

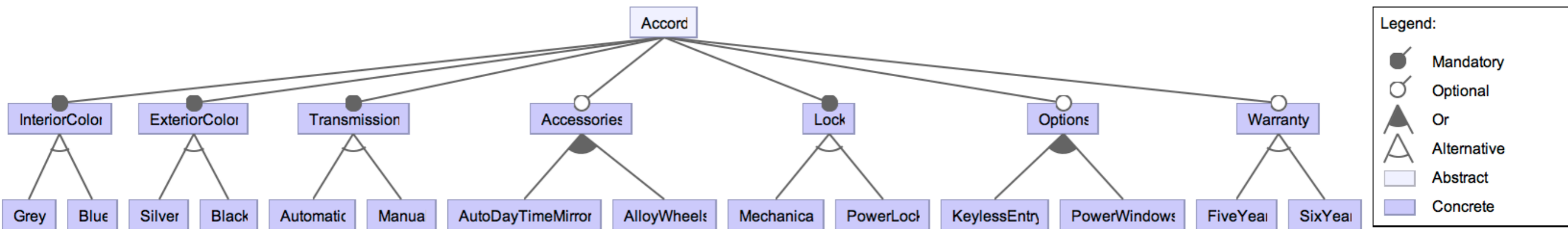
# Feature Modeling Exercise

Reference Solution

by

Sarah Nadi

Presented by Manuel Weiel



Legend:

- Mandatory
- Optional
- Or
- Alternative
- Abstract
- Concrete

## Accord

```

xor Transmission
  Manual
  Automatic
xor ExteriorColor
  Silver
  Black
xor InteriorColor
  Grey
  Blue
or Accessories ?
  AlloyWheels
  AutoDayNightMirror
xor Lock
  Mechanical
  PowerLock
or Options ?
  KeylessEntry
  PowerWindows
xor Warranty?
  FiveYear
  SixYear
  
```



# Are Number of Instances Correct?

Accord

- xor** Transmission
  - Manual
  - Automatic
- xor** ExteriorColor
  - Silver
  - Black
- xor** InteriorColor
  - Grey
  - Blue
- or** Accessories ?
  - AlloyWheels
  - AutoDayNightMirror
- xor** Lock
  - Mechanical
  - PowerLock
- or** Options ?
  - KeylessEntry
  - PowerWindows
- xor** Warranty?
  - FiveYear
  - SixYear

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**xor** Transmission  
Manual  
Automatic  
**xor** ExteriorColor  
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Black  
**xor** InteriorColor  
Grey  
Blue  
**or** Accessories ?  
AlloyWheels  
AutoDayNightMirror  
**xor** Lock  
Mechanical  
PowerLock  
**or** Options ?  
KeylessEntry  
PowerWindows  
**xor** Warranty?  
FiveYear  
SixYear

—————> 2 possibilities



# Are Number of Instances Correct?

Accord

<b>xor</b> Transmission		
Manual	→	2 possibilities
Automatic		
<b>xor</b> ExteriorColor		
Silver	→	2 possibilities
Black		
<b>xor</b> InteriorColor		
Grey		
Blue		
<b>or</b> Accessories ?		
AlloyWheels		
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Grey	→	2 possibilities
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<b>or</b> Accessories ?		
AlloyWheels	→	$2^2$ possibilities
AutoDayNightMirror		
<b>xor</b> Lock		
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Grey	→	2 possibilities
Blue		
<b>or</b> Accessories ?		
AlloyWheels	→	2 <sup>2</sup> possibilities
AutoDayNightMirror		
<b>xor</b> Lock		
Mechanical	→	2 possibilities
PowerLock		
<b>or</b> Options ?		
KeylessEntry		
PowerWindows		
<b>xor</b> Warranty?		
FiveYear		
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AutoDayNightMirror		
<b>xor</b> Lock		
Mechanical	→	2 possibilities
PowerLock		
<b>or</b> Options ?		
KeylessEntry		
PowerWindows	→	2 <sup>2</sup> possibilities
<b>xor</b> Warranty?		
FiveYear		
SixYear	→	3 possibilities

# Are Number of Instances Correct?

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<b>xor</b> Transmission				
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AutoDayNightMirror				
<b>xor</b> Lock				
Mechanical	→	2 possibilities		
PowerLock				
<b>or</b> Options ?				
KeylessEntry				
PowerWindows	→	2 <sup>2</sup> possibilities		
<b>xor</b> Warranty?				
FiveYear				
SixYear	→	3 possibilities		

= 768 instances

# Adding Cross-tree Constraints

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```
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  Manual
  Automatic
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  AutoDayNightMirror
xor Lock
  Mechanical
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or Options ?
  KeylessEntry
  PowerWindows
xor Warranty?
  FiveYear
  SixYear
```

*//additional cross-tree constraints*

*[ExteriorColor.Black => ! InteriorColor.Grey] //assumed color constraints*

*[ExteriorColor.Silver => ! InteriorColor.Blue] //assumed color constraints*

*[KeylessEntry => PowerLock] //KeylessEntry would not work with manual locks*







# New Number of Instances Correct?

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//additional cross-tree constraints
[ExteriorColor.Black => ! InteriorColor.Grey] //assumed color constraints
[ExteriorColor.Silver => ! InteriorColor.Blue] //assumed color constraints
[KeylessEntry => PowerLock] //KeylessEntry would not work with manual locks
```

# New Number of Instances Correct?

→ 2 possibilities

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  FiveYear
  SixYear
```

→ 2 possibilities

→ 2 combinations

*//additional cross-tree constraints*

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# New Number of Instances Correct?

Accord

**xor** Transmission  
Manual  
Automatic

→ 2 possibilities

**xor** ExteriorColor  
Silver  
Black

→ 2 combinations

**xor** InteriorColor  
Grey  
Blue

**or** Accessories ?  
AlloyWheels  
AutoDayNightMirror

→  $2^2$  possibilities

**xor** Lock  
Mechanical  
PowerLock

**or** Options ?  
KeylessEntry  
PowerWindows

**xor** Warranty?  
FiveYear  
SixYear

*//additional cross-tree constraints*

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*[KeylessEntry => PowerLock] //KeylessEntry would not work with manual locks*

# New Number of Instances Correct?

Accord

<code>xor</code> Transmission Manual Automatic	→	2 possibilities
<code>xor</code> ExteriorColor Silver Black	→	2 combinations
<code>xor</code> InteriorColor Grey Blue		
<code>or</code> Accessories ? AlloyWheels AutoDayNightMirror	→	$2^2$ possibilities
<code>xor</code> Lock Mechanical PowerLock	→	$8 - 2 = 6$ combinations
<code>or</code> Options ? KeylessEntry PowerWindows		
<code>xor</code> Warranty? FiveYear SixYear		

*//additional cross-tree constraints*

*[ExteriorColor.Black => ! InteriorColor.Grey] //assumed color constraints*

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# New Number of Instances Correct?

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<b>xor</b> Transmission		
Manual	→	2 possibilities
Automatic		
<b>xor</b> ExteriorColor	}	
Silver		→
Black		
<b>xor</b> InteriorColor	}	
Grey		
Blue		
<b>or</b> Accessories ?		
AlloyWheels	→	$2^2$ possibilities
AutoDayNightMirror		
<b>xor</b> Lock	}	
Mechanical		→
PowerLock		
<b>or</b> Options ?	}	
KeylessEntry		
PowerWindows		
<b>xor</b> Warranty?		
FiveYear	→	3 possibilities
SixYear		

*//additional cross-tree constraints*

*[ExteriorColor.Black => ! InteriorColor.Grey] //assumed color constraints*

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Accord

<code>xor</code> Transmission Manual Automatic	→	2 possibilities	
<code>xor</code> ExteriorColor Silver Black	→	2 combinations	
<code>xor</code> InteriorColor Grey Blue	→		
<code>or</code> Accessories ? AlloyWheels AutoDayNightMirror	→	$2^2$ possibilities	= 288
<code>xor</code> Lock Mechanical PowerLock	→	$8 - 2 = 6$ combinations	instances
<code>or</code> Options ? KeylessEntry PowerWindows	→		
<code>xor</code> Warranty? FiveYear SixYear	→	3 possibilities	

*//additional cross-tree constraints*

`[ExteriorColor.Black => ! InteriorColor.Grey]` *//assumed color constraints*

`[ExteriorColor.Silver => ! InteriorColor.Blue]` *//assumed color constraints*

`[KeylessEntry => PowerLock]` *//KeylessEntry would not work with manual locks*