Dagstuhl Beauty Contest

Software Technology Group, TU Dresden
Christian Wende
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Dagstuhl Beauty Contest

- German saying:

  “Schönheit liegt im Auge des Betrachters”

- Two Betrachter/Observer roles w.r.t. benchmark implementation: developer, user

- Our submission contributes:

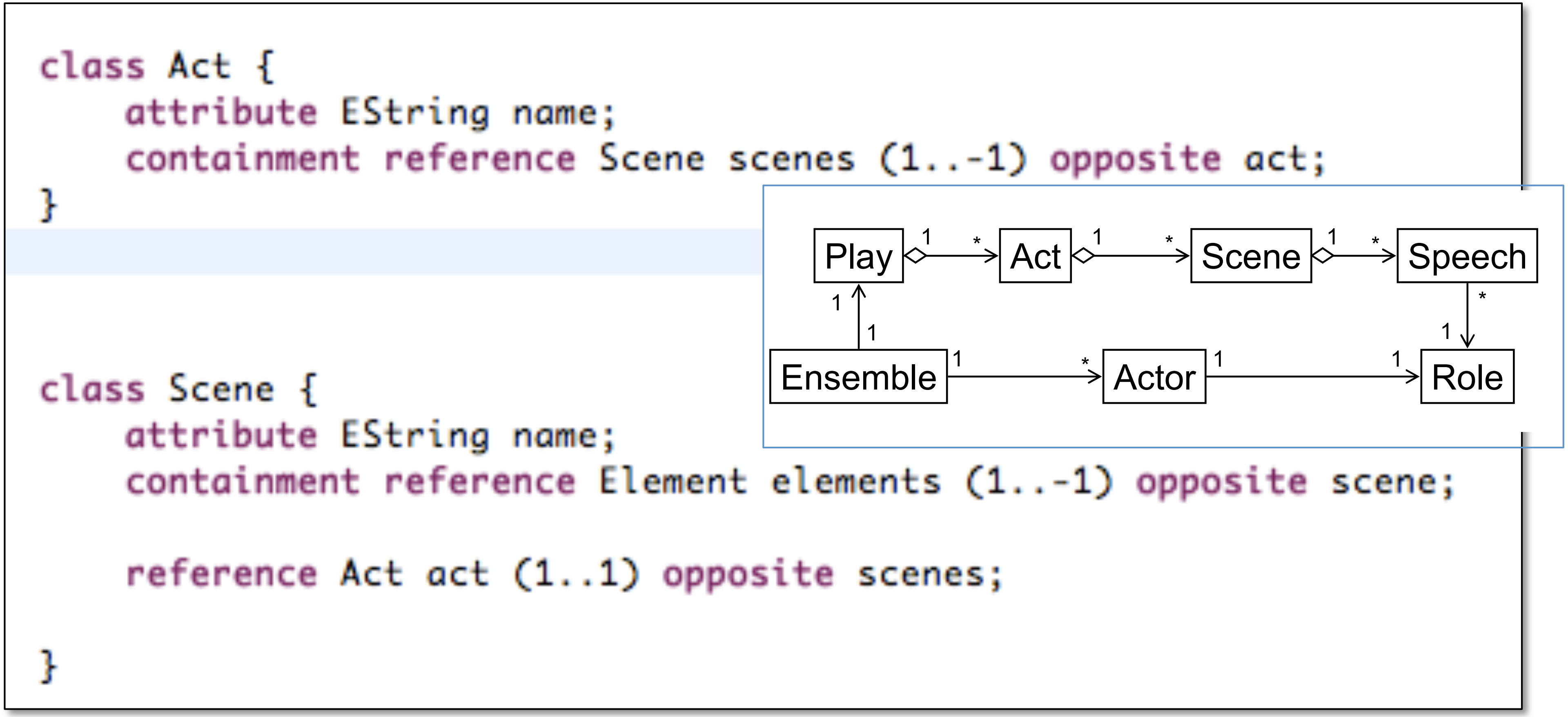
  - Meta-Beauty: conceived beautiful by the software developer

  - Beauty: conceived beautiful by the software user

Meta-Beauty

Data Model in Ecore:

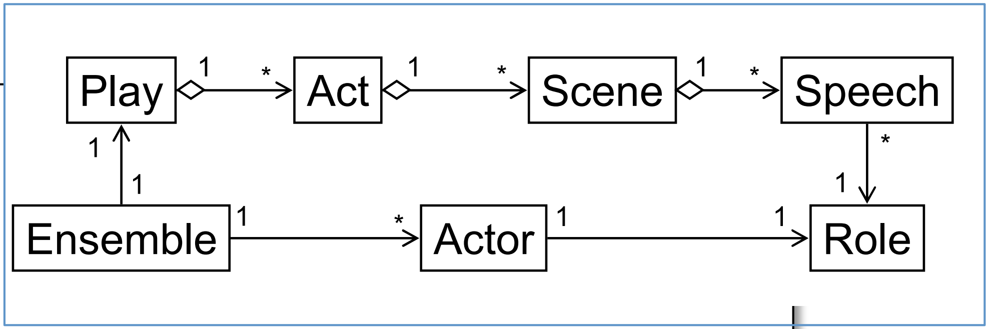
- Metamodeling in Eclipse EMF
- no explicit roles concept
- but means to declare references (uni-, bidirectional, derived relationships)

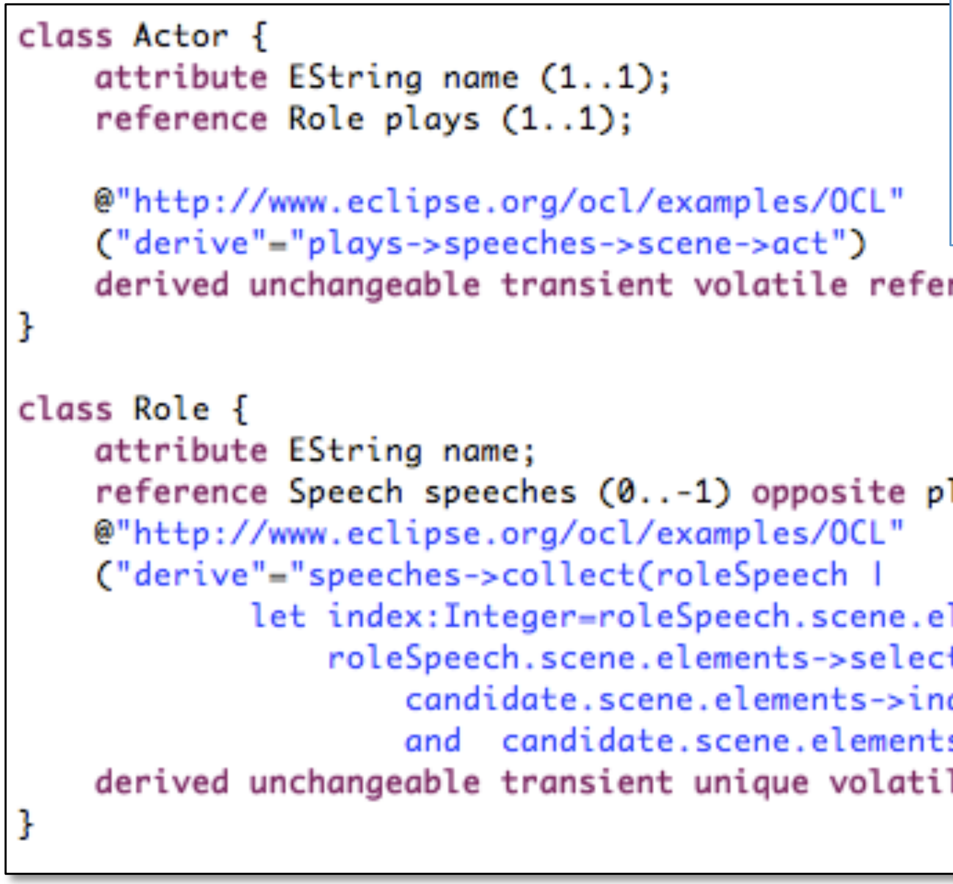


```
class Act {
    attribute EString name;
    containment reference Scene scenes (1..-1) opposite act;
}


class Scene {
    attribute EString name;
    containment reference Element elements (1..-1) opposite scene;

    reference Act act (1..1) opposite scenes;

}
```

Functions in OCL:

- set-based language to navigate/query object structures
- used to specify derived references answering benchmark questions





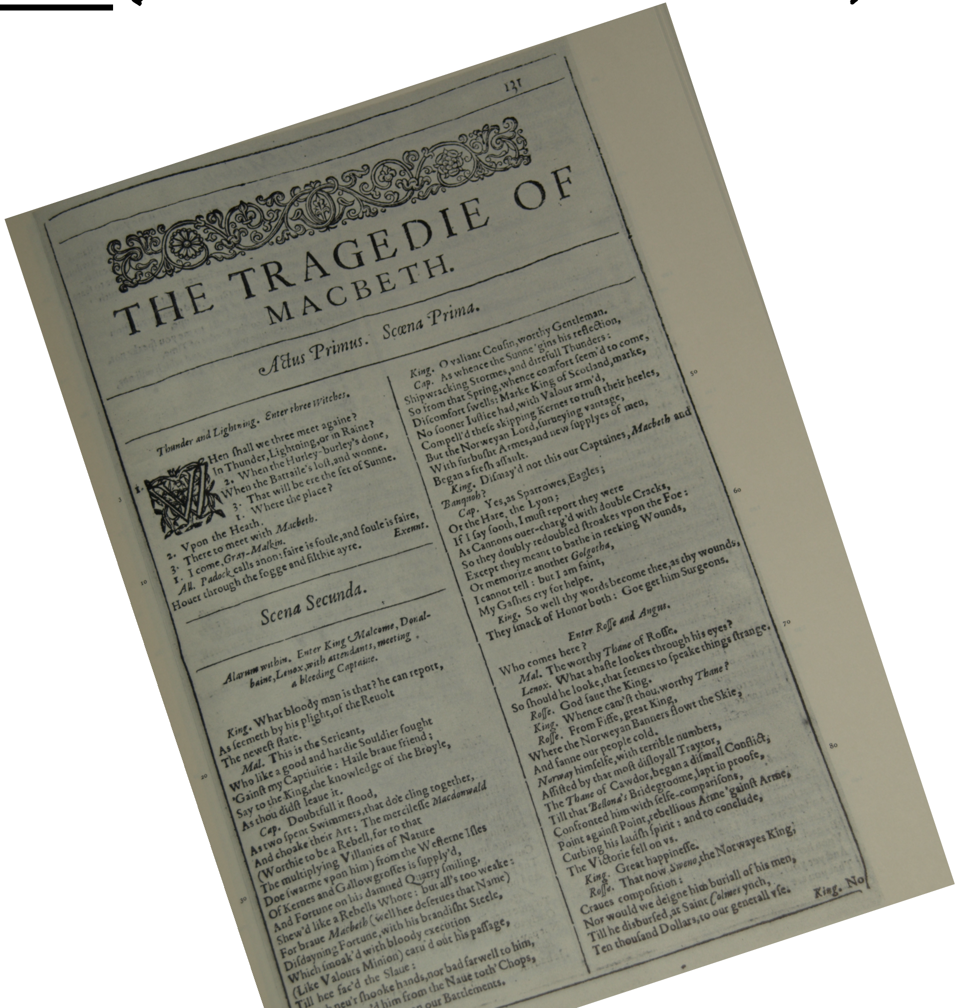
```
class Actor {
    attribute EString name (1..1);
    reference Role plays (1..1);

    @"http://www.eclipse.org/ocl/examples/OCL"
    ("derive"="plays->speeches->scene->act")
    derived unchangeable transient volatile reference Act appearsIn (0..-1);
}

class Role {
    attribute EString name;
    reference Speech speeches (0..-1) opposite playedBy;
    @"http://www.eclipse.org/ocl/examples/OCL"
    ("derive"="speeches->collect(roleSpeech |
            let index:Integer=roleSpeech.scene.elements->indexOf(roleSpeech) in
                roleSpeech.scene.elements->select(candidate |
                    candidate.scene.elements->indexOf(candidate) = index-1
                    and  candidate.scene.elements->indexOf(candidate) = index+1  ))")
    derived unchangeable transient unique volatile reference Speech roleScript (0..-1);
}
```

Meta-Beauty

Test-driven development

- JUnit for testing
- input data: <u>Macbeth </u>script by project Gutenberg

<u>Problem </u>(we did not want to avoid): Parsing



THE TRAGEDIE OF MACBETH.

Actus Primus. Scœna Prima.

Thunder and Lightning. Enter three Witches.

1. WHen ſhall we three meet againe?
In Thunder, Lightning, or in Raine?
2. When the Hurley-burley's done,
When the Battaile's loſt, and wonne.
3. That will be ere the ſet of Sunne.
1. Where the place?
2. Vpon the Heath.
3. There to meet with *Macbeth*.
1. I come, *Gray-Malkin*.
All. *Padock* calls anon: faire is foule, and foule is faire,
Houer through the fogge and filthie ayre. *Exeunt.*

Scena Secunda.

Alarum within. Enter King Malcome, Donalbaine, Lenox, with attendants, meeting a bleeding Captaine.

King. What bloody man is that? he can report,
As ſeemeth by his plight, of the Reuolt
The neweſt ſtate.
Mal. This is the Serieant,
Who like a good and hardie Souldier fought
'Gainſt my Captiuitie: Haile braue friend;
Say to the King, the knowledge of the Broyle,
As thou didſt leaue it.
Cap. Doubtfull it ſtood,
As two ſpent Swimmers, that doe cling together,
And choake their Art: The mercileſſe *Macdonwald*
(Worthie to be a Rebell, for to that
The multiplying Villanies of Nature
Doe ſwarme vpon him) from the Weſterne Iſles
Of Kernes and Gallowgroſſes is ſupply'd,
And Fortune on his damned Quarry ſmiling,
Shew'd like a Rebells Whore: but all's too weake:
For braue *Macbeth* (well hee deſerues that Name)
Diſdayning Fortune, with his brandiſht Steele,
Which ſmoak'd with bloody execution
(Like Valours Minion) caru'd out his paſſage,
Till hee fac'd the Slaue:
neu'r ſhooke hands, nor bad farwell to him,
'd him from the Naue toth' Chops,
our Battlements.

King. O valiant Couſin, worthy Gentleman.
Cap. As whence the Sunne 'gins his reflection,
Shipwracking Stormes, and direfull Thunders:
So from that Spring, whence comfort ſeem'd to come,
Diſcomfort ſwells: Marke King of Scotland, marke,
No ſooner Iuſtice had, with Valour arm'd,
Compell'd theſe skipping Kernes to truſt their heeles,
But the Norweyan Lord, ſurueying vantage,
With furbuſht Armes, and new ſupplyes of men,
Began a freſh aſſault.
King. Diſmay'd not this our Captaines, *Macbeth* and *Banquoh*?
Cap. Yes, as Sparrowes, Eagles;
Or the Hare, the Lyon:
If I ſay ſooth, I muſt report they were
As Cannons ouer-charg'd with double Cracks,
So they doubly redoubled ſtroakes vpon the Foe:
Except they meant to bathe in reeking Wounds,
Or memorize another *Golgotha*,
I cannot tell: but I am faint,
My Gaſhes cry for helpe.
King. So well thy words become thee, as thy wounds,
They ſmack of Honor both: Goe get him Surgeons.

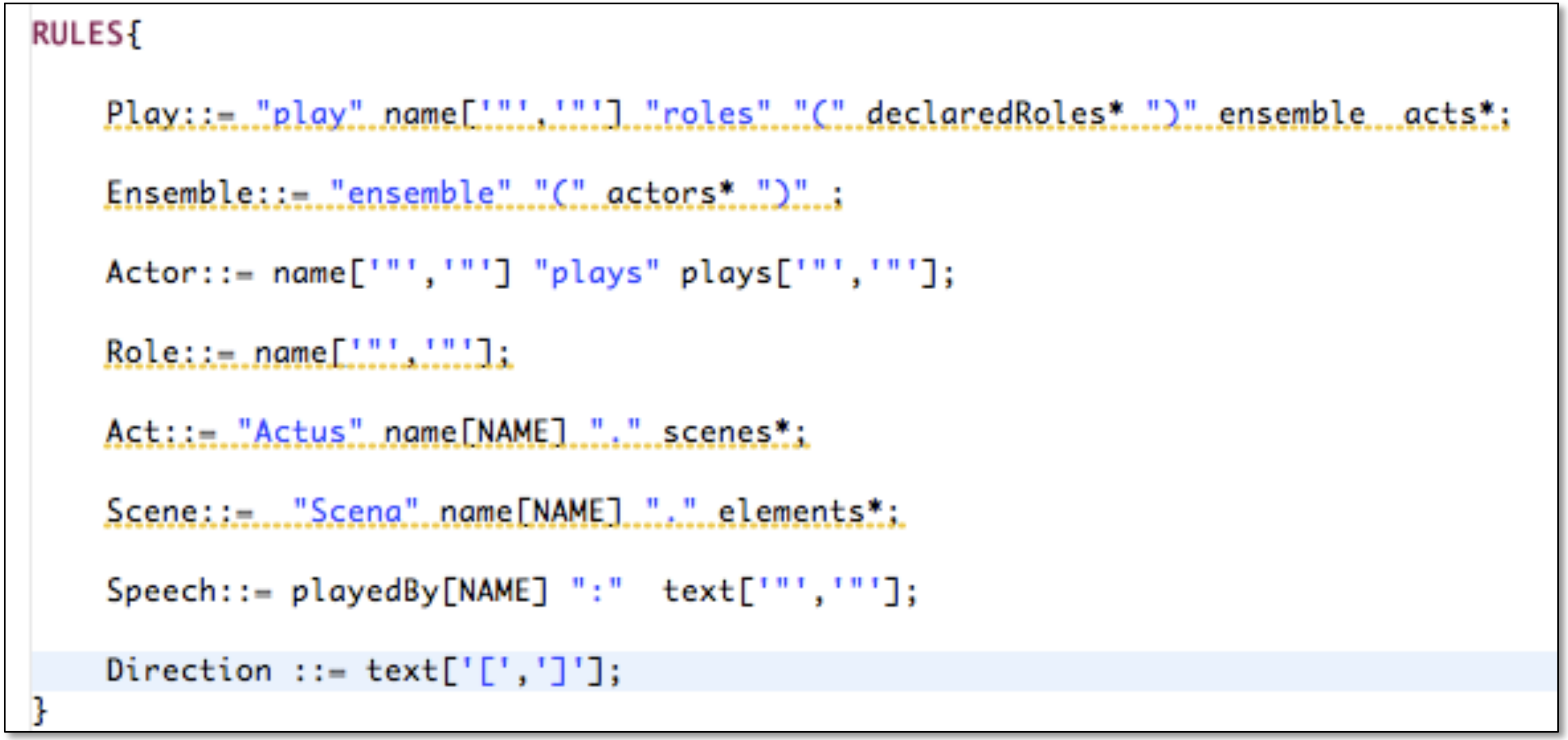
Enter Roſſe and Angus.

Who comes here?
Mal. The worthy *Thane* of Roſſe.
Lenox. What a haſte lookes through his eyes?
So ſhould he looke, that ſeemes to ſpeake things ſtrange.
Roſſe. God ſaue the King.
King. Whence cam'ſt thou, worthy *Thane*?
Roſſe. From Fiffe, great King,
Where the Norweyan Banners flowt the Skie,
And fanne our people cold.
Norway himſelfe, with terrible numbers,
Aſſiſted by that moſt diſloyall Traytor,
The *Thane* of Cawdor, began a diſmall Conflict,
Till that *Bellona's* Bridegroome, lapt in proofe,
Confronted him with ſelfe-compariſons,
Point againſt Point, rebellious Arme 'gainſt Arme,
Curbing his lauiſh ſpirit: and to conclude,
The Victorie fell on vs.
King. Great happineſſe.
Roſſe. That now *Sweno*, the Norwayes King,
Craues compoſition:
Nor would we deigne him buriall of his men,
Till he disburſed, at Saint *Colmes* ynch,
Ten thouſand Dollars, to our generall vſe.

King. No

Meta-Beauty

- Domain Specific Syntax:
  - Provide concrete textual syntax for theater scripts
  - Declarative Specification using EMFText

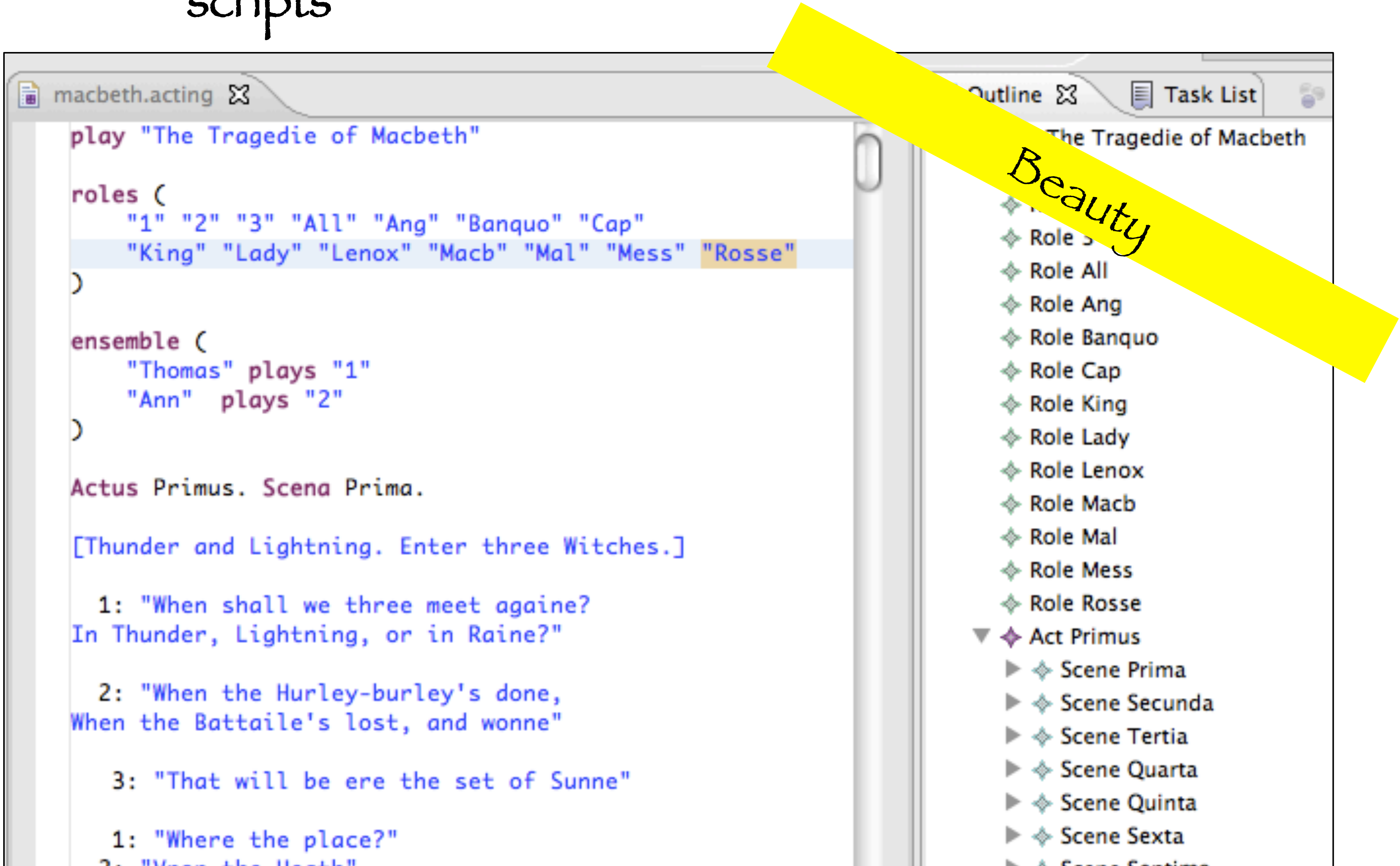


```
RULES{

    Play::= "play" name['"','"'] "roles" "(" declaredRoles* ")" ensemble  acts*;

    Ensemble::= "ensemble" "(" actors* ")" ;

    Actor::= name['"','"'] "plays" plays['"','"'];

    Role::= name['"','"'];

    Act::= "Actus" name[NAME] "." scenes*;

    Scene::=  "Scena" name[NAME] "." elements*;

    Speech::= playedBy[NAME] ":"  text['"','"'];

    Direction ::= text['[',']'];
}
```

Meta-Beauty

Domain Specific Syntax:

- Provide concrete textual syntax for theater scripts



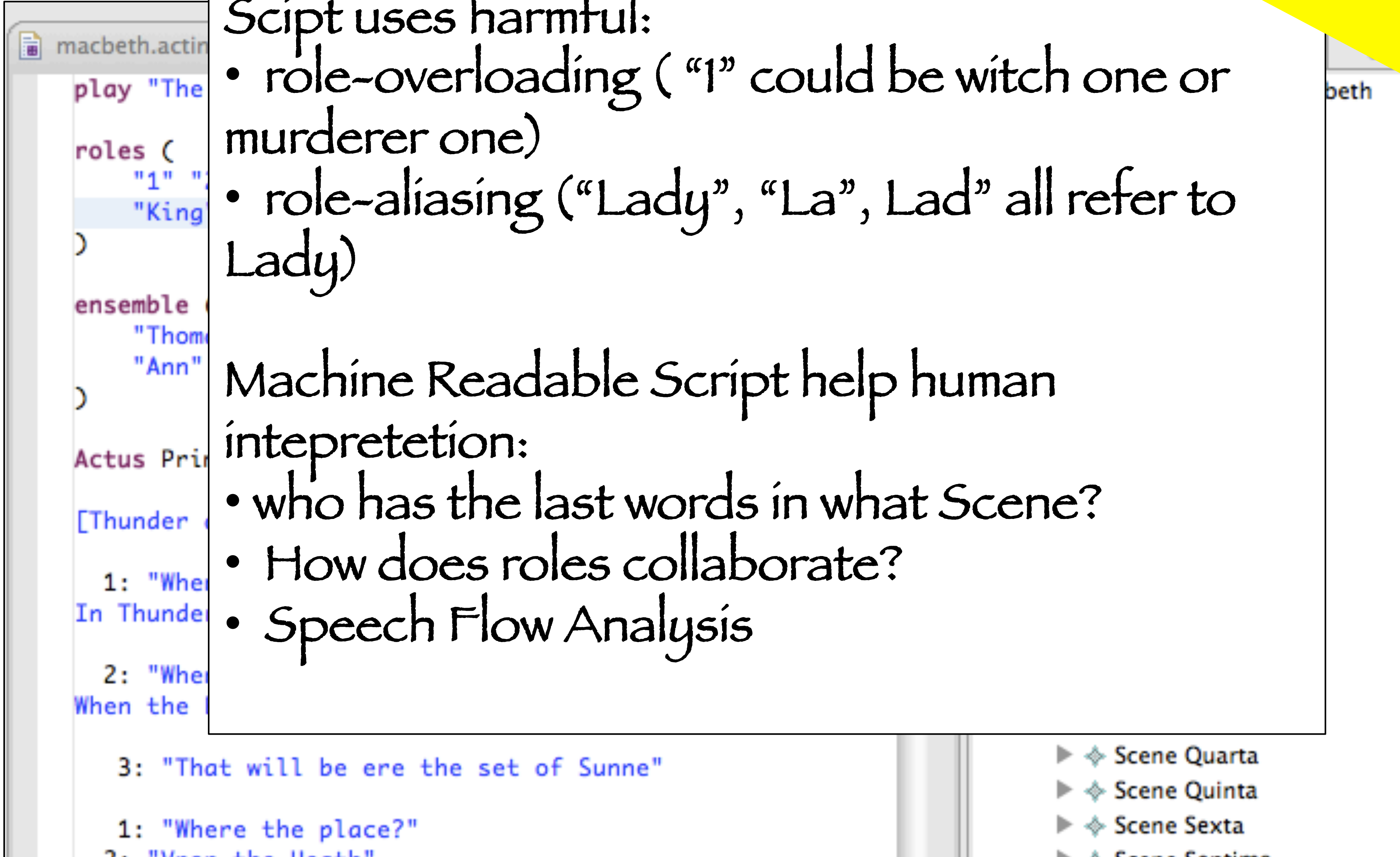
```
play "The Tragedie of Macbeth"

roles (
    "1" "2" "3" "All" "Ang" "Banquo" "Cap"
    "King" "Lady" "Lenox" "Macb" "Mal" "Mess" "Rosse"
)

ensemble (
    "Thomas" plays "1"
    "Ann"  plays "2"
)

Actus Primus. Scena Prima.

[Thunder and Lightning. Enter three Witches.]

  1: "When shall we three meet againe?
In Thunder, Lightning, or in Raine?"

  2: "When the Hurley-burley's done,
When the Battaile's lost, and wonne"

   3: "That will be ere the set of Sunne"

   1: "Where the place?"
  2: "Vpon the Heath"
```

```
The Tragedie of Macbeth
  Role 3
  Role All
  Role Ang
  Role Banquo
  Role Cap
  Role King
  Role Lady
  Role Lenox
  Role Macb
  Role Mal
  Role Mess
  Role Rosse
▼ Act Primus
  ▶ Scene Prima
  ▶ Scene Secunda
  ▶ Scene Tertia
  ▶ Scene Quarta
  ▶ Scene Quinta
  ▶ Scene Sexta
  ▶ Scene Septima
```

Meta-Beauty

Beauty

Domain Specific Syntax:



```
macbeth.actin
play "The

roles (
    "1" "
    "King
)

ensemble (
    "Thom
    "Ann"
)

Actus Pri

[Thunder

  1: "Whe
In Thunde

  2: "Whe
When the

   3: "That will be ere the set of Sunne"

   1: "Where the place?"
```

Findings:

Scipt uses harmful:
- role-overloading (“1” could be witch one or murderer one)
- role-aliasing (“Lady”, “La”, Lad” all refer to Lady)

Machine Readable Script help human intepretetion:
- who has the last words in what Scene?
- How does roles collaborate?
- Speech Flow Analysis

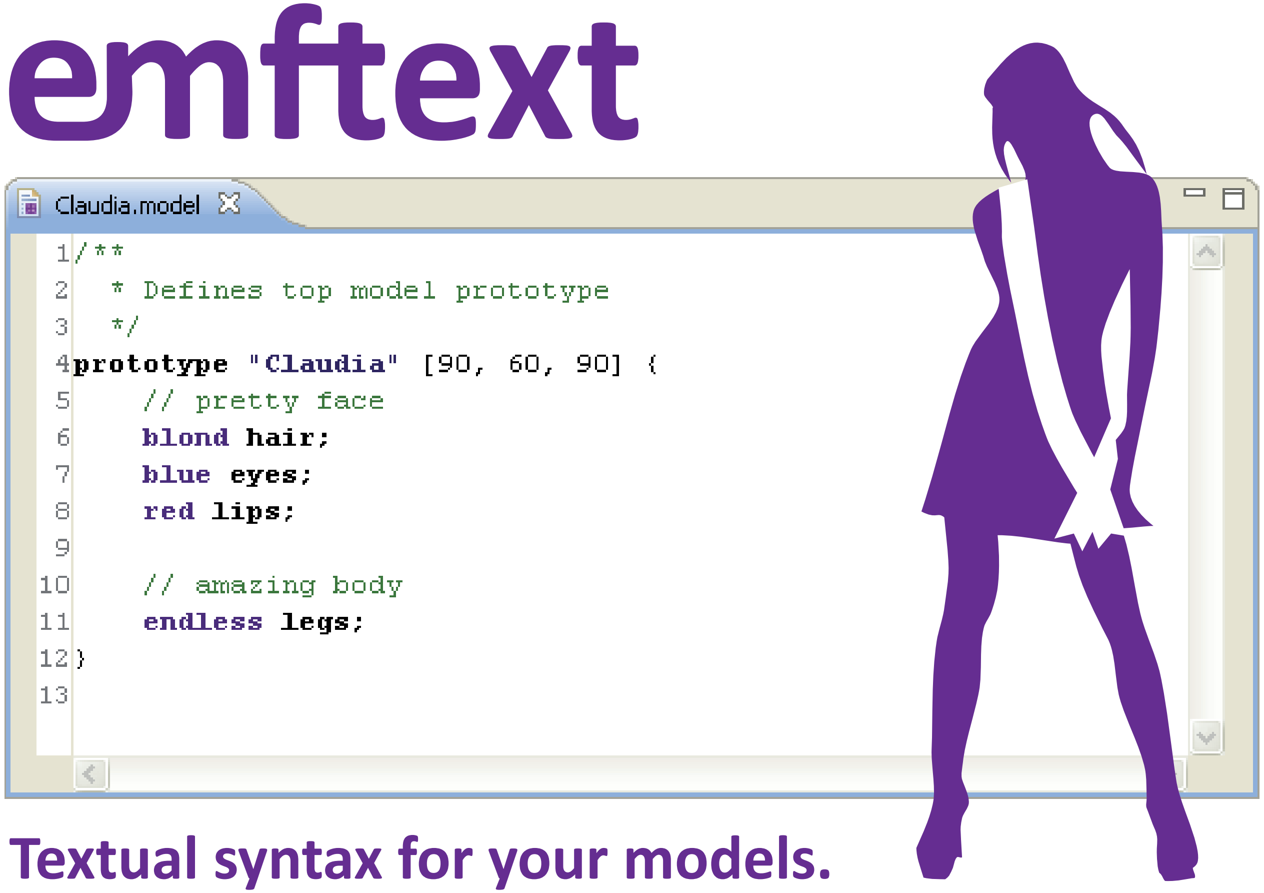
Conclusion

Data	Modelled in Ecore, used references, bidirectional if necessary
Functions	Defined using OCL
Evolution (chorus roles, double roles, tenary references)	adapted cardinalities of references, OCL unchanged slightly adapted concrete syntax specification Ternary references not supported
Evaluation Criteria	Unary, binary, derived references are language feature Binary relationships have minimal runtime overhead No “higher-order” references, no support for role types
Selling points	Meta-Beauty: fully declarative specification of data, functions and textual syntax semantics of “->” in OCL eased evolution Beauty: Advanced editing facilities for theater scripts

“Schönheit liegt im Auge des Betrachters”

Decide yourself.

emftext



```
/**
  * Defines top model prototype
  */
prototype "Claudia" [90, 60, 90] {
    // pretty face
    blond hair;
    blue eyes;
    red lips;

    // amazing body
    endless legs;
}
```

Textual syntax for your models.