [ SimpleValueOrExpr { Attribute } [ Body ] .
Keyword:          uc_identifier .
Attribute:        AttrName [ : Modifier ] [ : SimpleValExprOrBody ] .
AttrName:         attr_identifier | ArrayLValue .
ArrayLValue:      lc_identifier [ CommaExpr ] .
                  [ATTENTION: [] ArrayLValue are terminal symbols!]

Modifier:         attr_identifier .
SimpleValExprOrBody: SimpleValueOrExpr | Body .
SimpleValueOrExpr: SimpleValue | ( CommaExpression ) .
CommaExpr:        OrExpr | CommaExpr , OrExpr .
OrExpr:           AndExpr | OrExpr OR AndExpr .
AndExpr:          EqualityExpr | AndExpr AND EqualityExpr .
EqualityExpr:      AddExpr [ EqualityOp AddExpr ] .
EqualityOp:        = | < | > | <> | != | <= | >= .
AddExpr:          MultExpr | AddExpr + MultExpr | AddExpr - MultExpr .
MultExpr:         UnaryExpr | MultExpr * UnaryExpr | MultExpr / UnaryExpr .
UnaryExpr:        PostfixExpr | UnaryOp UnaryExpr .
UnaryOp:          - | LEN | NOT | STR | VAL | CM | CMS | PT | PTS | ROUN
PostfixExpr:      PrimaryExpr | ArraySubscription | StructSubscription |
                  [ATTENTION: [] at ArraySubscription are terminal symbols!]
ArraySubscription: PostfixExpr [ CommaExpr ] .

StructSubscription: PostfixExpr . lc_identifier .
FunctionCall:       lc_identifier Parameters [ MoreParameters1 ] .
PrimaryExpr:        Value | expr_identifier | ( CommaExpr ) .
Parameters:         ( ExpressionSeq ) .
MoreParameters1:    { CommaExpr } (MoreParameters2) .
MoreParameters2:    ( CommaExpr ) | { CommaExpr } .
ExpressionSeq:      [ Expression { , Expression } ] .
Expression:         OrExpr .
```

The LEO Language(s) – Short overview

- **Commands and procedures**
 - Written in all upper-case letters
 - Examples: INCL, AVAL, ATTR, GRAPHREP, MODELTYPE, RECTANGLE, SETL, EXIT, IF, FOR, ...
- **Parameters, variables and functions**
 - Written in all lower-case letters and can contain symbols
 - Examples: myvariable, objid, modid, objname, ecode, max(...), min(...), token(...), cond(...), for(...), ...
- **Operators (only in LEO-Expressions)**
 - Written as symbols or all upper-case letters
 - Examples: +, -, *, AND, OR, STR, VAL, INT, MOD, ...
- **"Simple Values" / Constants**
 - Written using terminal symbols from the given data types
 - Examples: "a string", 3, 4, 7.4, 1.5cm, 2020:05:06 13:36:59, ...

The LEO Language(s) – Examples

NOTEBOOK

"Program" specifying how
to assemble the Notebook

```
#-----  
CHAPTER "Description"  
ATTR "Name"  
ATTR "Description" lines:5  
ATTR "Comment" lines:5  
ATTR "Open questions" lines:5  
ATTR "Weak entity" ctrltype:check checked-  
value:"yes" unchecked-value:"no"  
  
#-----  
CHAPTER "Presentation"  
ATTR "Color" dialog:color  
  
#-----  
CHAPTER "RDF properties"  
ATTR "URI"  
ATTR "Additional Triples" lines:10  
ATTR "Implemented by" lines:5  
  
#-----  
CHAPTER "General purpose"  
ATTR "General purpose attribute" lines:20
```

Entity (ER)-51016 (Entity (ER))

Name: Entity (ER)-51016

Description:

Comment:

Open questions:

☐ Weak entity

The LEO Language(s) – Examples

NOTEBOOK

"Program" specifying how to assemble the Notebook

```
#-----  
CHAPTER "Description"  
ATTR "Name"  
ATTR "Description" lines:5  
ATTR "Comment" lines:5  
ATTR "Open questions" lines:5  
ATTR "Weak entity" ctrltype:check checked-  
value:"yes" unchecked-value:"no"
```

```
#-----  
CHAPTER "Presenta  
ATTR "Color" dial  
#-----  
CHAPTER "RDF prop  
ATTR "URI"  
ATTR "Additional  
ATTR "Implemented  
#-----  
CHAPTER "General  
ATTR "General pur
```

GRAPHREP sizing:asymmetrical

-- COLOR DEFINITIONS --

SET fontcolor:("black")

AVAL as-original-type bnw:"vizGrayscaleMode"

IF (bnw) {

...

} ELSE {

SET colBrd:("black")

SET colFFm:("white")

AVAL colFTo:"Color"

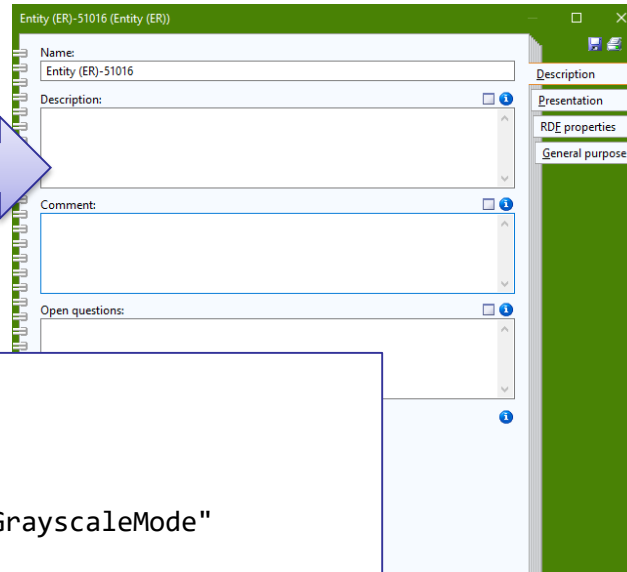
}

AVAL weak:"Weak entity"

We use a table so it is properly resizable

y:-0.6cm w:3.6cm h:1.2cm cols:1 rows:1
1:100%

"Program" specifying
how to draw the object



Entity (ER)-51016

The LEO Language(s) – Examples

NOTEBOOK

"Program" specifying how to assemble the Notebook

```
#-----  
CHAPTER "Description"  
ATTR "Name"  
ATTR "Description" lines:5  
ATTR "Comment" lines:5  
ATTR "Open questions" lines:5  
ATTR "Weak entity" ctrltype:check checked-  
value:"yes" unchecked-value:"no"
```

```
#-----  
CHAPTER "Presenta  
ATTR "Color" dial  
  
#-----  
CHAPTER "RDF prop  
ATTR "URI"  
ATTR "Additional  
ATTR "Implemented  
  
#-----  
CHAPTER "General  
ATTR "General pur  
  
GRAPHREP sizing:asymmetrical  
  
#-- COLOR DEFINITIONS --  
SET fontcolor:("black")  
AVAL as-original-type bwn:"vizGrayscale  
IF (bwn) {  
    ...  
} ELSE {  
    SET colBrd:("black")  
    SET colFFm:("white")  
    AVAL colFTo:"Color"  
}  
AVAL weak:"Weak entity"
```

"Program" specifying how to draw the object

```
# We use a table so it is properly resizable  
y:-0.6cm w:3.6cm h:1.2cm cols:1 rows:1  
1:100%
```

Entity (ER)-51016 (Entity (ER))

Name: Entity (ER)-51016

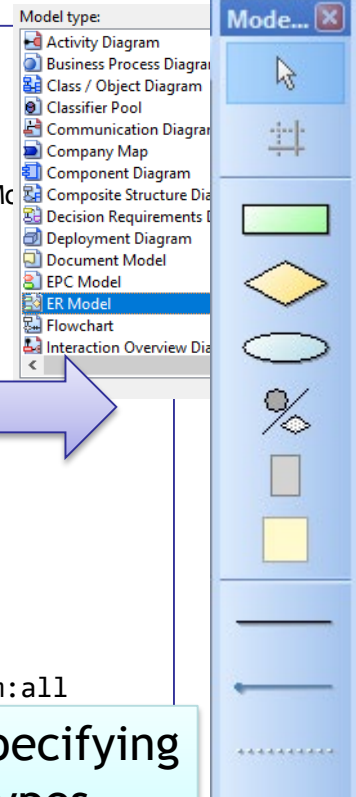
Description:

Comment:

Open questions:

```
GENERAL order-of-classes:custom  
  
# ER -----  
  
MODELTYPE "ER Model" plural:"ER Mo  
from:none not-simulateable  
bitmap:"db:\\mtico_ErModel.bmp"  
attrrep:"AttrRep_ER"  
INCL "Entity (ER)"  
INCL "Relation (ER)"  
INCL "Attribute (ER)"  
INCL "Links (ER)"  
INCL "Relation Node"  
INCL "Aggregation"  
INCL "Note"  
INCL "has Attribute (ER)"  
INCL "has Note"  
  
MODE "All modelling objects" from:all  
MODE "Documentat
```

"Program" specifying the model types



Entity (ER)-51016