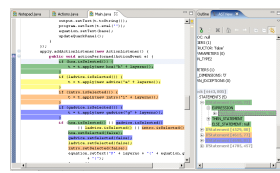
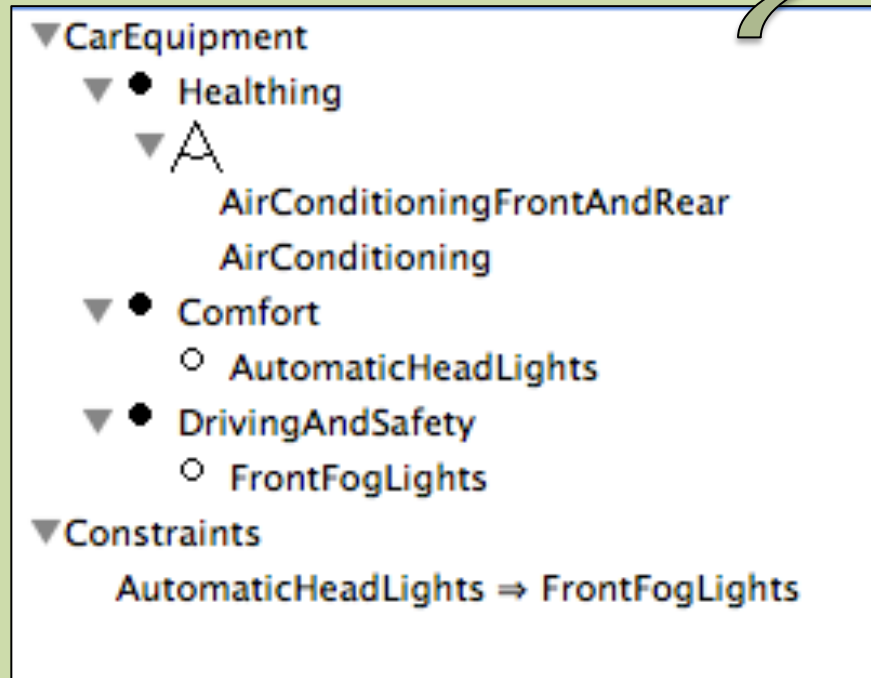


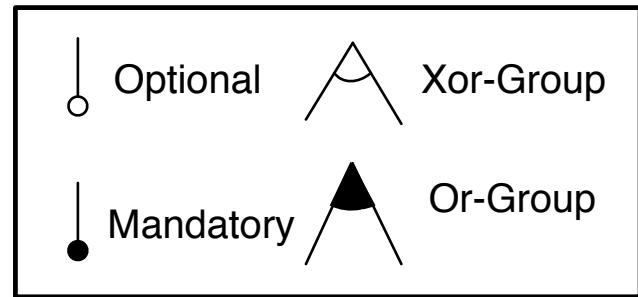
Feature Models (Background)

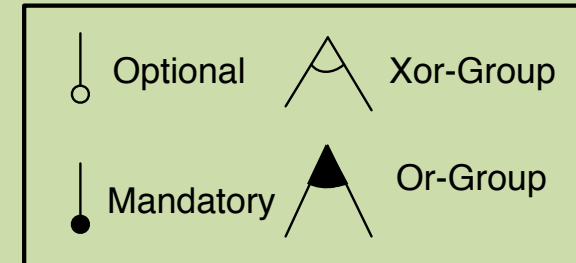
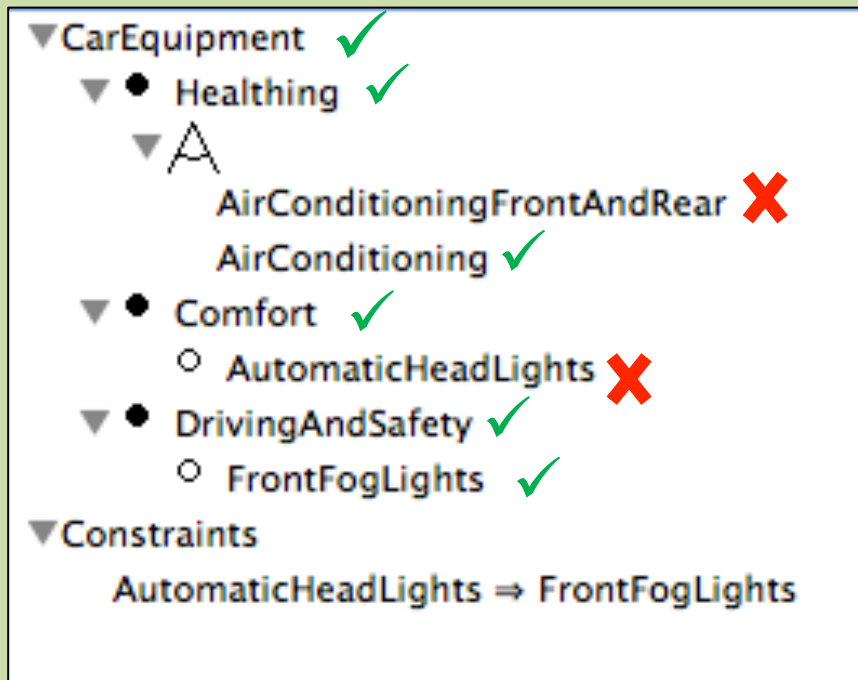


Hierarchy: rooted tree

Variability:

- mandatory,
- optional,
- Groups: exclusive or inclusive features
- Cross-tree constraints





Hierarchy + Variability

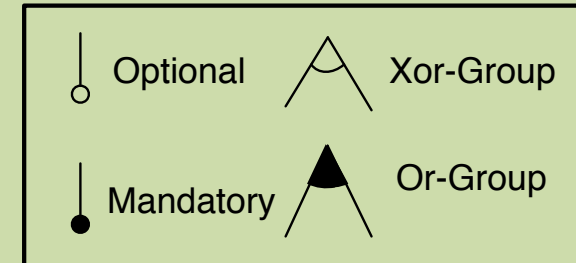
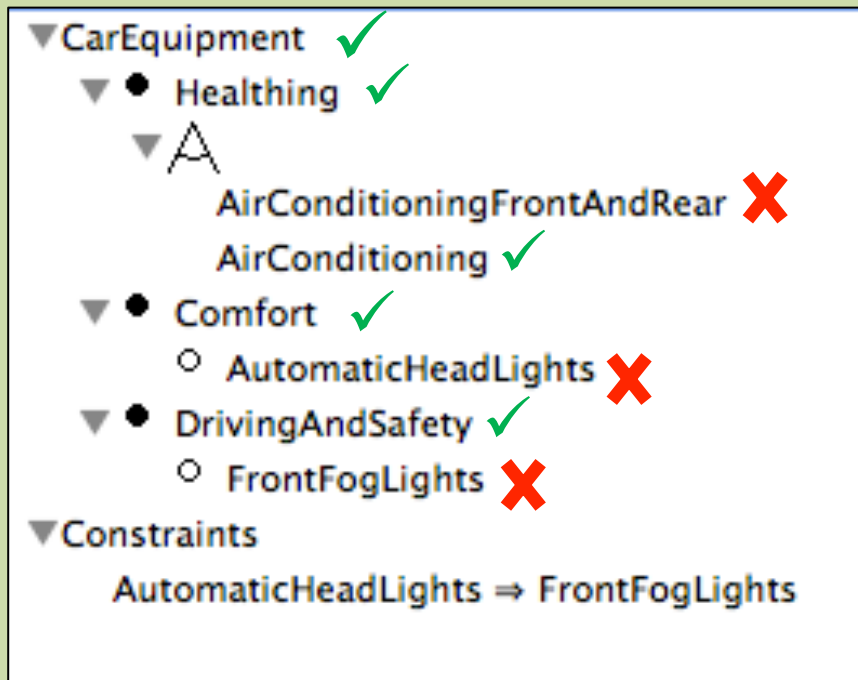
=

set of valid configurations

configuration = set of features selected

{CarEquipment, Comfort, DrivingAndSafety, Healthing, AirConditioning, FrontFogLights}





Hierarchy + Variability

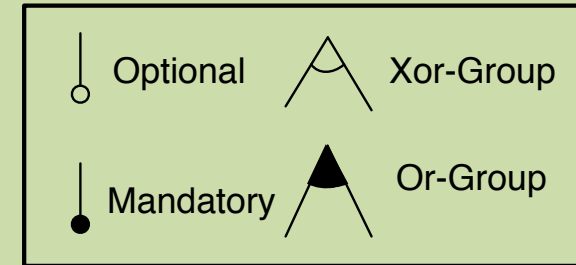
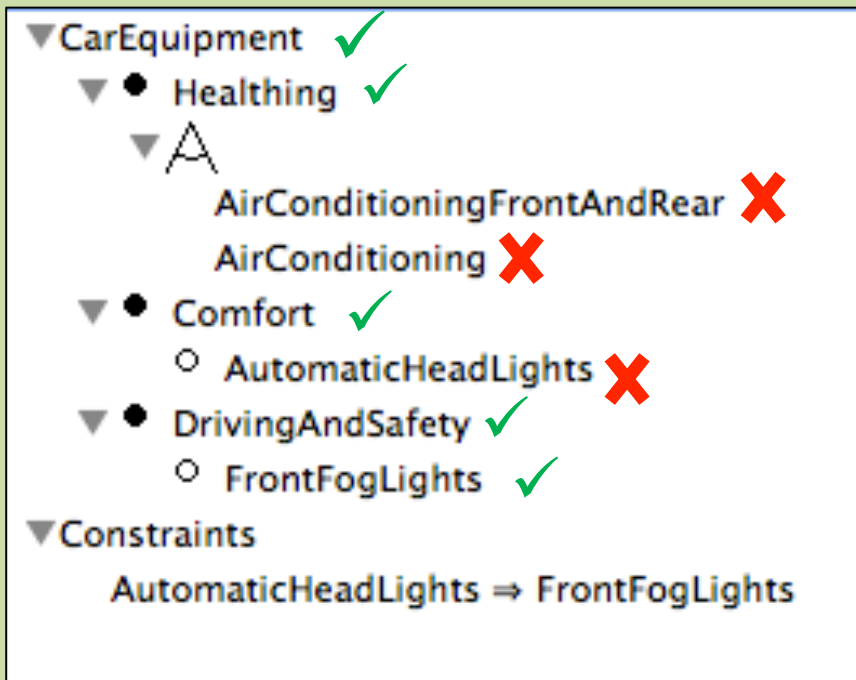
=

set of valid configurations

configuration = set of features selected

{CarEquipment, Comfort, DrivingAndSafety, Healthing, AirConditioning}



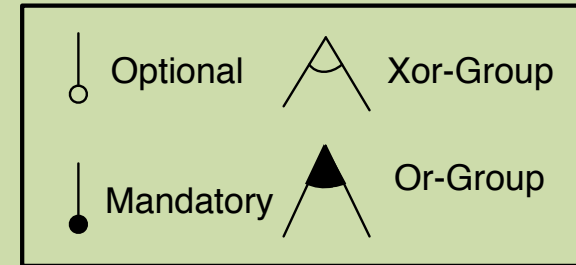
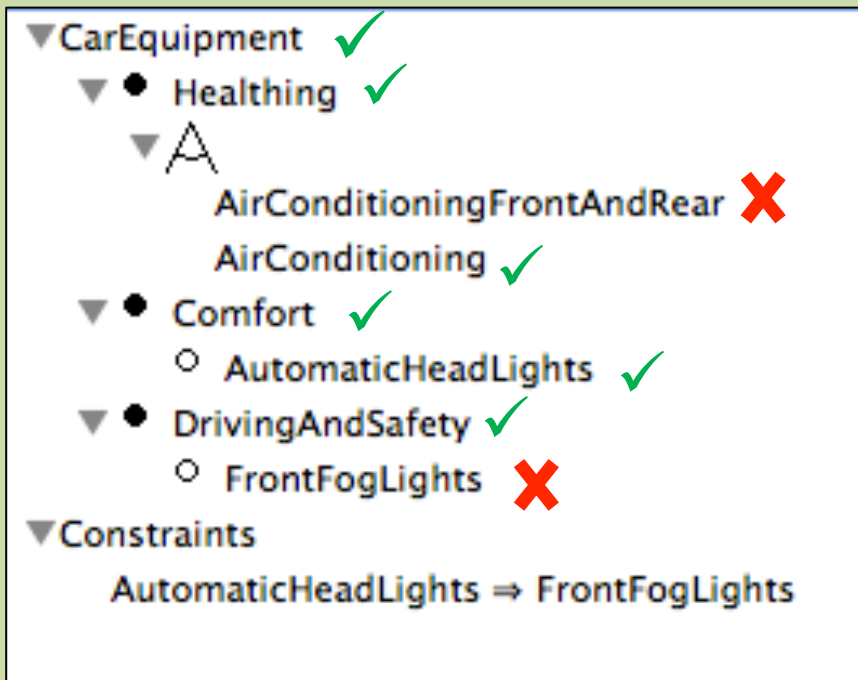


Hierarchy + Variability = set of valid configurations

configuration = set of features selected

{CarEquipment, Comfort, DrivingAndSafety, Healthing, AirConditioning, AirConditioningFrontAndRear, FrontFogLights}



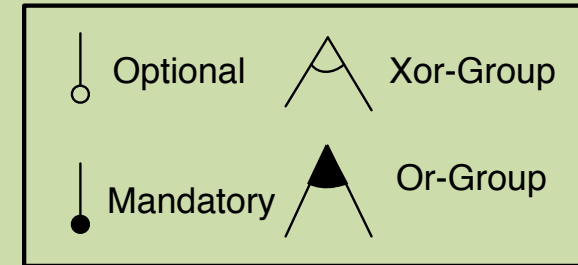
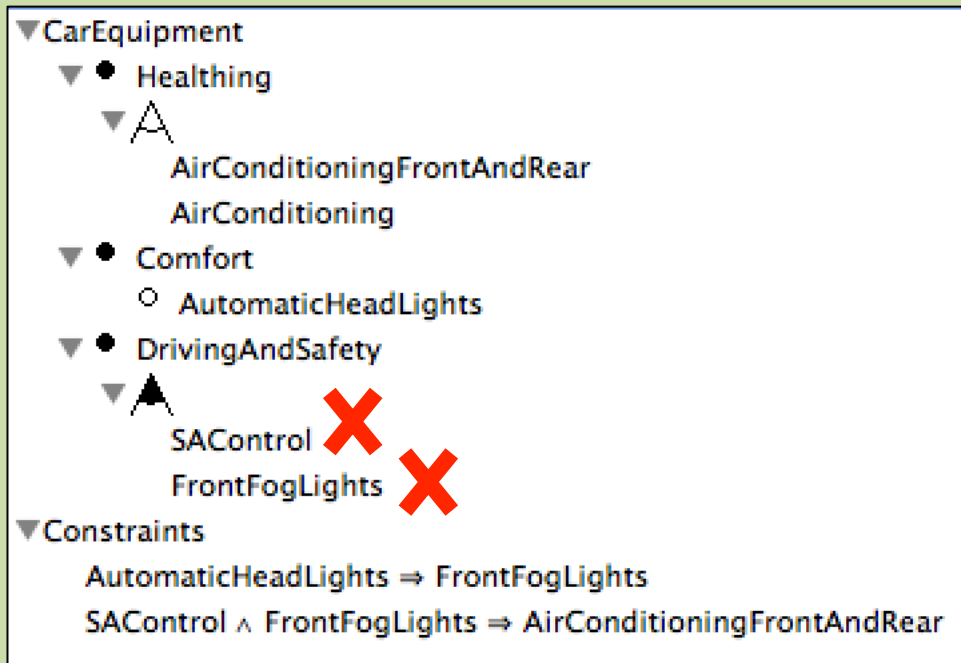


Hierarchy + Variability = set of valid configurations

configuration = set of features selected

{CarEquipment, Comfort, DrivingAndSafety, Healthing, AirConditioning, AutomaticHeadLights}



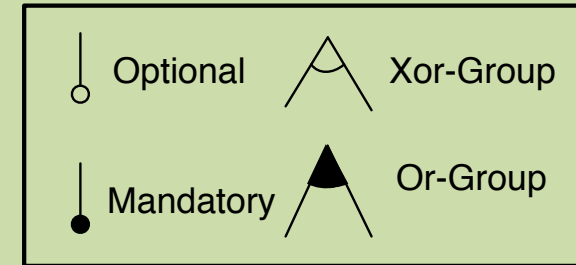
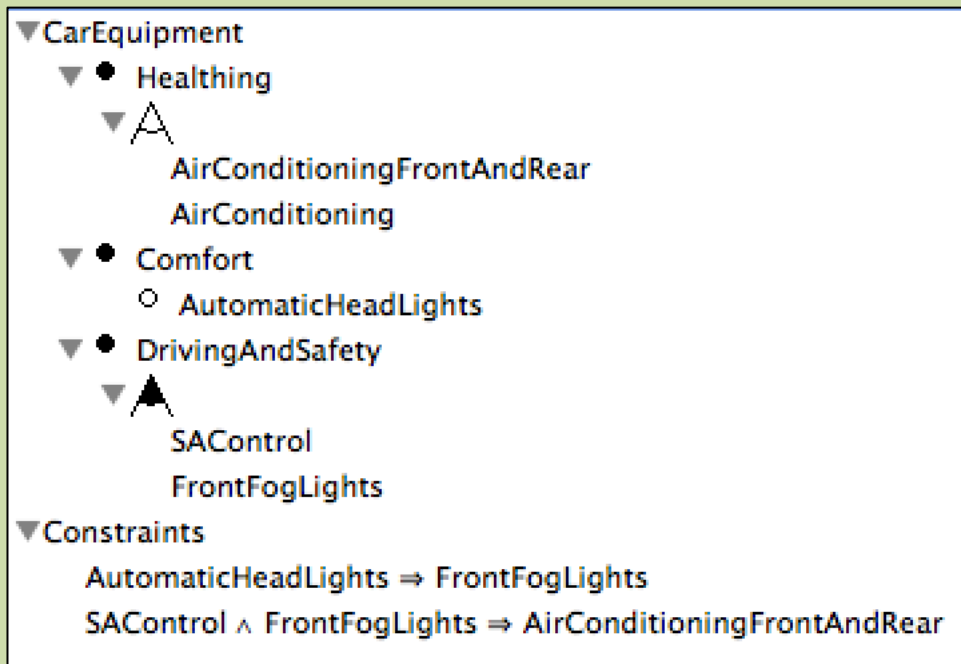


Hierarchy + Variability = set of valid configurations



Or-group: at least one!





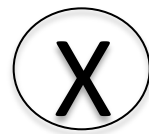
Hierarchy + Variability

=

set of valid configurations

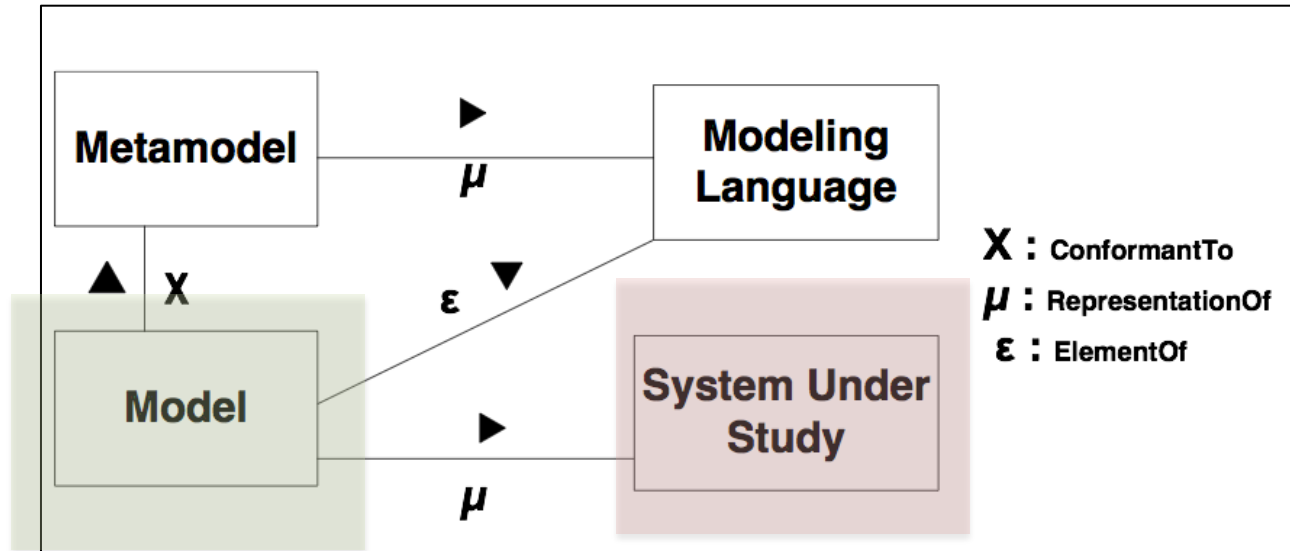


{CarEquipment, Comfort, DrivingAndSafety, Healthing}



- {AirConditioningFrontAndRear, FrontFogLights, SAControl}
- {AirConditioningFrontAndRear, SAControl}
- {AutomaticHeadLights, AirConditioning, FrontFogLights}
- {AirConditioningFrontAndRear, SAControl, AutomaticHeadLights, FrontFogLights}
- {FrontFogLights, AirConditioning}
- {AutomaticHeadLights, AirConditioningFrontAndRear, FrontFogLights}
- {FrontFogLights, AirConditioningFrontAndRear}
- {SAControl, AirConditioning}

Feature Models



▼ CarEquipment

▼ ● Healinging



AirConditioningFrontAndRear
AirConditioning

▼ ● Comfort

○ AutomaticHeadLights

▼ ● DrivingAndSafety

○ FrontFogLights

▼ Constraints

AutomaticHeadLights ⇒ FrontFogLights

R8 Spyder
 5,2 FSI quattro R tronic
 Prix total: 195.899,35 EUR
 Prix de base: 170.490,00 EUR
 Équipements optionnels: 25.409,35 EUR

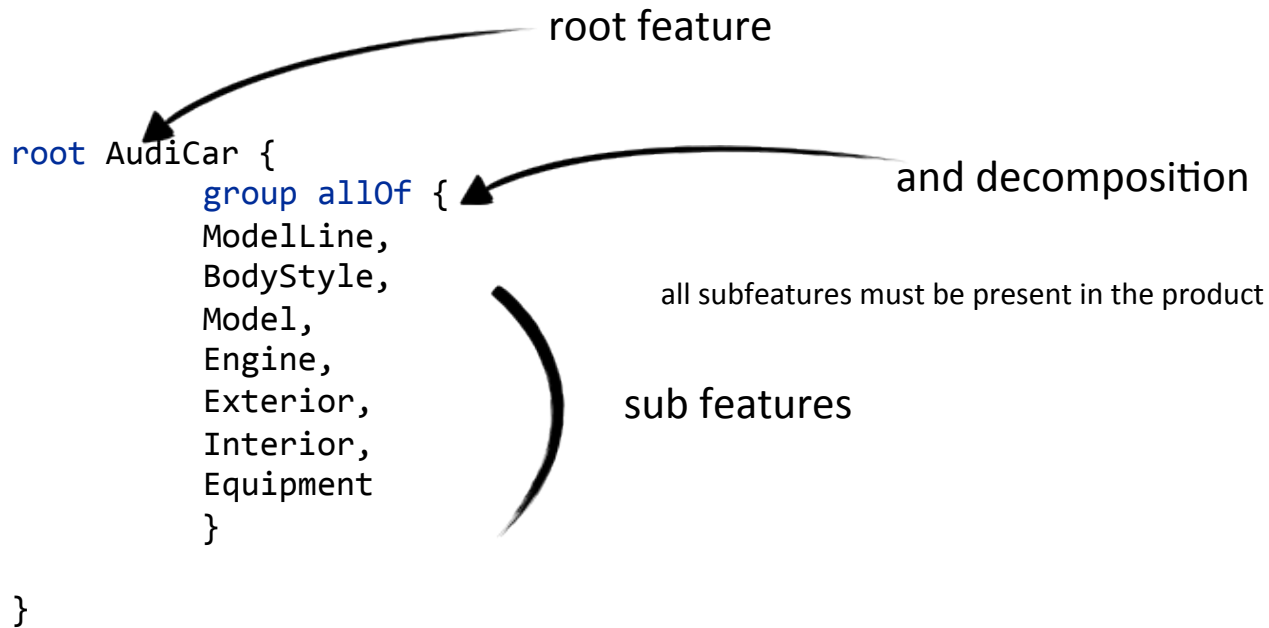
Packs d'équipements	Prix
Châssis	320,65 EUR
Freins	931,70 EUR
Systèmes d'assistance	1.373,35 EUR
Autres	1.790,80 EUR

Attention: Si une fonction n'est pas disponible en fonction du choix de moteur et de transmission, elle sera désactivée.
 Un aperçu des équipements:

1 Mobile 2 Moteur
 Français

8

TVL : allOf – and decomposition



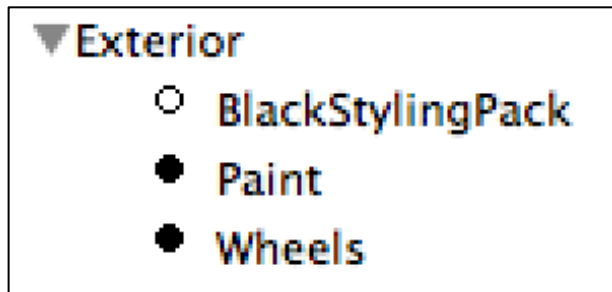
- ▼ AudiCar
- Modelline
 - Model
 - Exterior
 - Engine
 - Interior
 - BodyStyle
 - Equipment

TVL : optional features

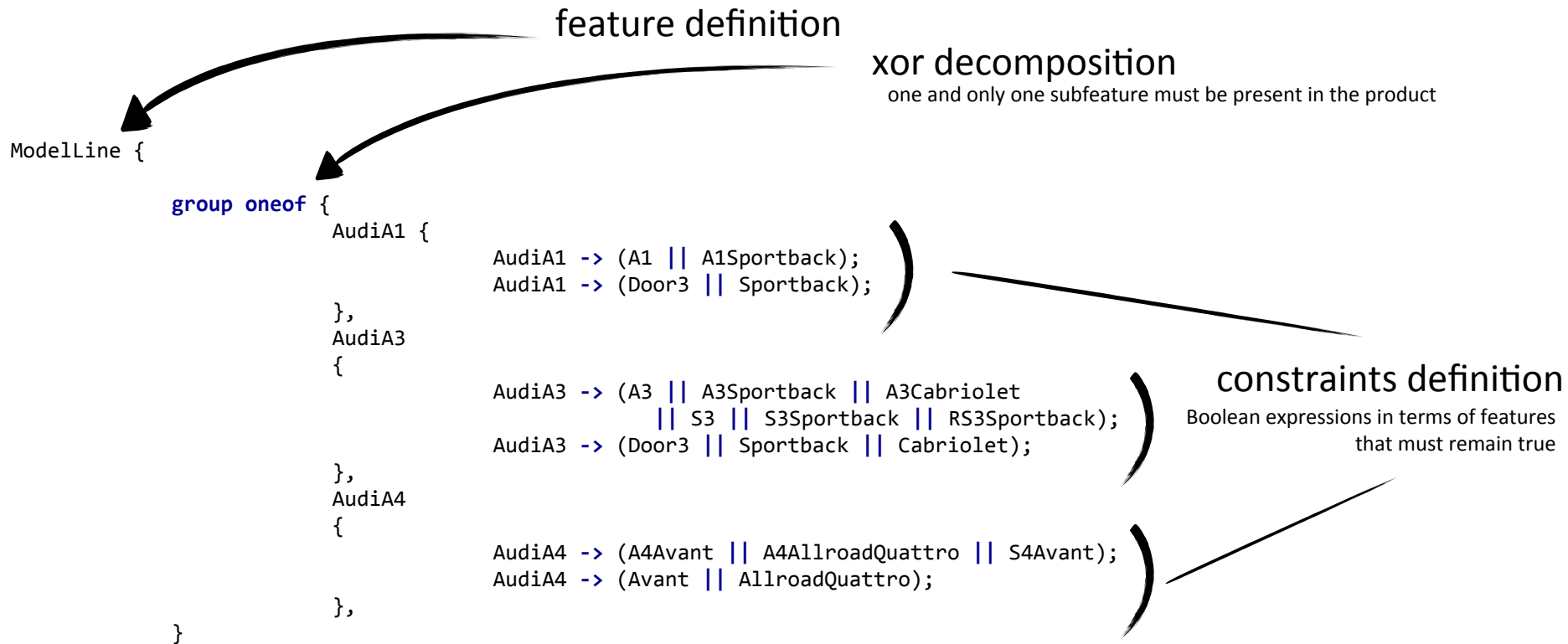
```
Exterior{  
  group allof {  
    Wheels,  
    Paint,  
    opt BlackStylingPack  
  }  
}
```

all subfeatures
must be present in the product

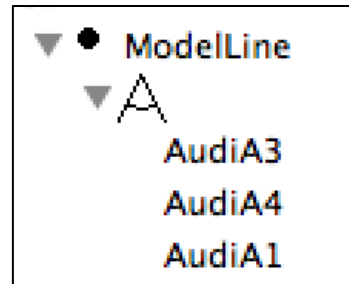
except this one
it is optional



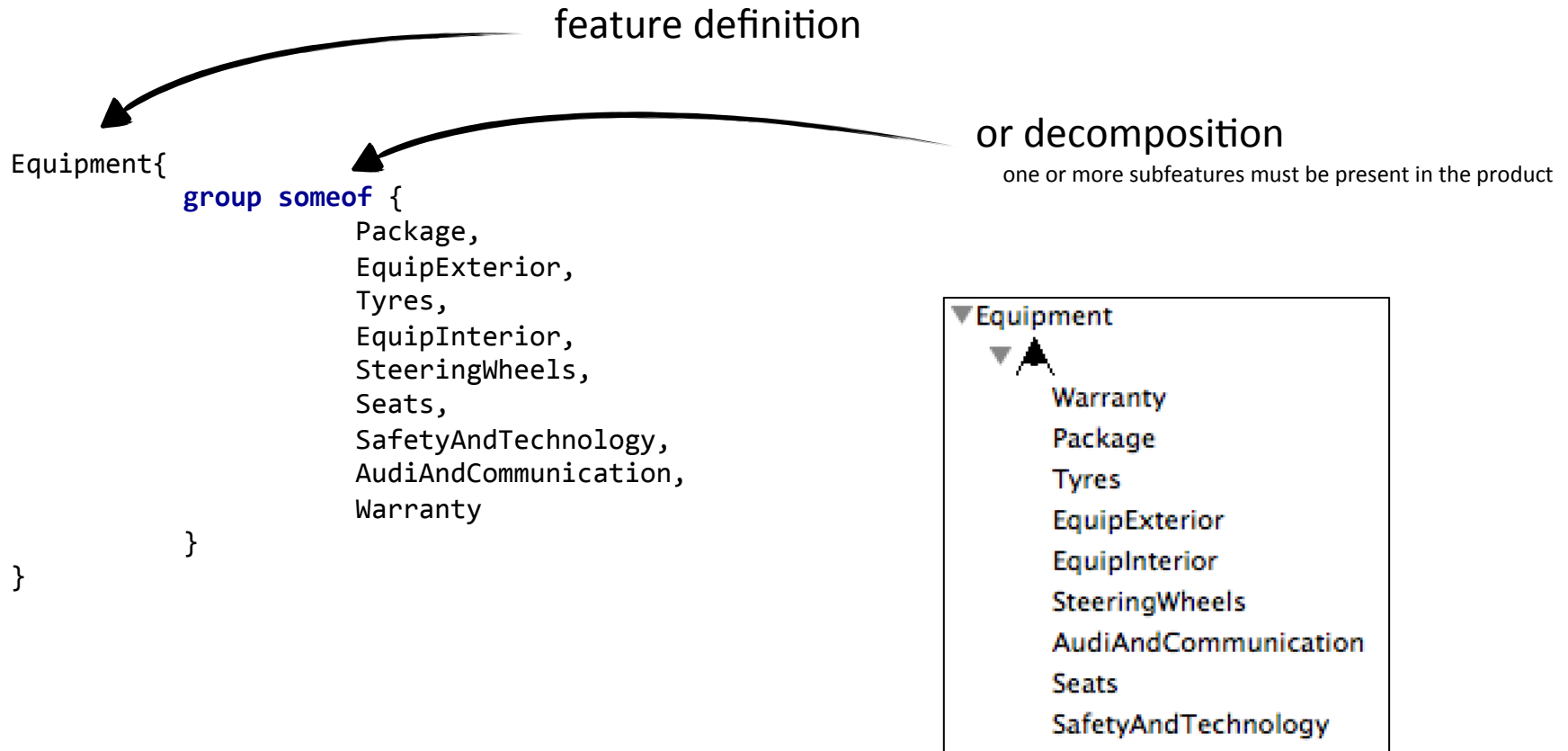
TVL : one of – xor decomposition



}



TVL : someOf – or decomposition



TVL : Modularity

```
root Car {  
    group allOf {  
        BodyStyle,  
        Model,  
        Engine,  
        Equipment }  
}
```

```
include(BodyStyle.tvl);  
include(Model.tvl);  
include(Engine.tvl);  
include(Equipment.tvl);
```



Split model in reusable parts
using external files

TVL : Modularity

BodyStyle.tvl

```
BodyStyle {  
  group oneof {  
    Avant,  
    Door3,  
    Sportback,  
    Coupe,  
    Cabriolet,  
    Roadster,  
    Spyder,  
    SUV  
  }  
}
```

Model.tvl

```
Model {  
  group oneof {  
    A1,  
    A3,  
    S3,  
    A4,  
    S4,  
    A5,  
    S5,  
    RS5,  
    A6,  
    A7,  
    A8,  
    A8L,  
    R8  
    Q3,  
    Q5,  
    Q7,  
    TT,  
    TTS,  
    TT RS  
  }  
}
```

Engine.tvl

```
Engine {  
  group oneof {  
    SE12TFSI,  
    CE14TFSI,  
    CE14TFSI119,  
    Sport12TFSI,  
    Sport14TFSI,  
    Sport14TFSI119,  
    BlackEdition14TFSI,  
    SLine12TFSI,  
    SLine14TFSI,  
    SE16TDI,  
    CE16TDI,  
    CE20TDI,  
    ...  
  }  
}
```

Eclipse Plugin for TVL

The screenshot displays the Eclipse IDE interface for the TVL (Textual Value Language) plugin. The main editor window shows the following TVL code:

```
*foo1.tvl
root Foo1 {
  group allOf {
    A,
    B,
    opt C {
      group allOf {
        opt E,
        opt A
      }
    }
  }
}
```

Below the code editor, a feature browser is visible, showing the following structure:

- Foo1.A => Foo1. ;
- Foo1.C -> C.A ;

The feature browser also displays a list of features: A, B, C, and . (root). A yellow tooltip is shown over the feature 'A', containing the text 'Hierarchical_Feature A' and a prompt 'Press 'F2' for focus'.

TVL to XMI

```
macher-wifi:A0SD13 macher1$ java -jar /Users/macher1/Documents/TVLExporter007.jar /Users/macher1/Documents/workspaceTVL/TVLfoos/foo1.tvl /Users/macher1/Documents
macher-wifi:A0SD13 macher1$ cat /Users/macher1/Documents/workspaceTVL/TVLfoos/foo1.tvl
root Foo1 {
    group allOf {
        A,
        B,
        opt C {
            group allOf {
                opt E,
                opt A
            }
        }
    }
    Foo1.A -> Foo1.C ;
    Foo1.C -> C.A ;
}
}

}macher-wifi:A0SD13 macher1$ ls -alrt /Users/macher1/Documents/foo1.tvl.xmi
-rw-r--r--  1 macher1  staff  2100  22  nov 17:30 /Users/macher1/Documents/foo1.tvl.xmi
macher-wifi:A0SD13 macher1$
```