

AI and Variability for Software Development

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AI for Software Development

- Artificial intelligence for assisting developers
 - Learn, represent, reuse knowledge
 - Automation vs. Augmentation
- Assisting stakeholders in their *decisions*
 - Documenting different **options**
 - Explainability

Variability Management

- Software product line engineering
 - Managing software **variants**
 - Planned reuse
- **Variability**
 - Commonalities + variabilities
 - Handling complexity
 - *Artefacts, models, processes, ...*

Extracting Variability Information

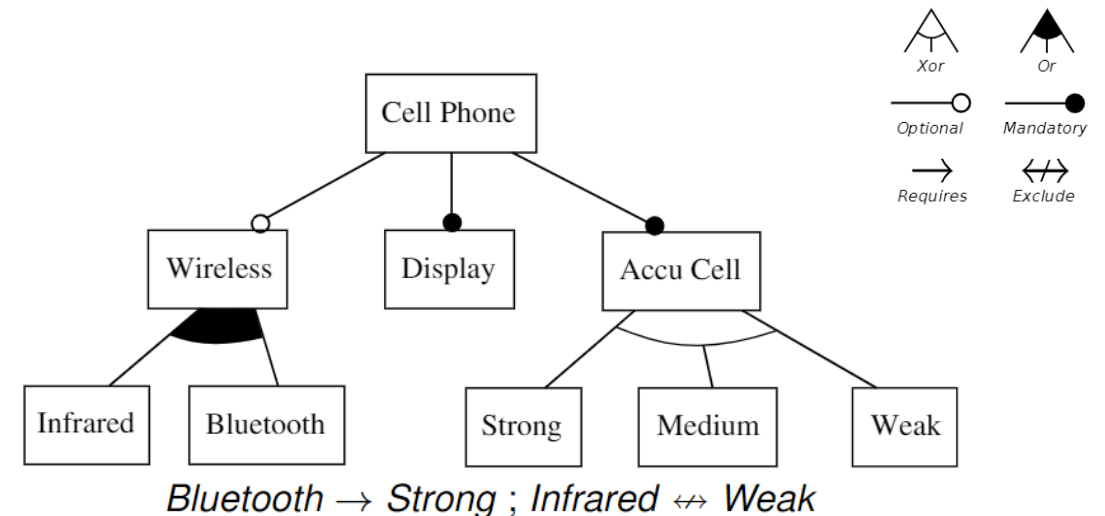
- Variability Models

- Representation
- Maintenance
- Evolution
- Reasoning

- Feature models

- Set of configurations
- Decisions

	Cell Phone	Wireless	Infrared	Bluetooth	Display	Accu Cell	Strong	Medium	Weak
C ₁	X				X	X	X		
C ₂	X				X	X		X	
C ₃	X				X	X			X
C ₄	X	X	X		X	X	X		
C ₅	X	X	X		X	X		X	
C ₆	X	X		X	X	X	X		
C ₇	X	X	X	X	X	X	X		



Representing Recurring Code Patterns

- Code sophistication
 - Recommending **alternative behavior**
 - Without specification
- Abstract behavior vs. code snippets
 - Variability in code
 - *Step-by-step* recommendation

```
1  if <?>:  
2      return <?>
```

```
1  if len(x) == 0:  
2      return <?>
```

```
1  if len(x) == 0:  
2      return 0
```

```
1  if len(x) == 0:  
2      return y.values[0]
```



Next?

- **Variability** in **code**
 - What variability information?
 - What formalisms?
- Variability and **Uncertainty**
 - Design uncertainty (variability extraction)
 - Flexible configuration process