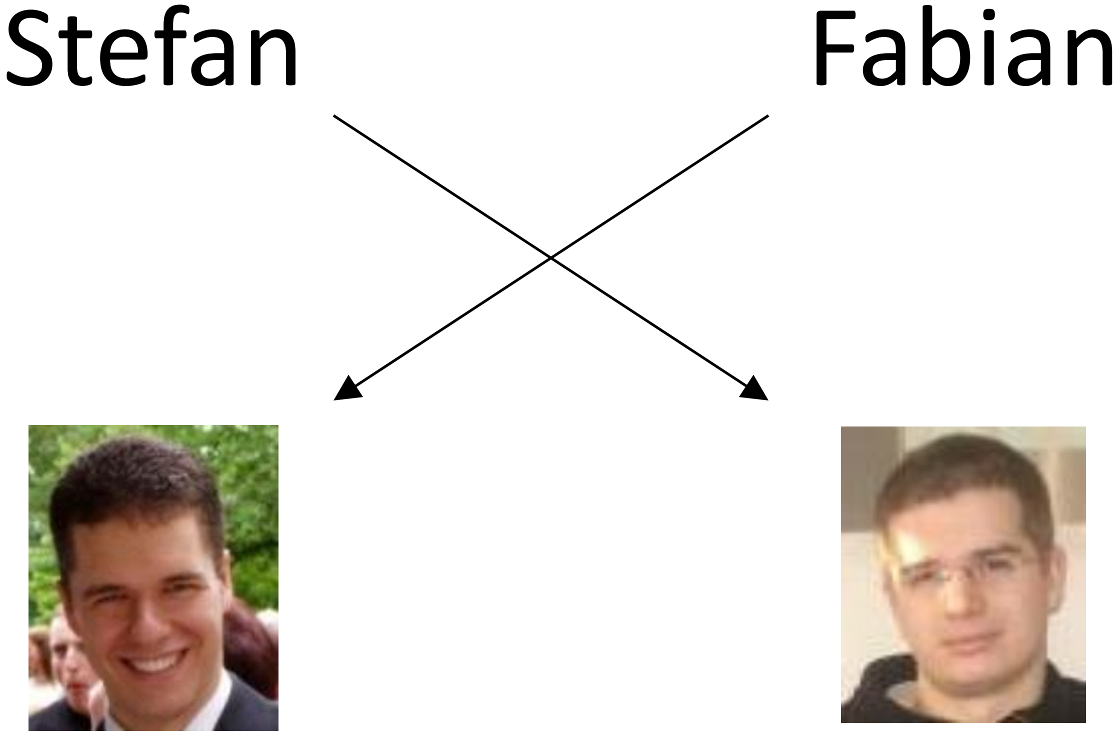
[re:motion] mixins

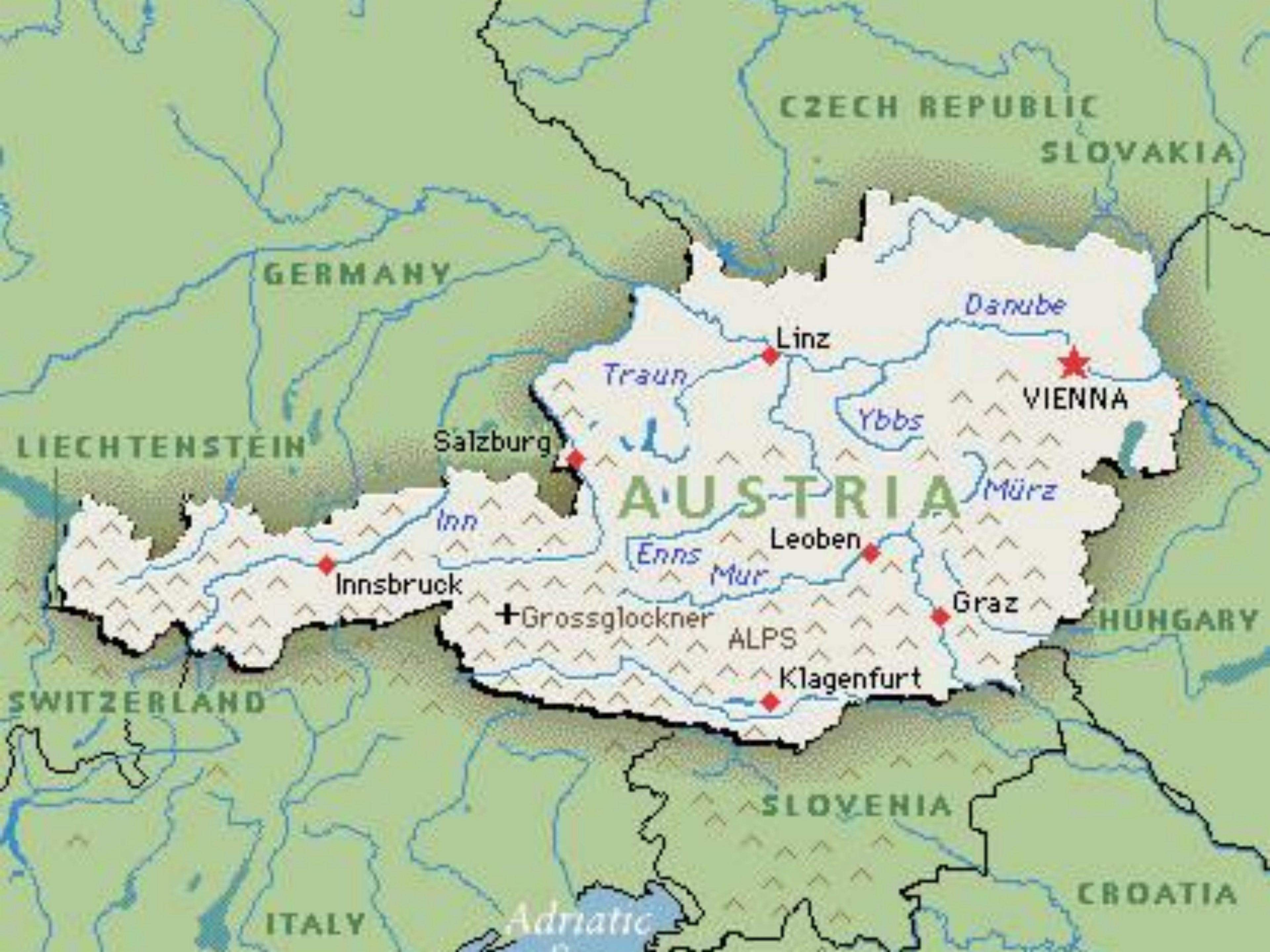
beyond inheritance



Stefan

Fabian

rubicon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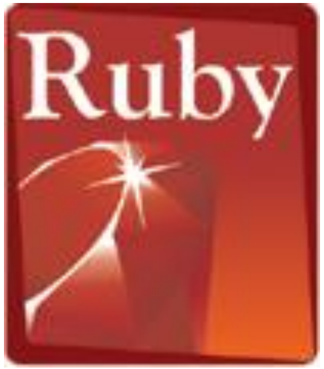
SLOVAKIA
GERMANY
LIECHTENSTEIN
Danube
Linz
Traun
VIENNA
Ybbs
Salzburg
AUSTRIA
Mürz
Inn
Leoben
Enns
Mur
Innsbruck
Graz
HUNGARY
Grossglockner
ALPS
Klagenfurt
SWITZERLAND
SLOVENIA
CROATIA
ITALY
Adriatic

rubicon

≠


Ruby

C#

Geschäftszahl 03.10.2007/1

Verfahrensbereich Verfahrensbereich BW

Sachgebiet

Datum des Poststempel

Eingangsdatum * 03.10.2007

Erfassungsdatum * 03.10.2007

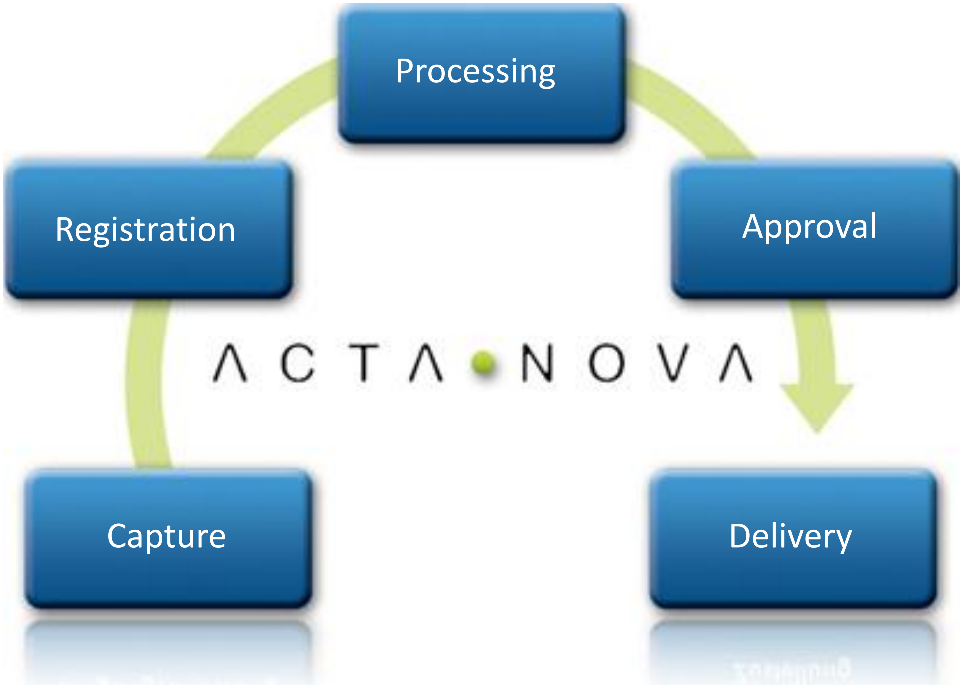
Einbringer * Salmann, Ronald

Fremddatum

Fremdzahl

Betreff Bauanzeige - Swimmingpool

Anmerkung



Capture

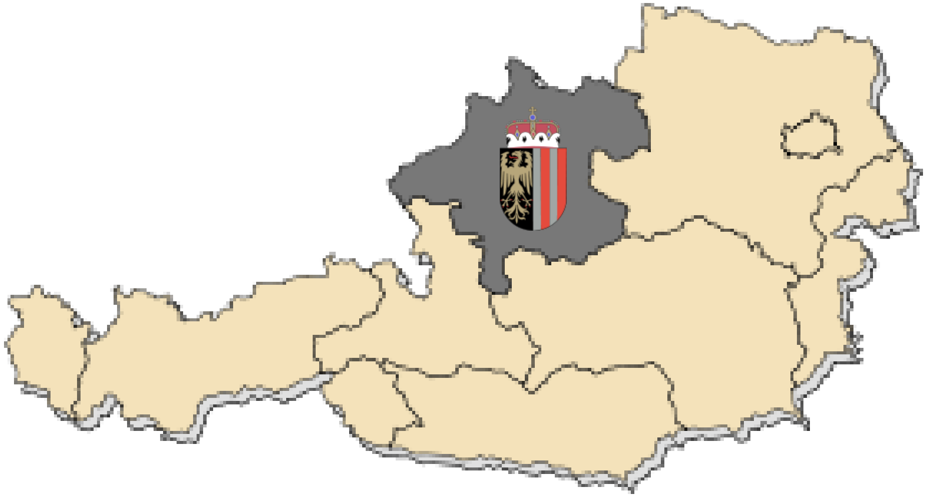
Registration

Processing

Approval

Delivery

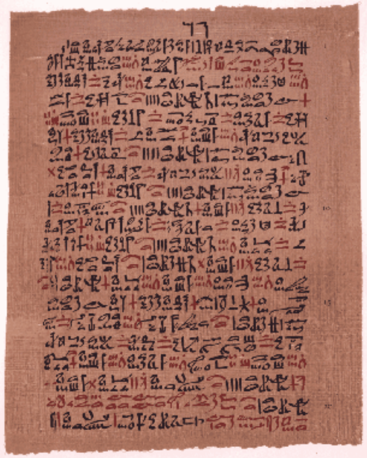
ACTA NOVA



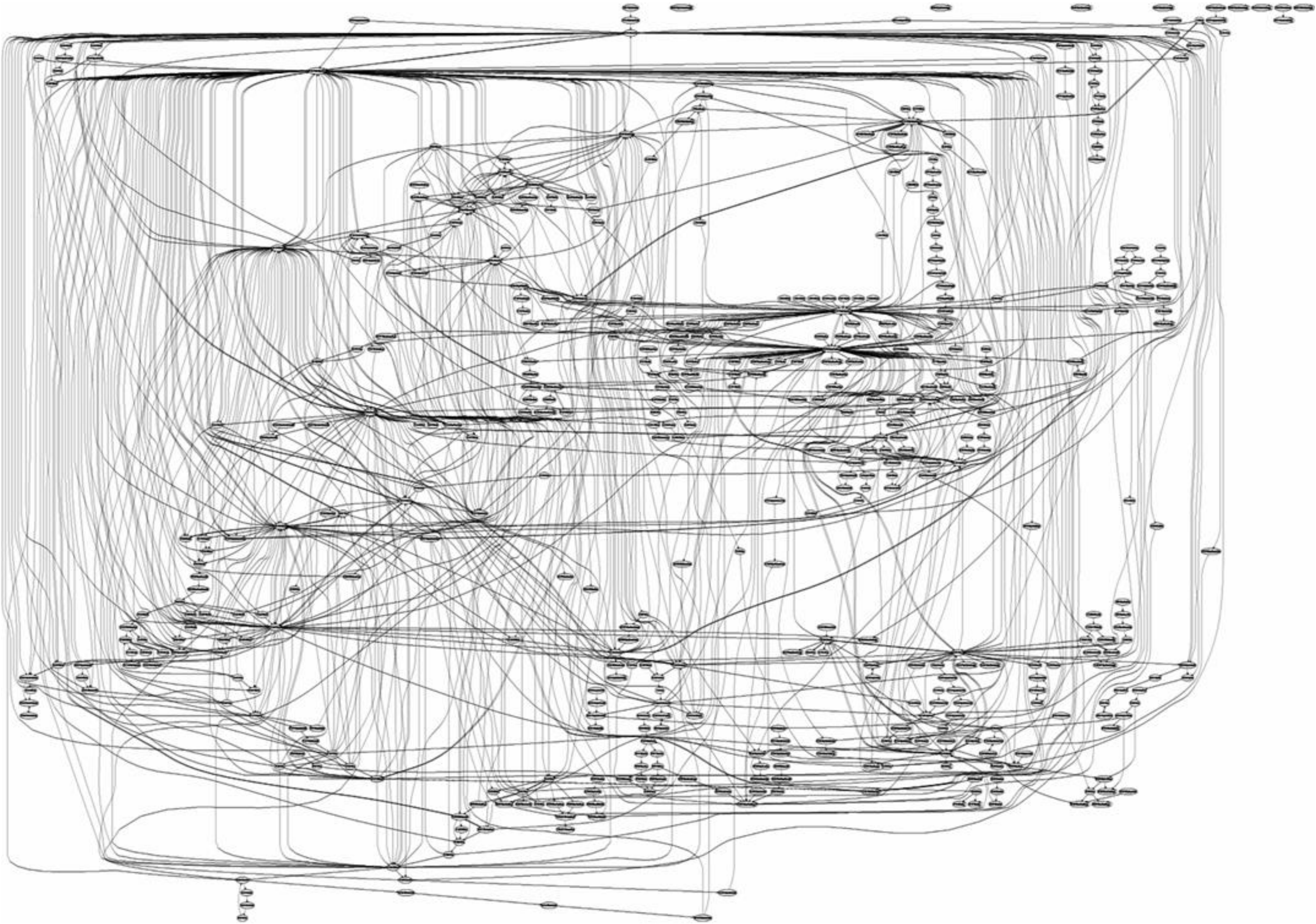
Fucking

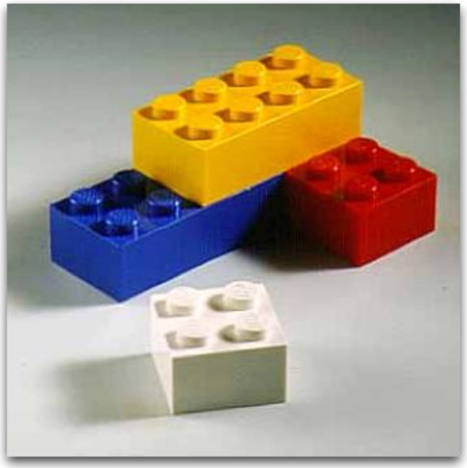
Fucking

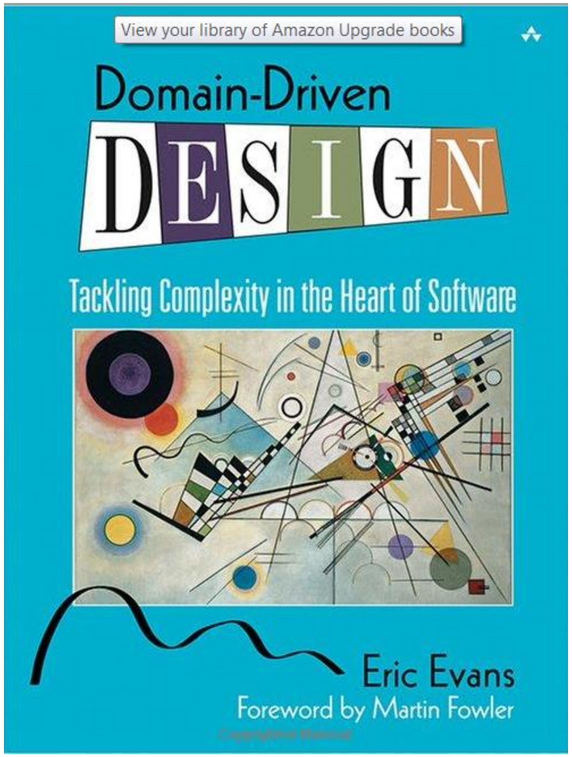
Software Configuration
Activate Sound ☑
High Quality Sound □
Activate Images ☑
...kground □
Files □



Leipzig [illegible] Papyrus Ebers. Tafel [illegible]





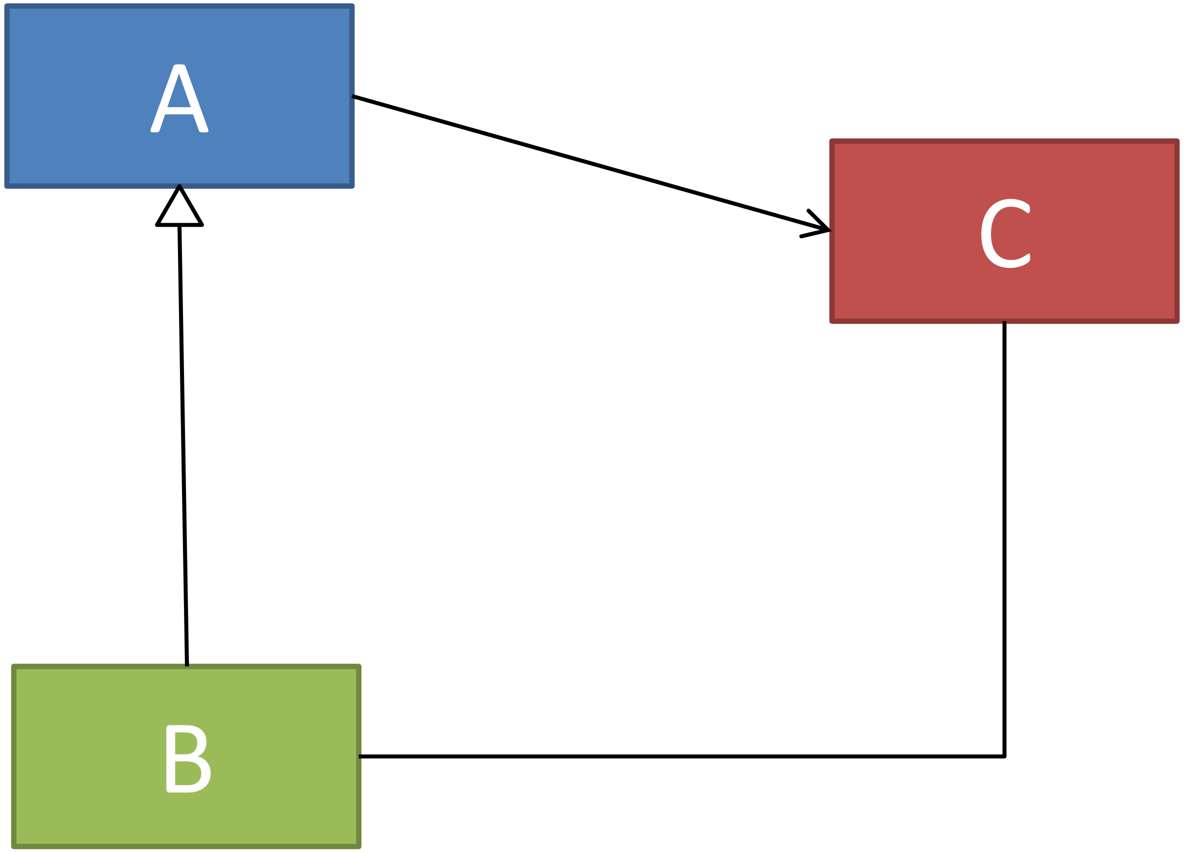


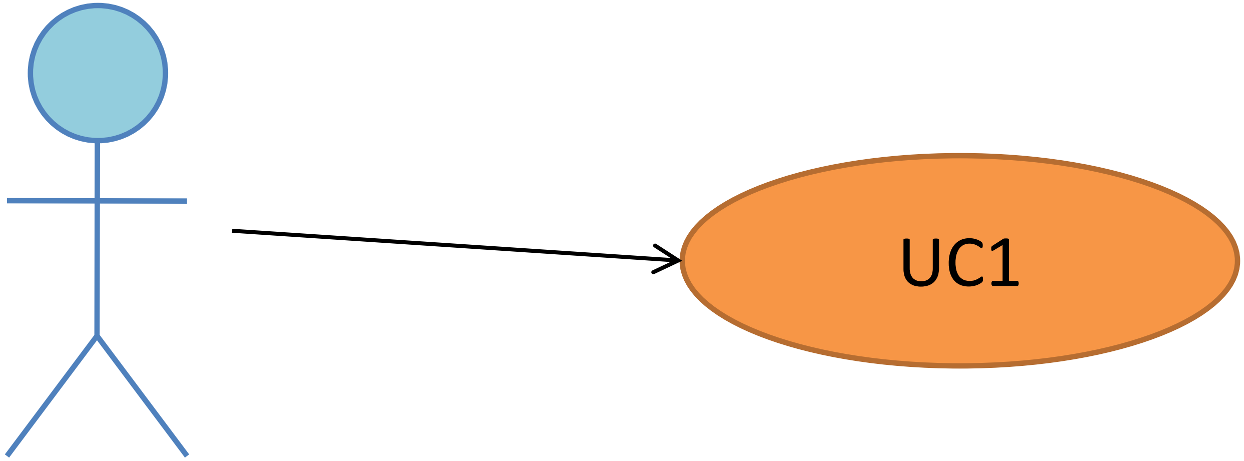
Domain-Driven DESIGN

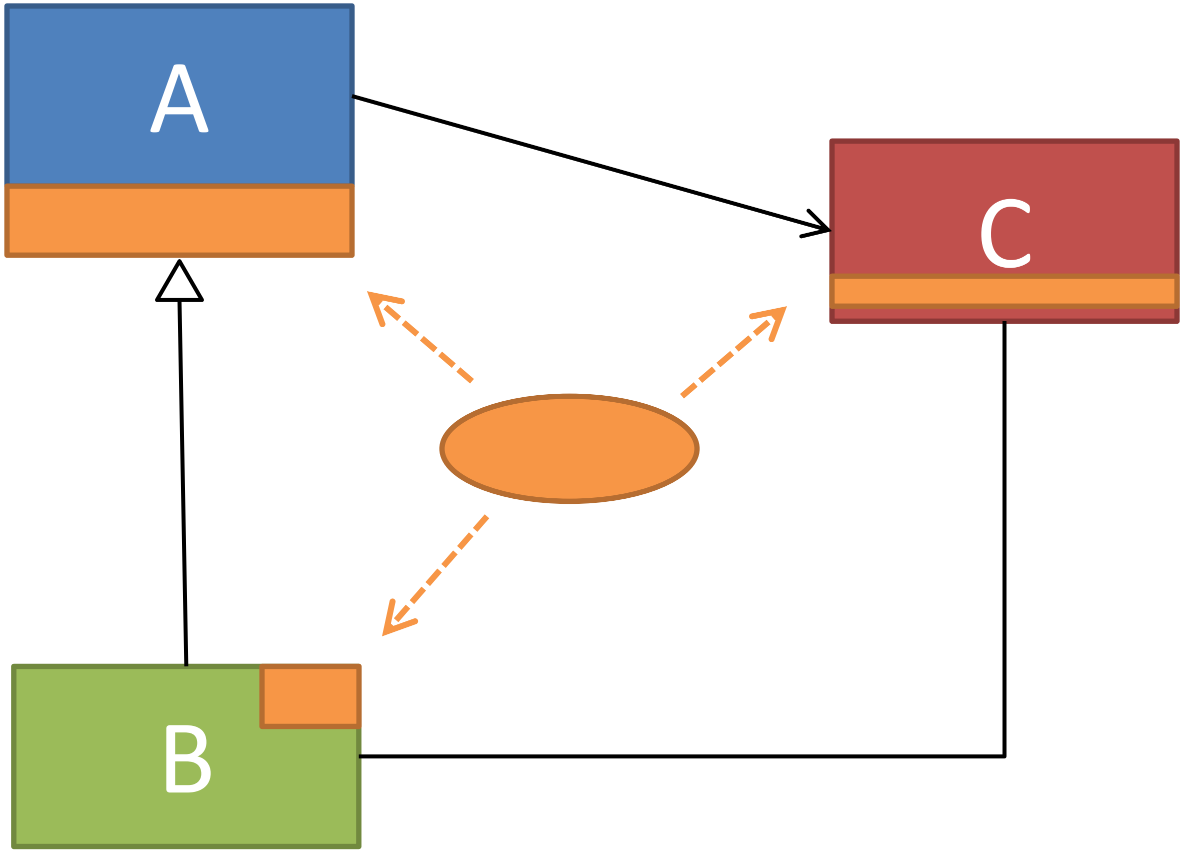
Tackling Complexity in the Heart of Software

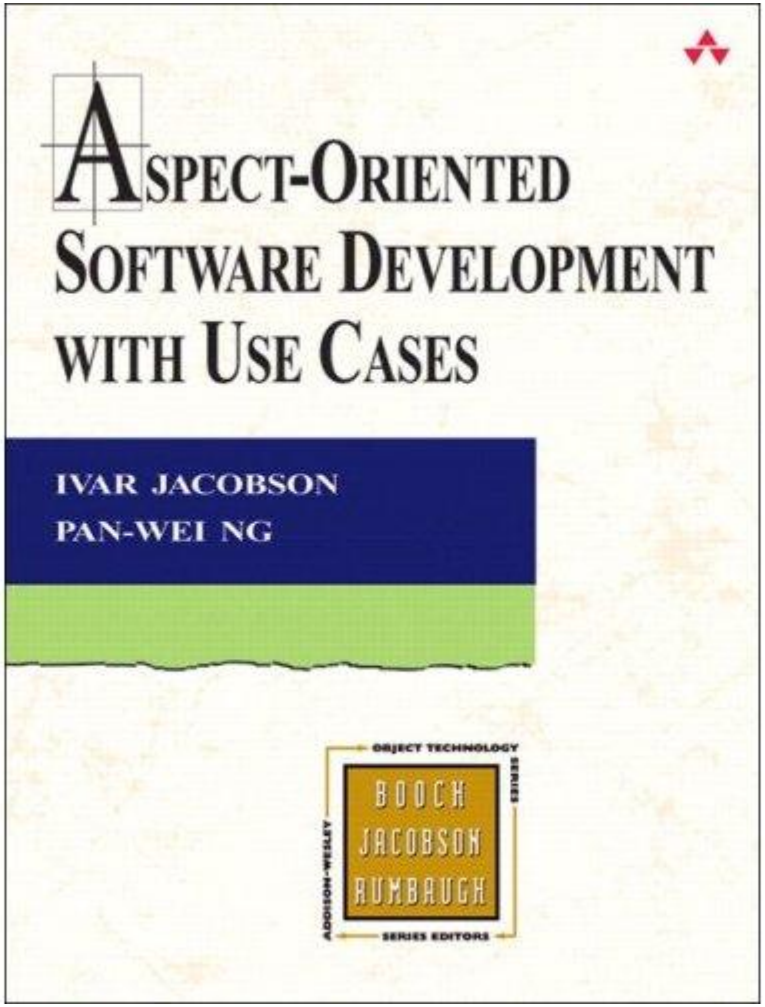
Eric Evans

Foreword by Martin Fowler


A
C
B

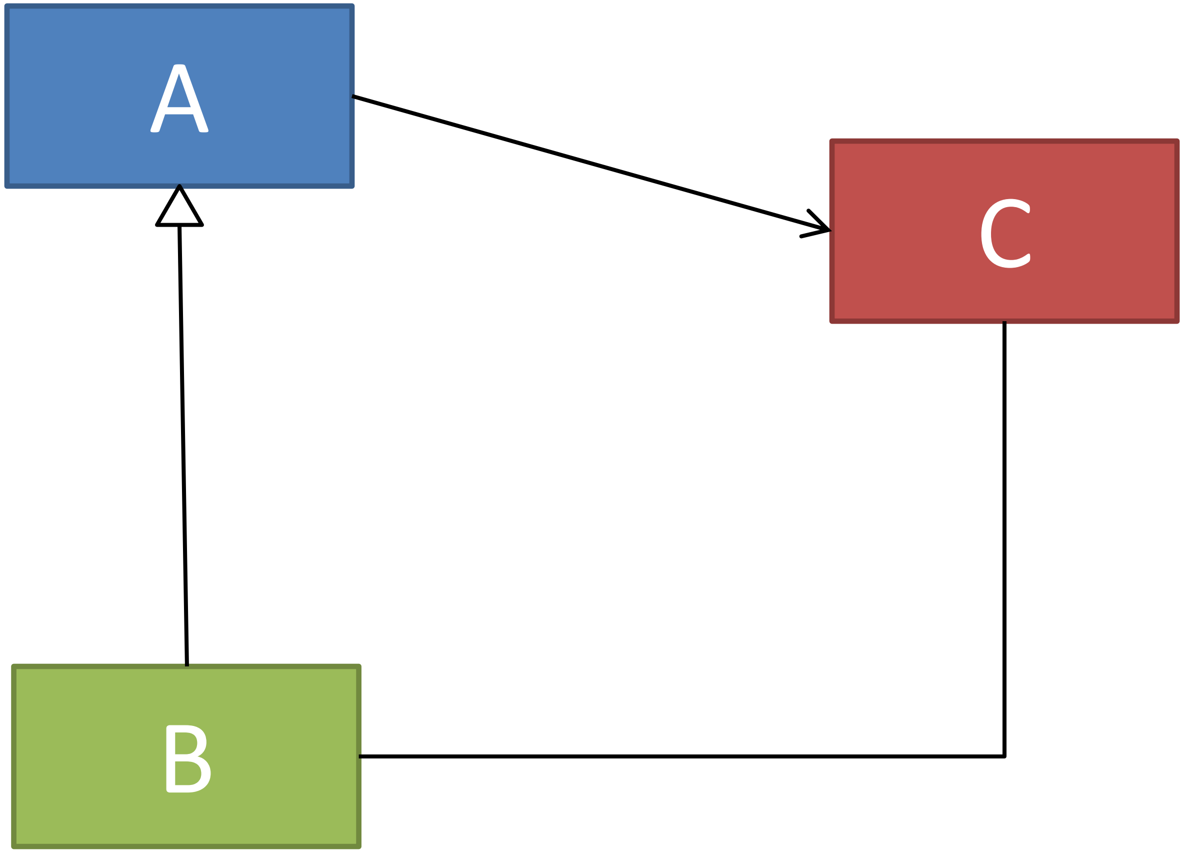

UC1

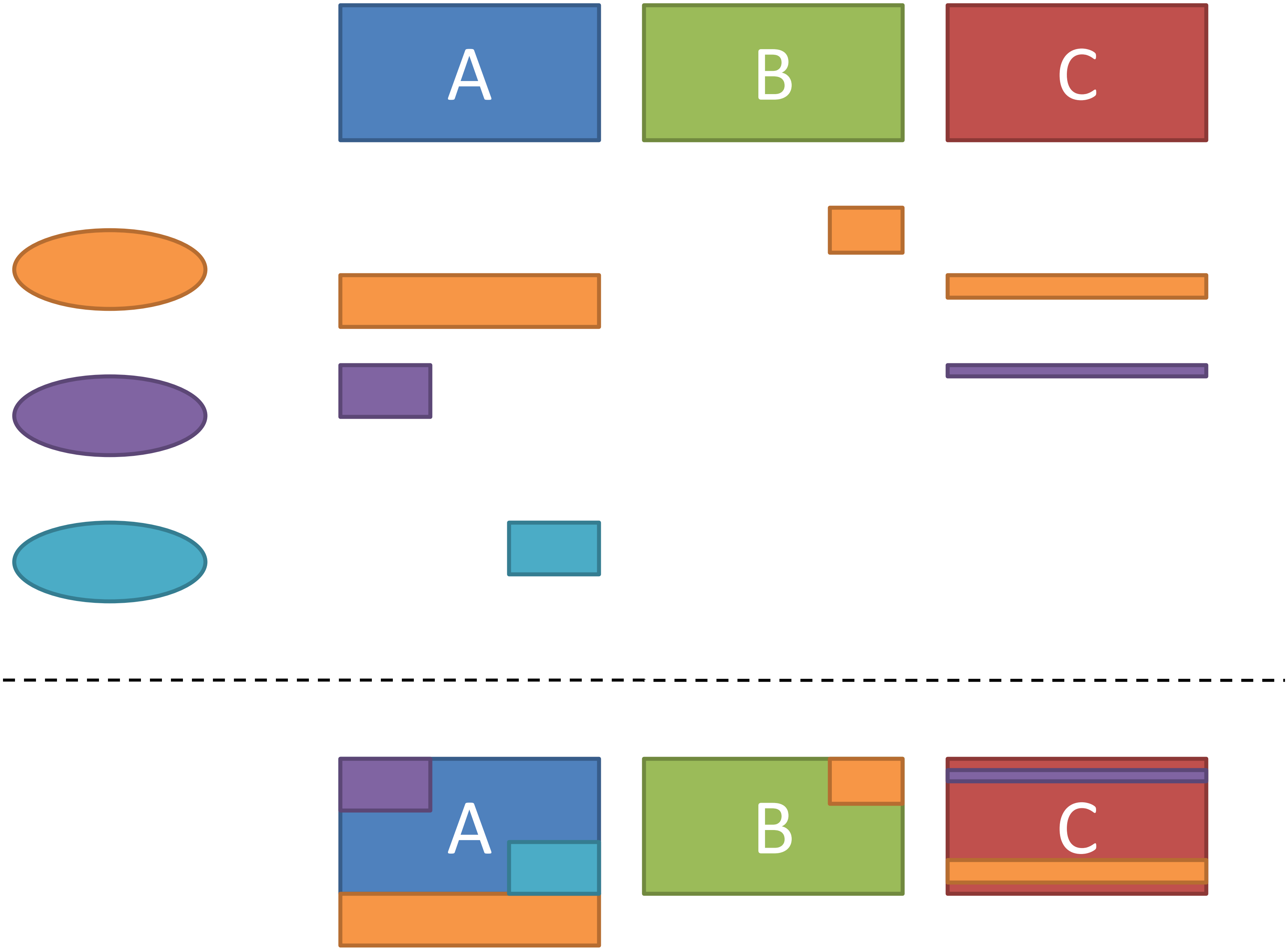

A
C
B



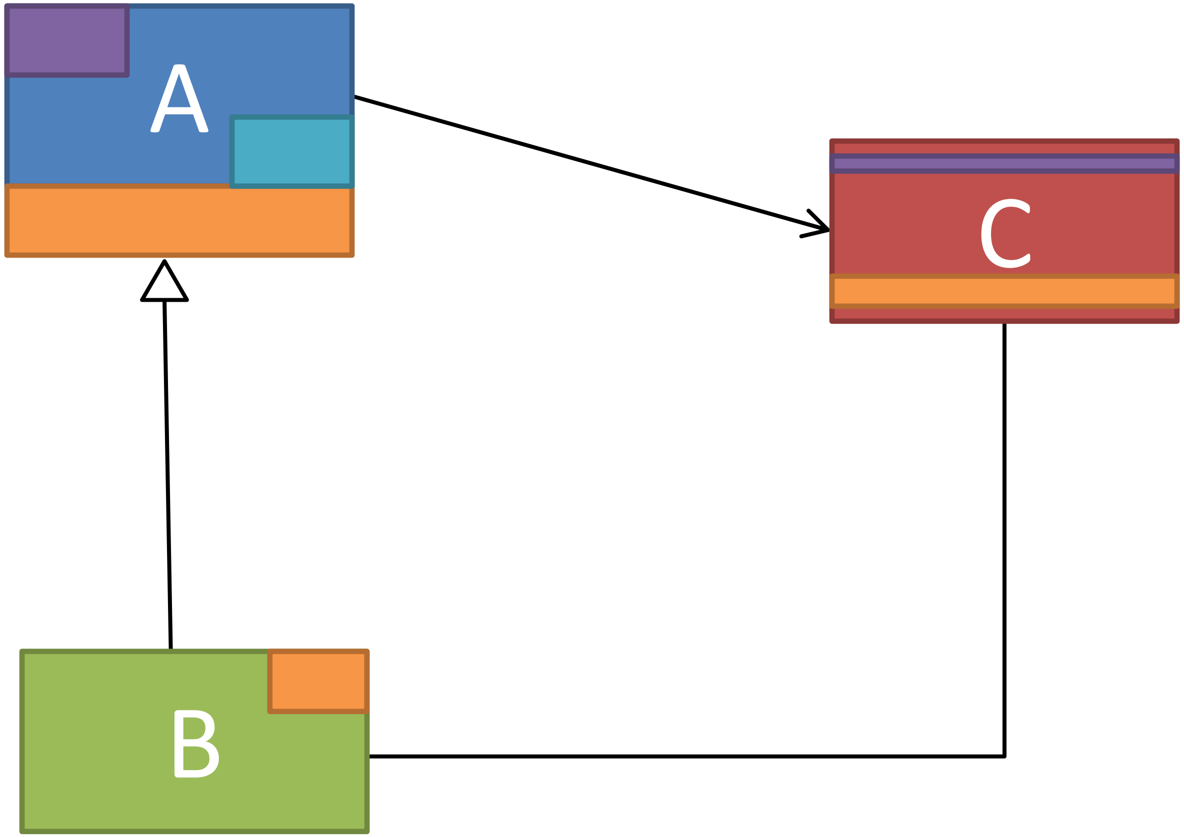
Aspect-Oriented Software Development with Use Cases

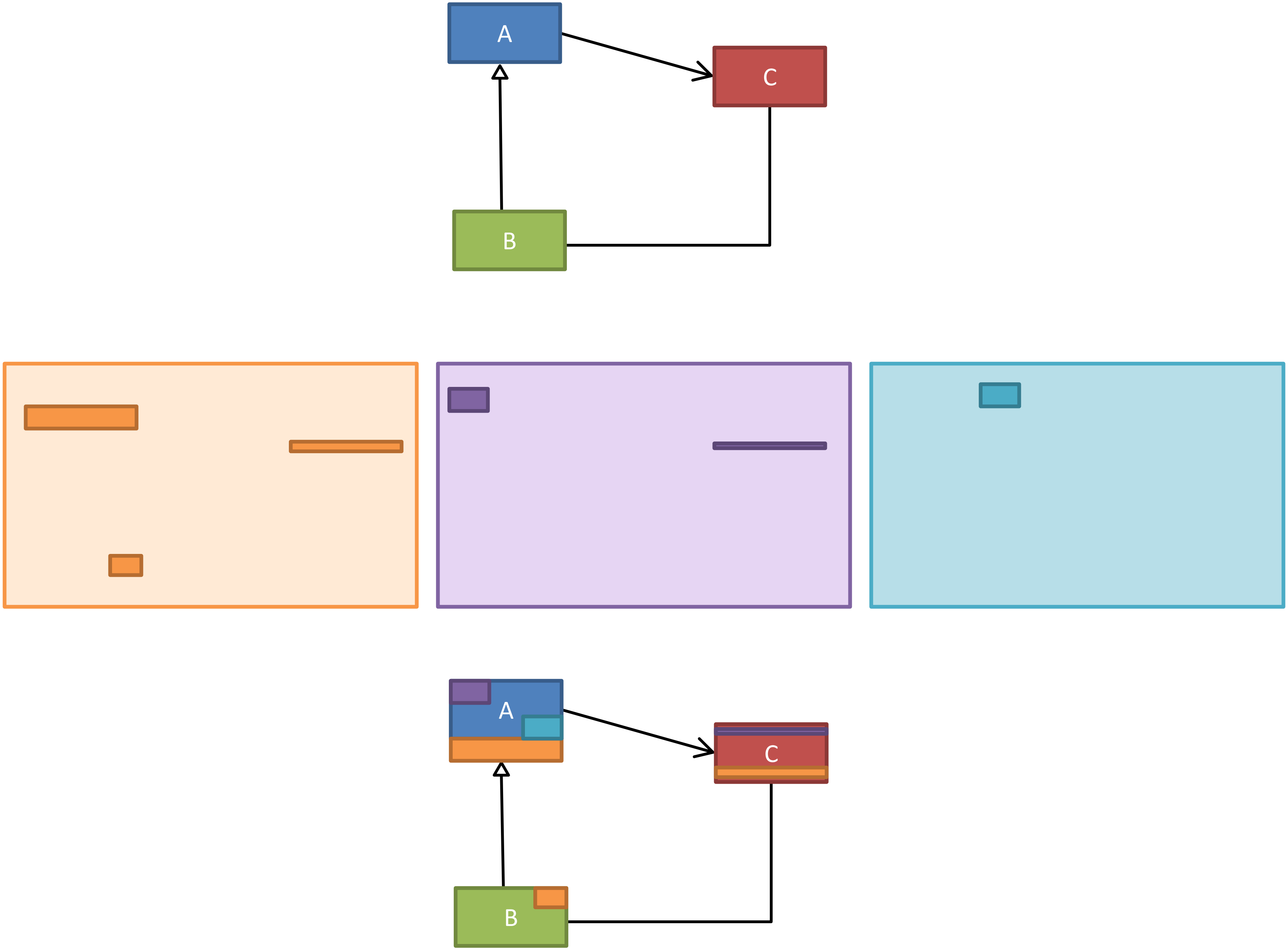
Ivar Jacobson
Pan-Wei Ng

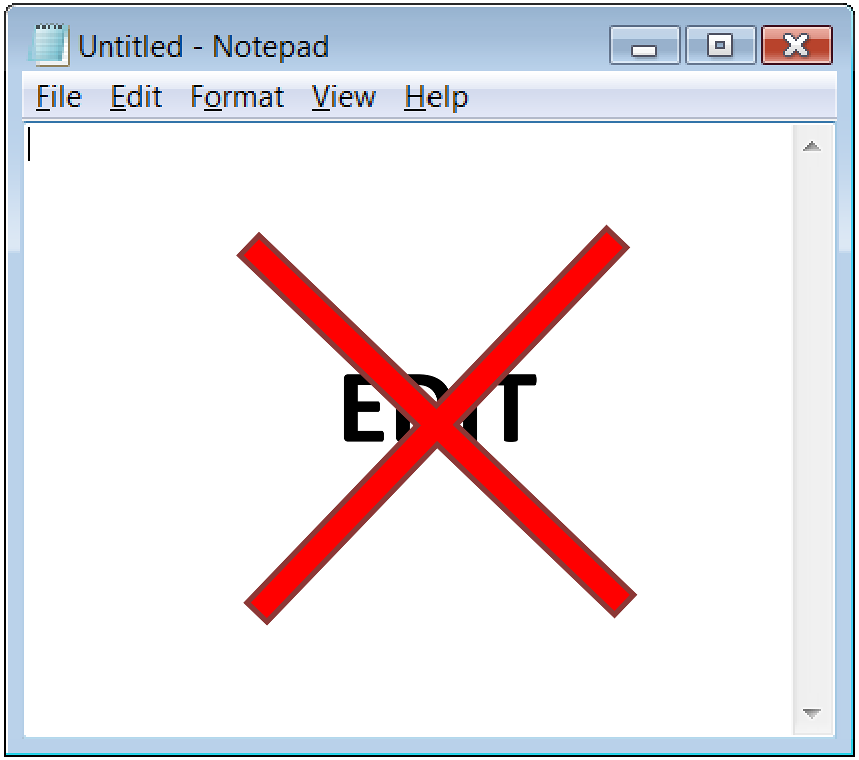

A
C
B

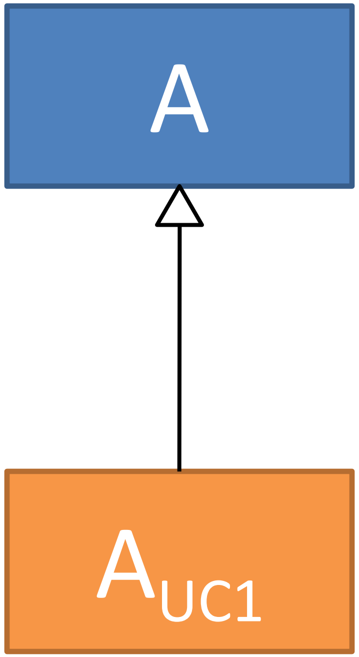


A
B
C
A
B
C


A
C
B


A
C
B
A
C
B

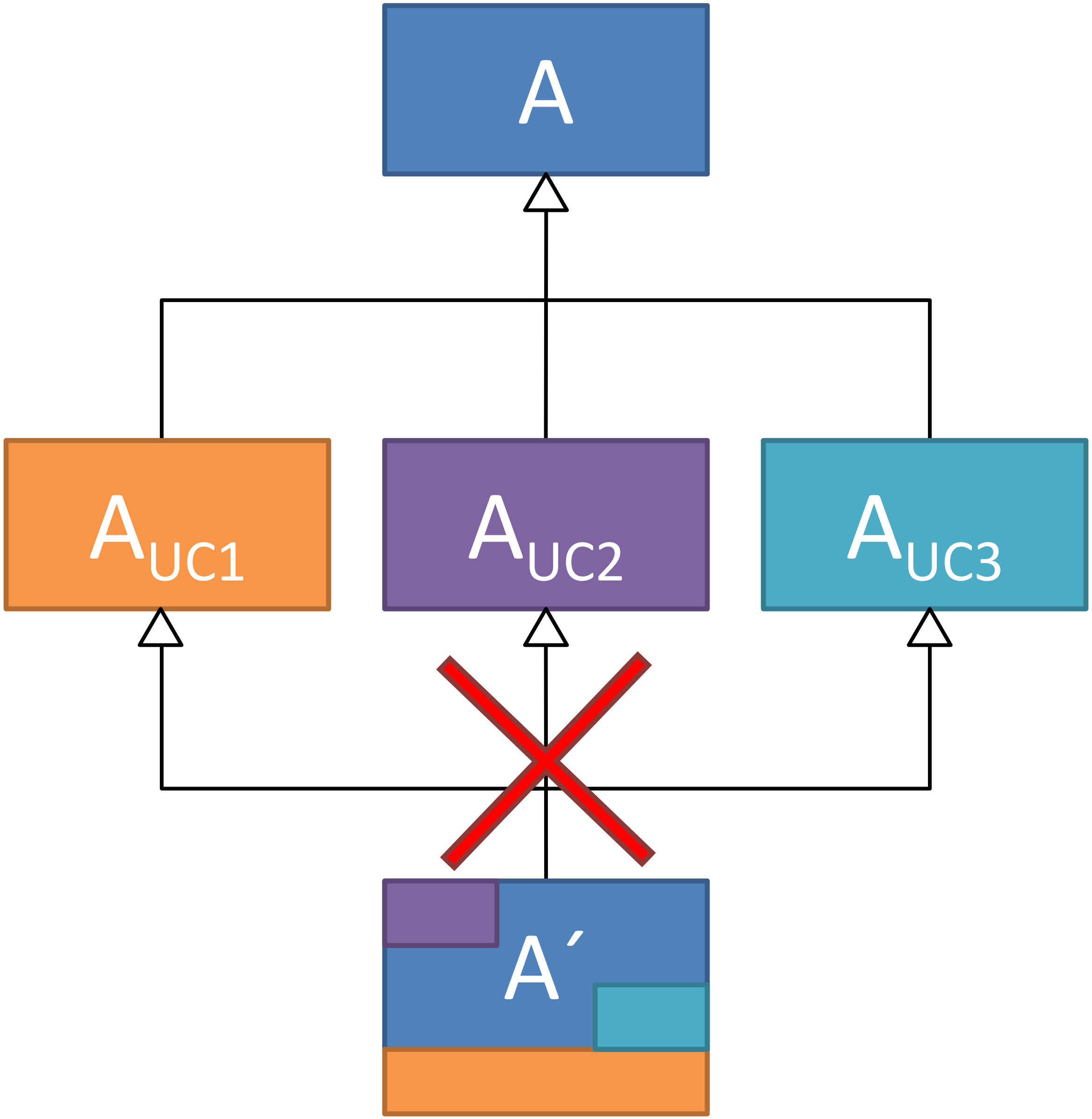

Untitled - Notepad
File
Edit
Format
View
Help
EDIT

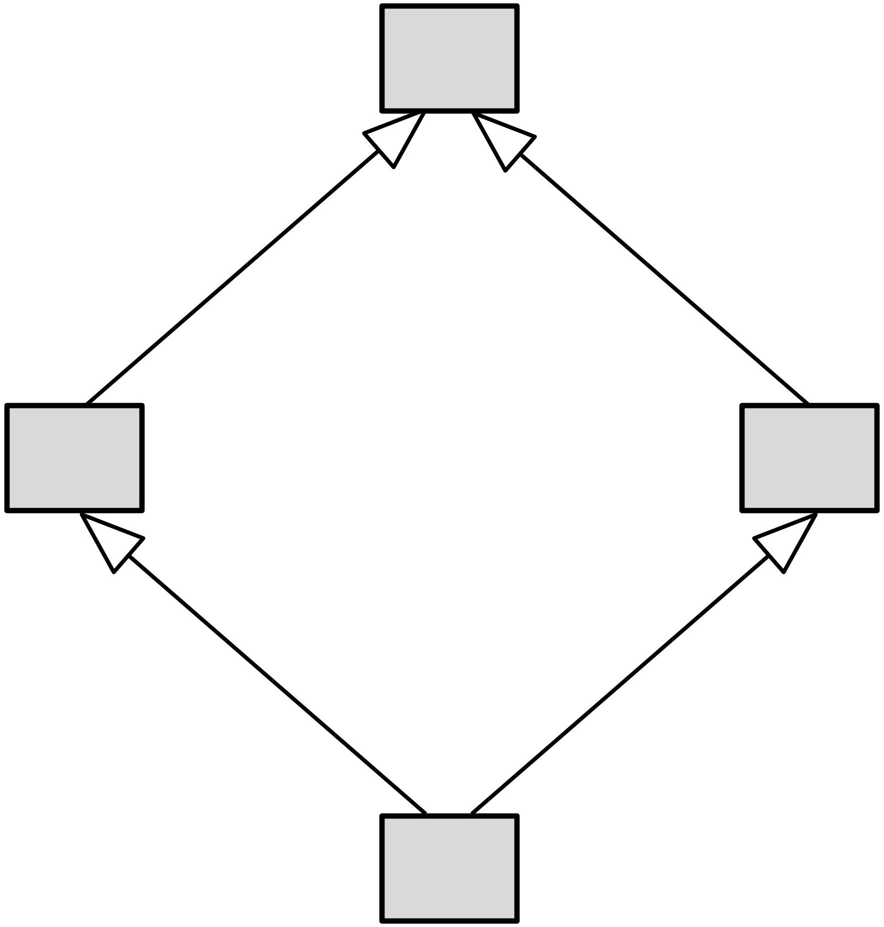

A
A_{UC1}

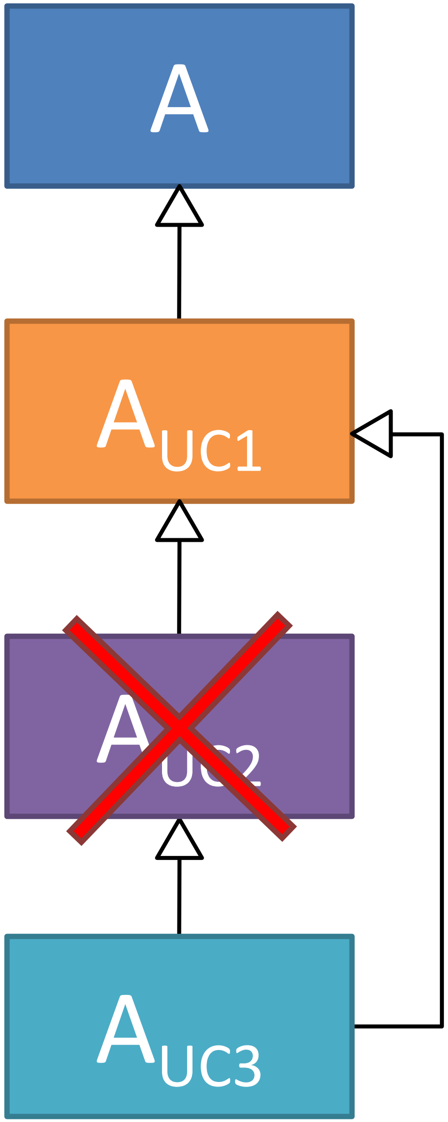
SIMPLE

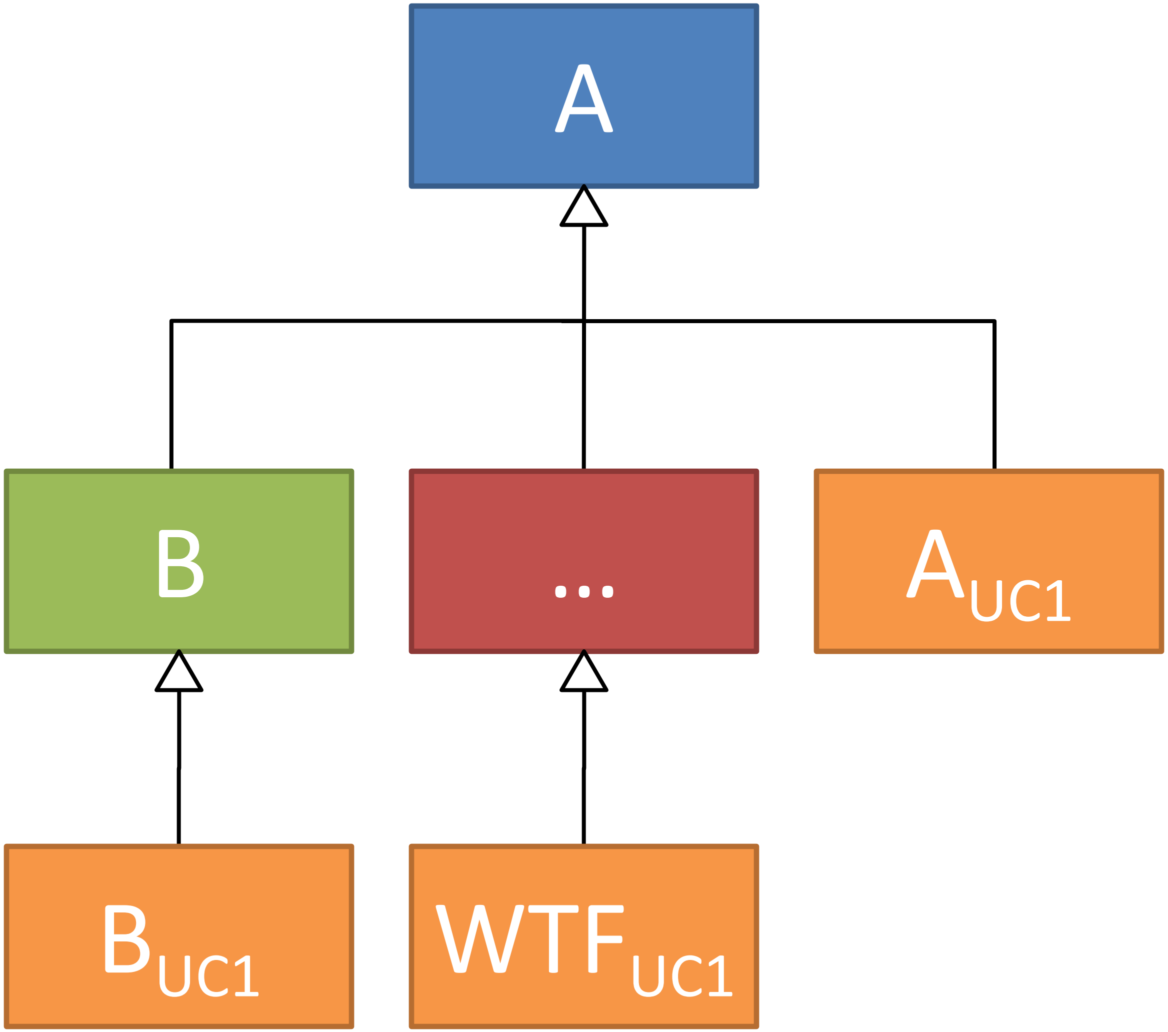
WELL-DEFINED EXTENSIBILITY

`virtual`


A
A_{UC1}
A_{UC2}
A_{UC3}
A´




A
AUC1
AUC2
AUC3

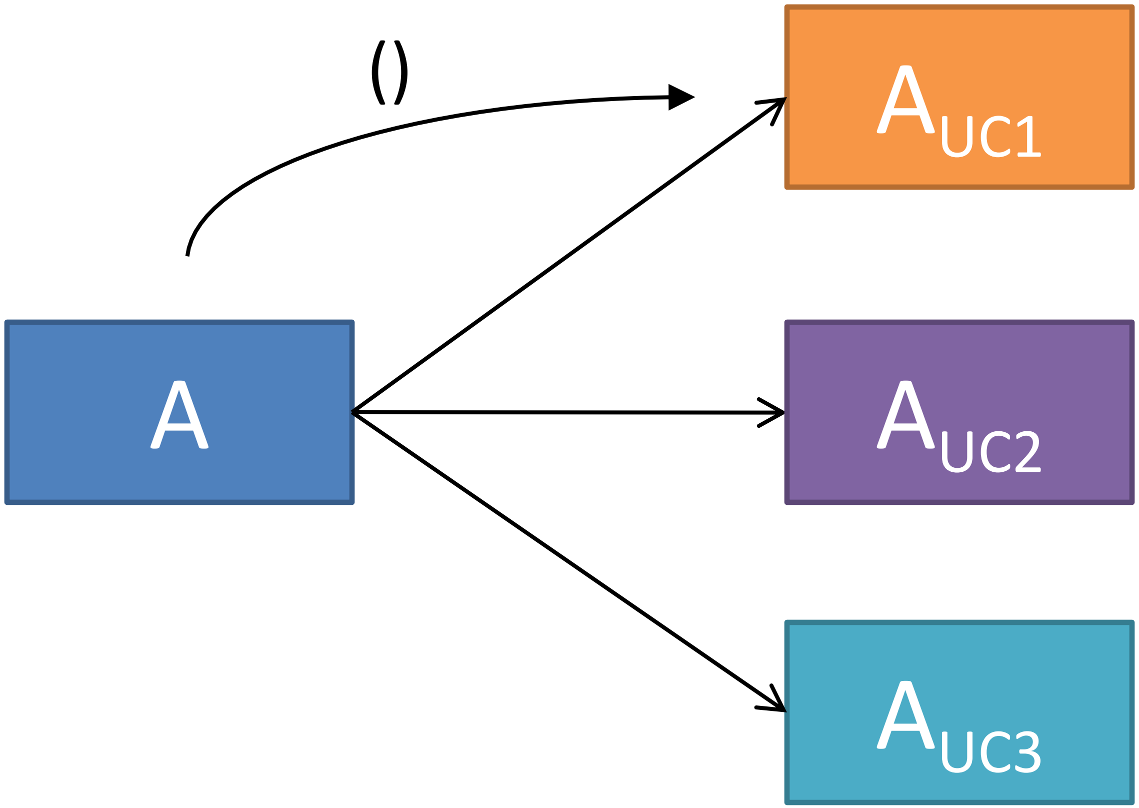

A
B
...
A_UC1
B_UC1
WTF_UC1

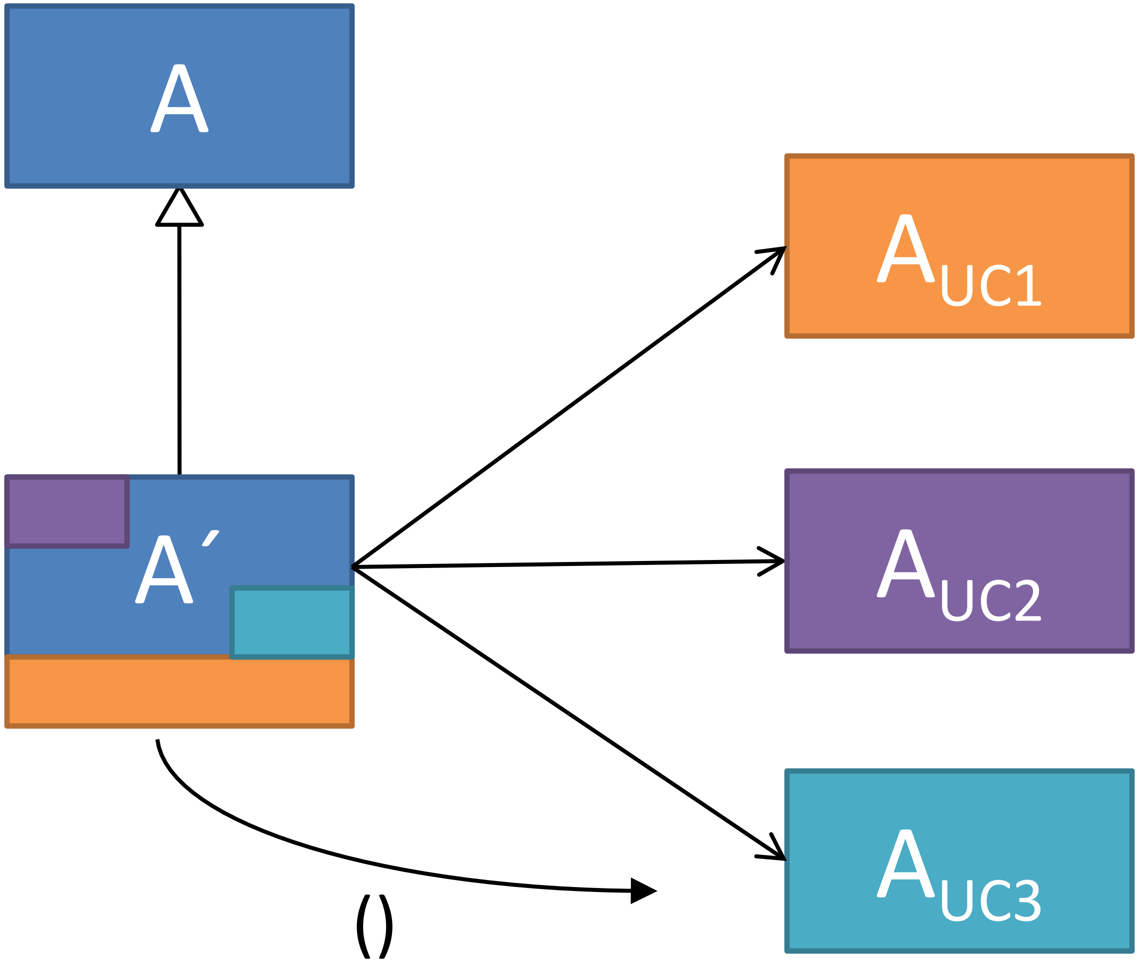
INHERITANCE IS NOT ENOUGH

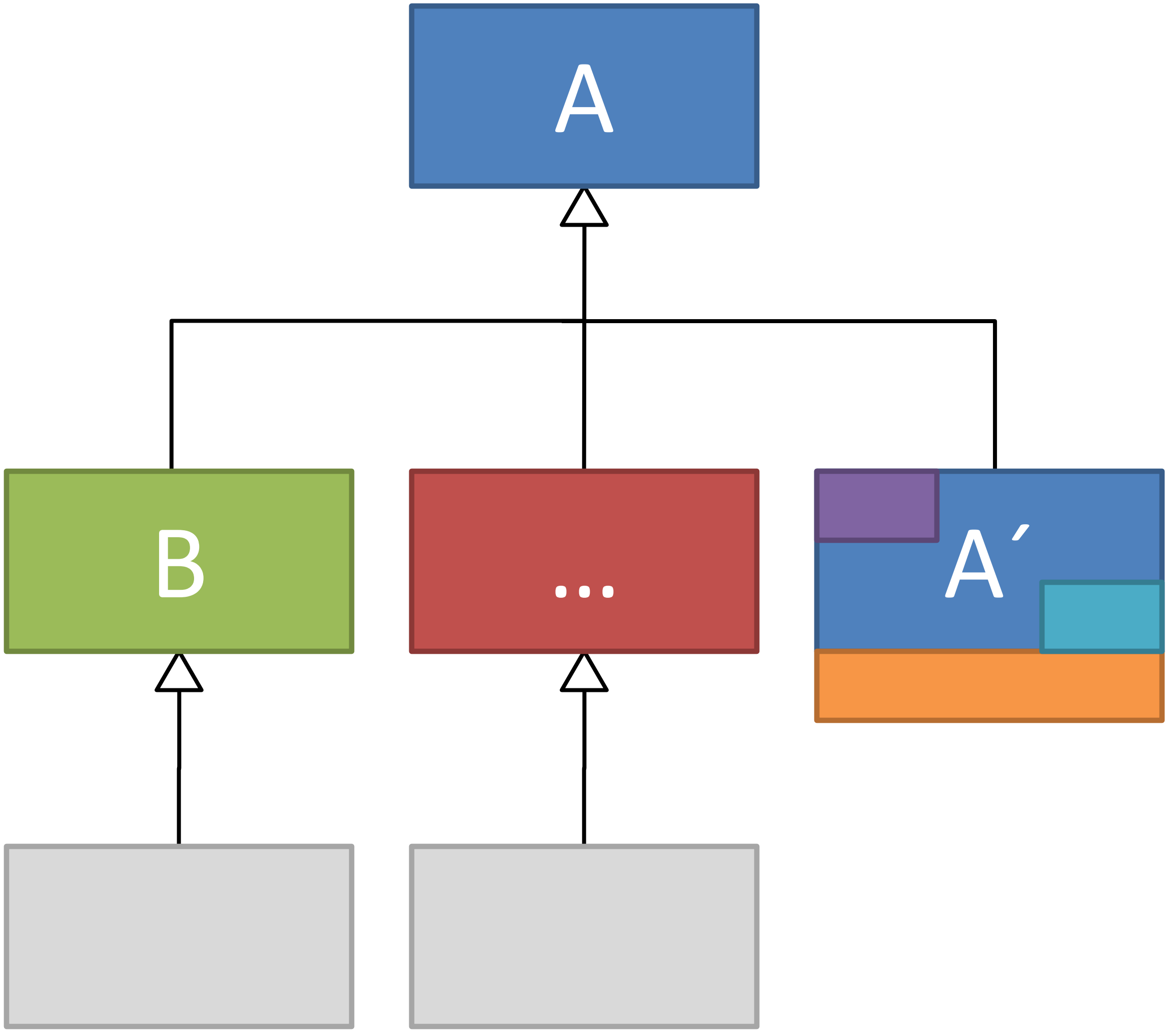
AOP

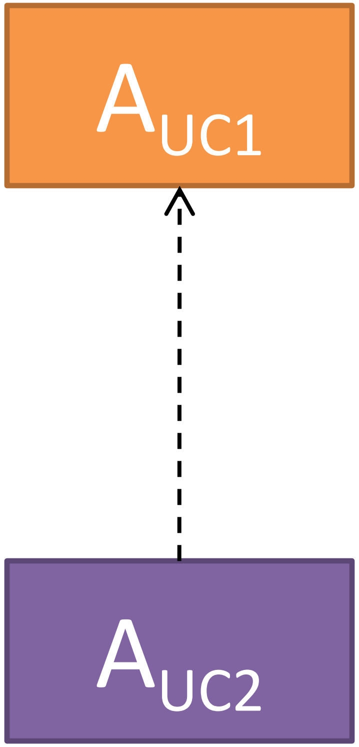
aspectj

OOP


()
A
A_UC1
A_UC2
A_UC3

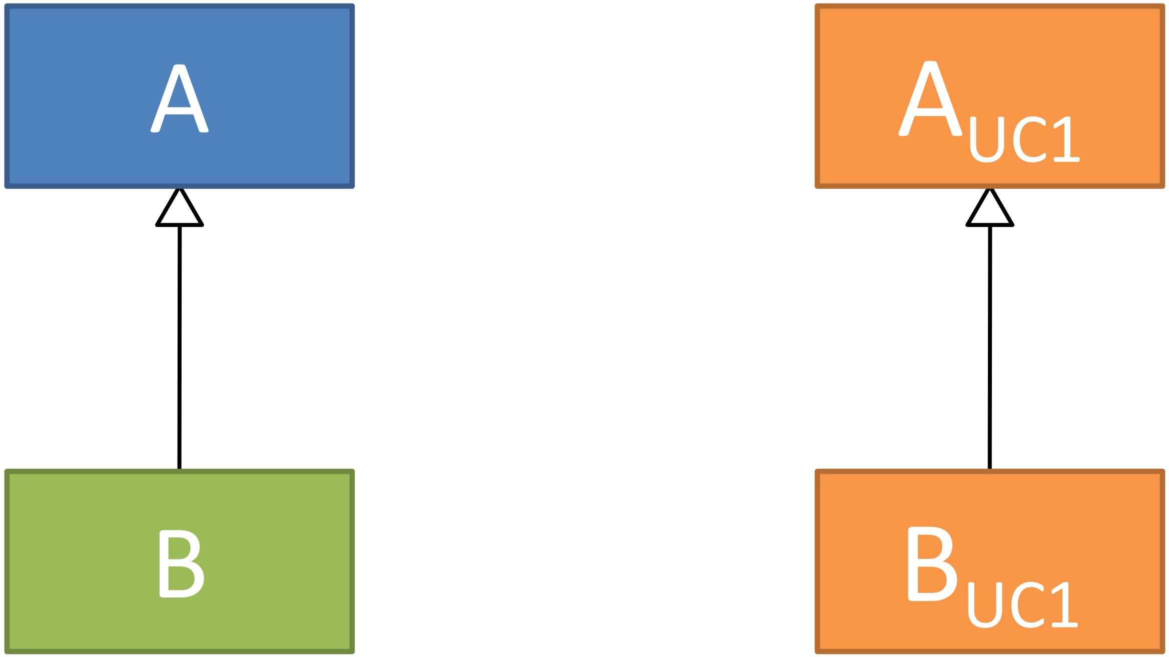

A
A´
A_UC1
A_UC2
A_UC3
()

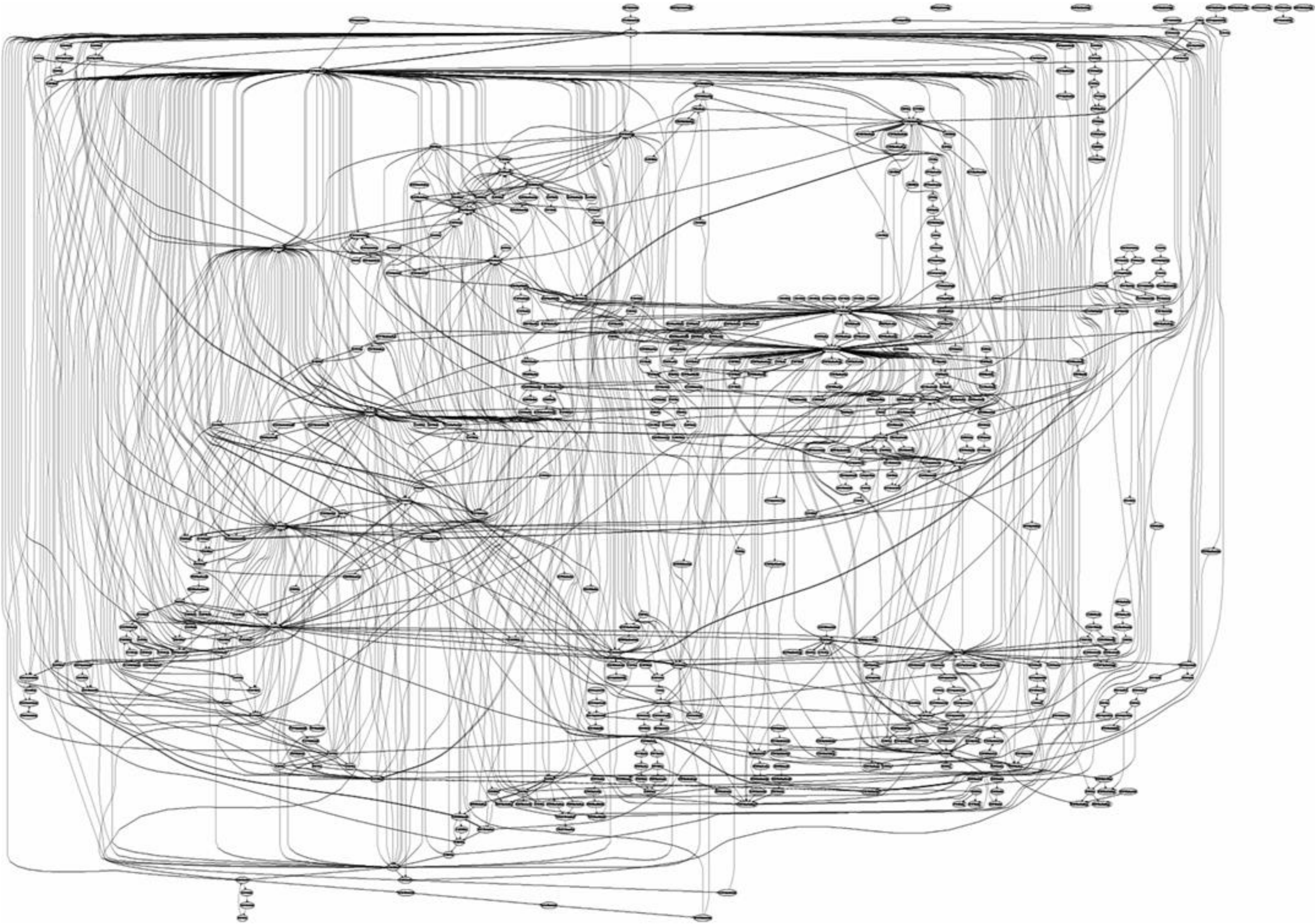

A
B
...
A´



A_{UC1}

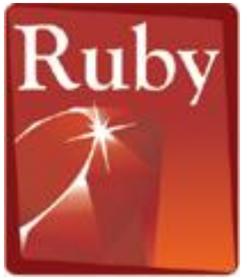
A_{UC2}

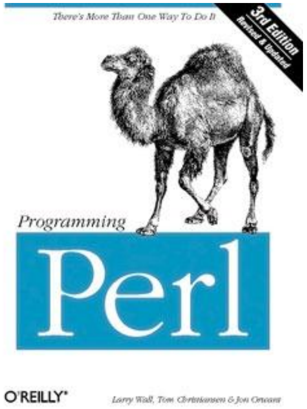

A
B
A_{UC1}
B_{UC1}



UNLESS …

[re:motion] mixins




There's More Than One Way To Do It

3rd Edition
Revised & Updated

Programming
Perl

O'REILLY®

Larry Wall, Tom Christiansen & Jon Orwant

C++

Newspeak

McDonald's
®

McFlurry is definitely a trademark of McDonald‘s Corporation.

+

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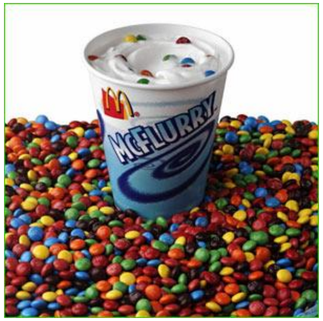
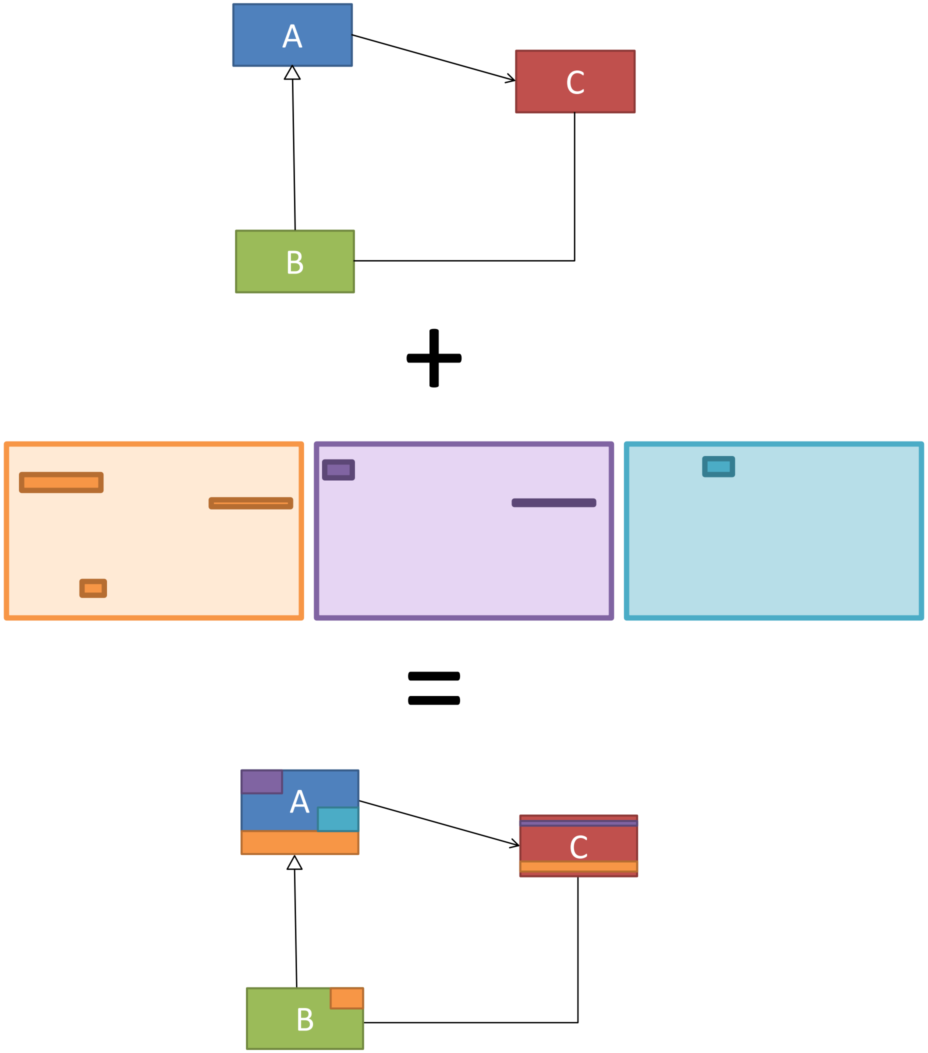
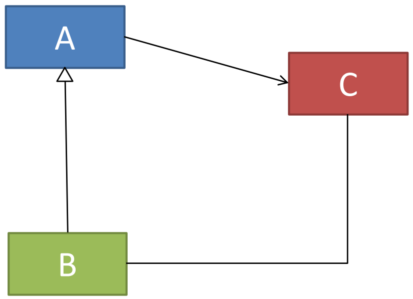

McFLURRY


A
C
B
A
C
B



+

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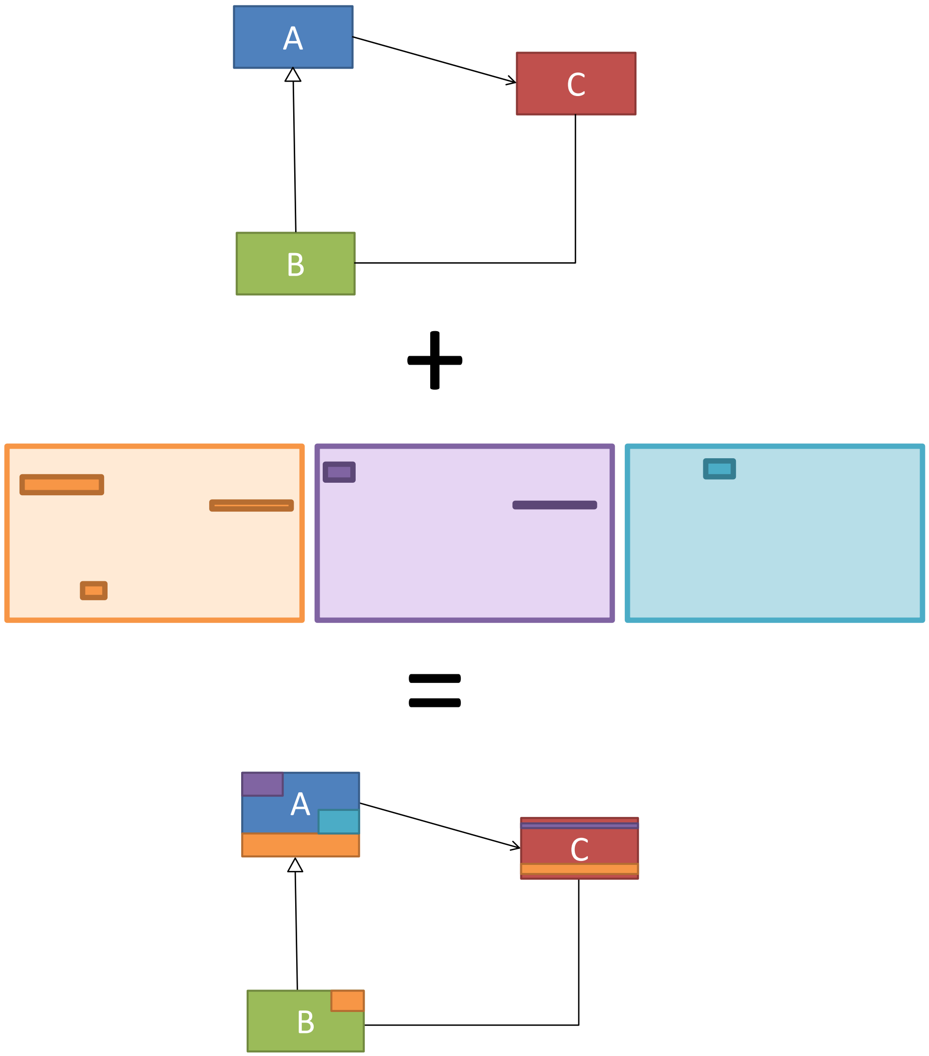
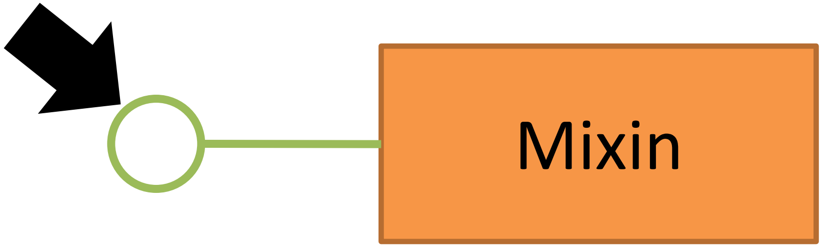
ΛCTΛ NOVΛ


A
C
B
A
C
B

USAGE?

Mixin

Add behavior:

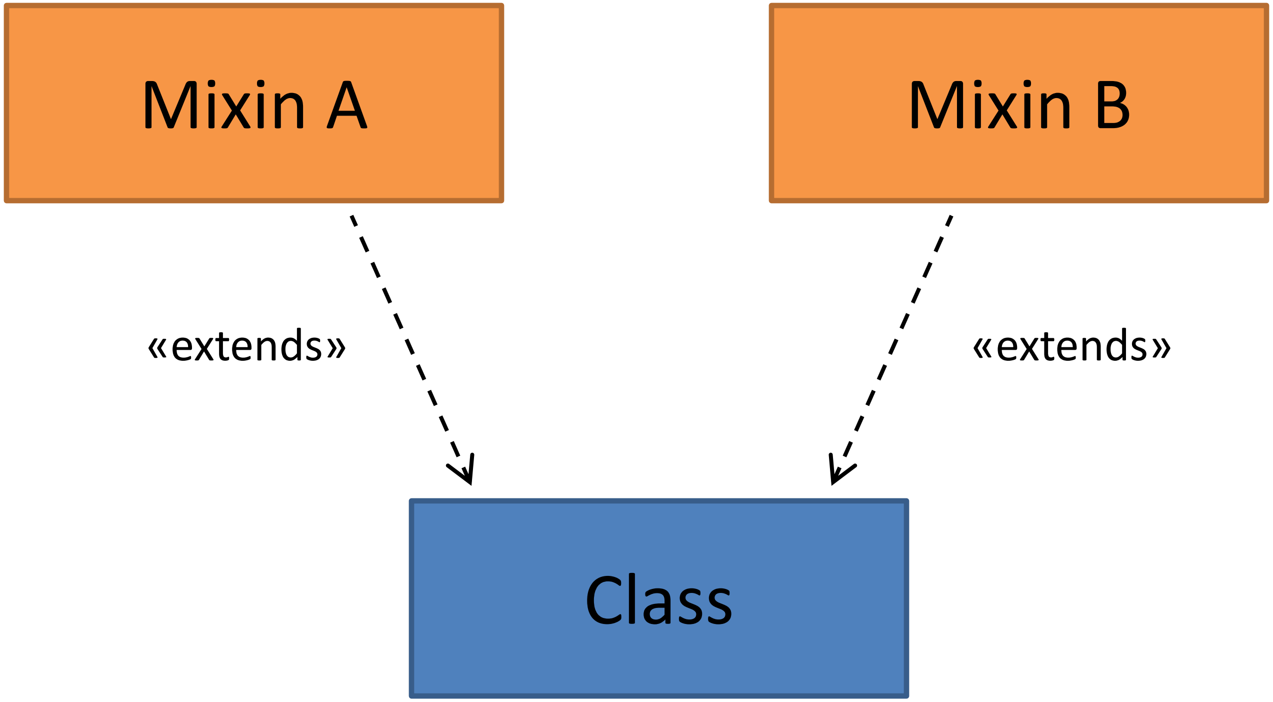


Change behavior:

Overrides

Language support?

(Hint!)



Mixin A

Mixin B

«extends»

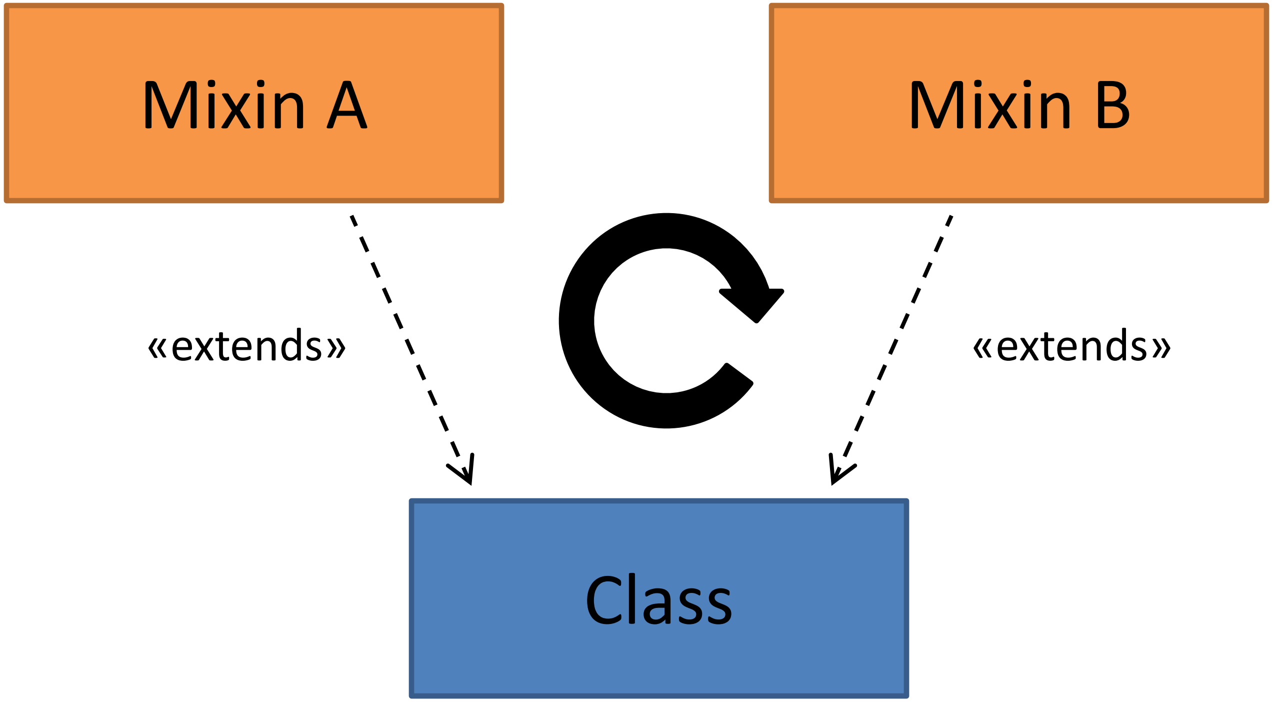
«extends»

Class

```
[Extends (typeof (Class))]
```

<mixins />

```
MixinConfiguration
   .ForClass<Class>()
   .AddMixin<Mixin>()
```



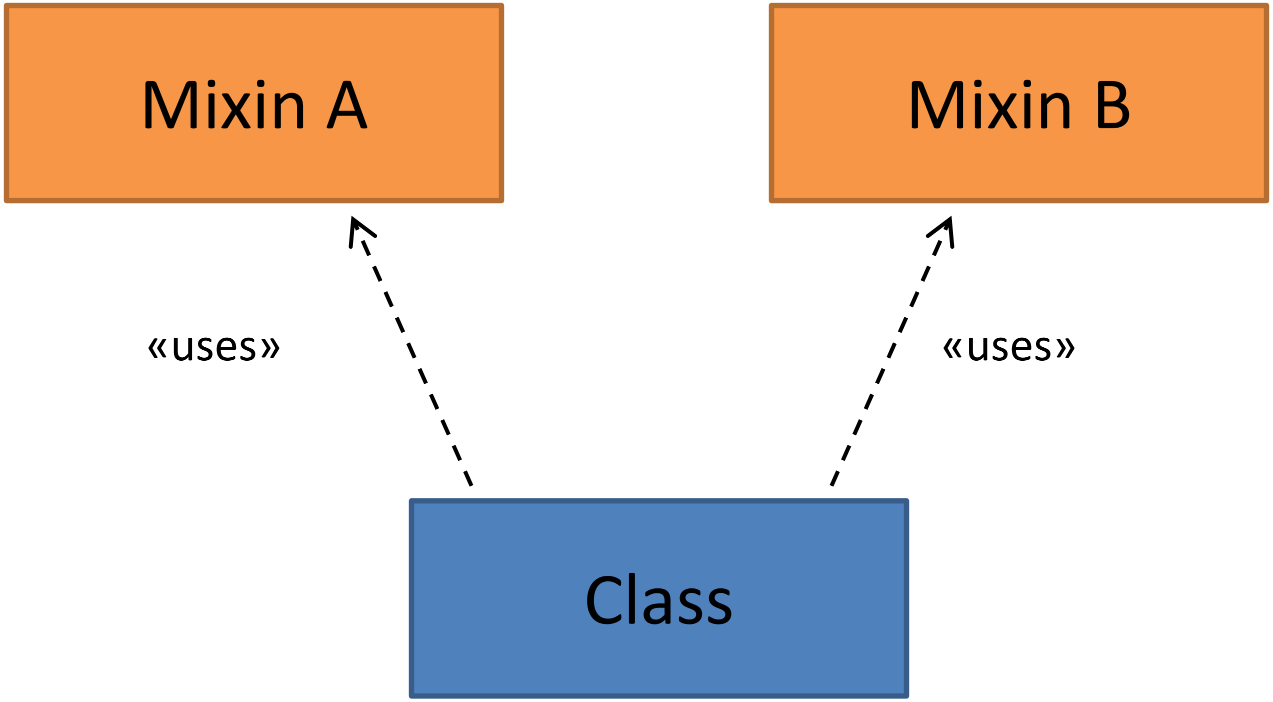
Mixin A

Mixin B

«extends»

«extends»

Class



Mixin A

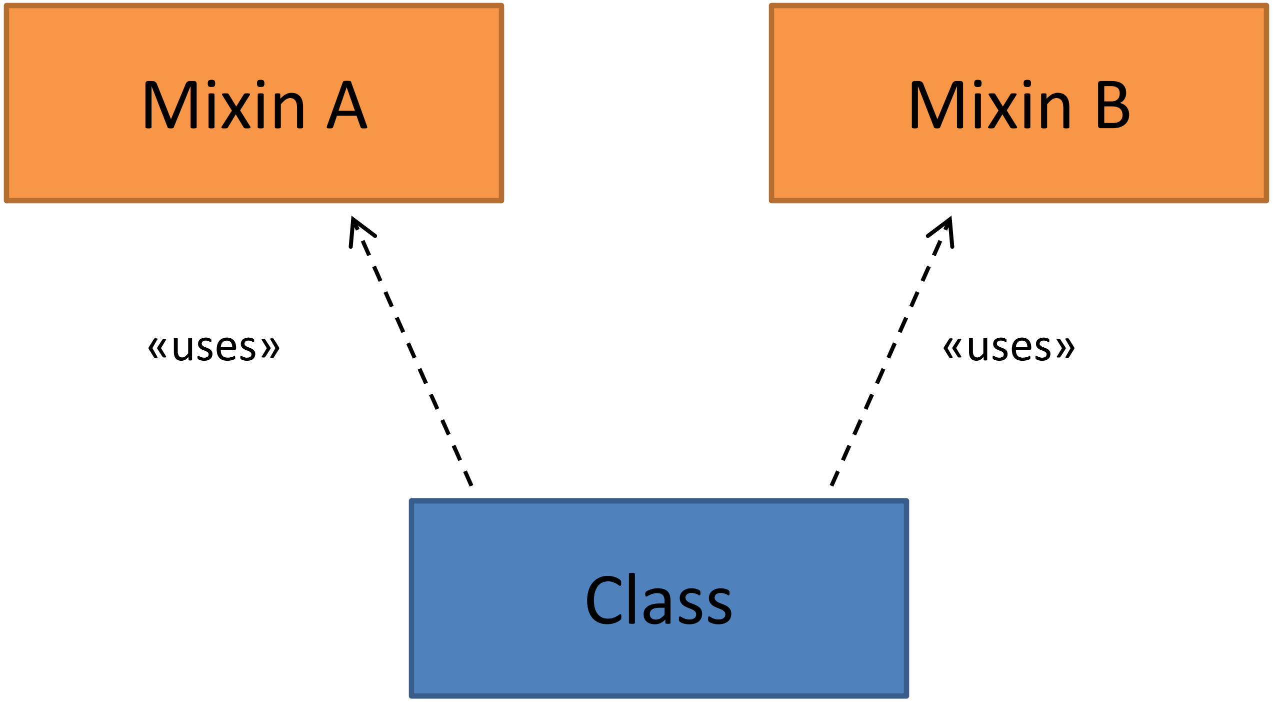
Mixin B

«uses»

«uses»

Class

```
[Uses(typeof (Mixin))]
```



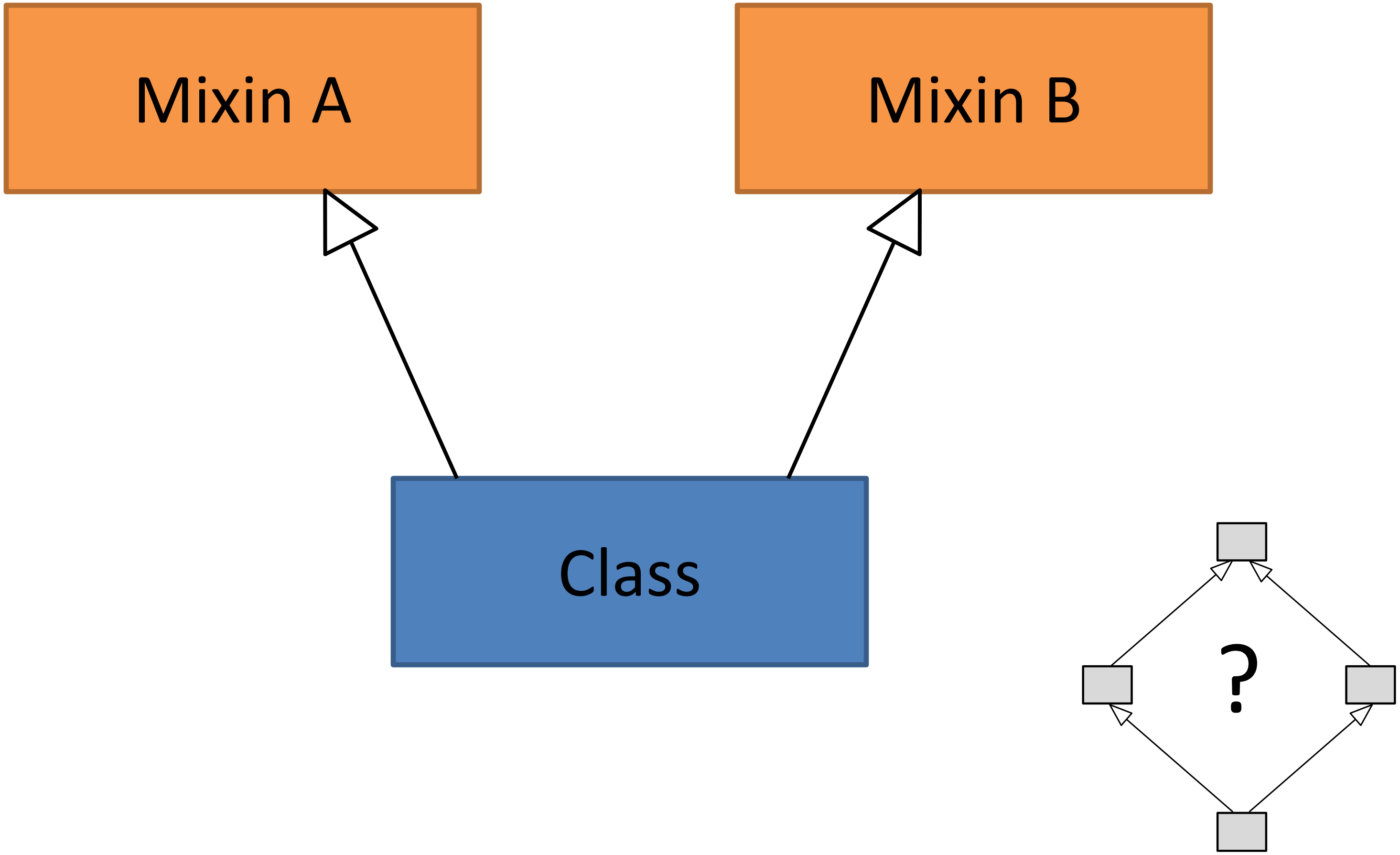
Mixin A

Mixin B

«uses»

«uses»

Class

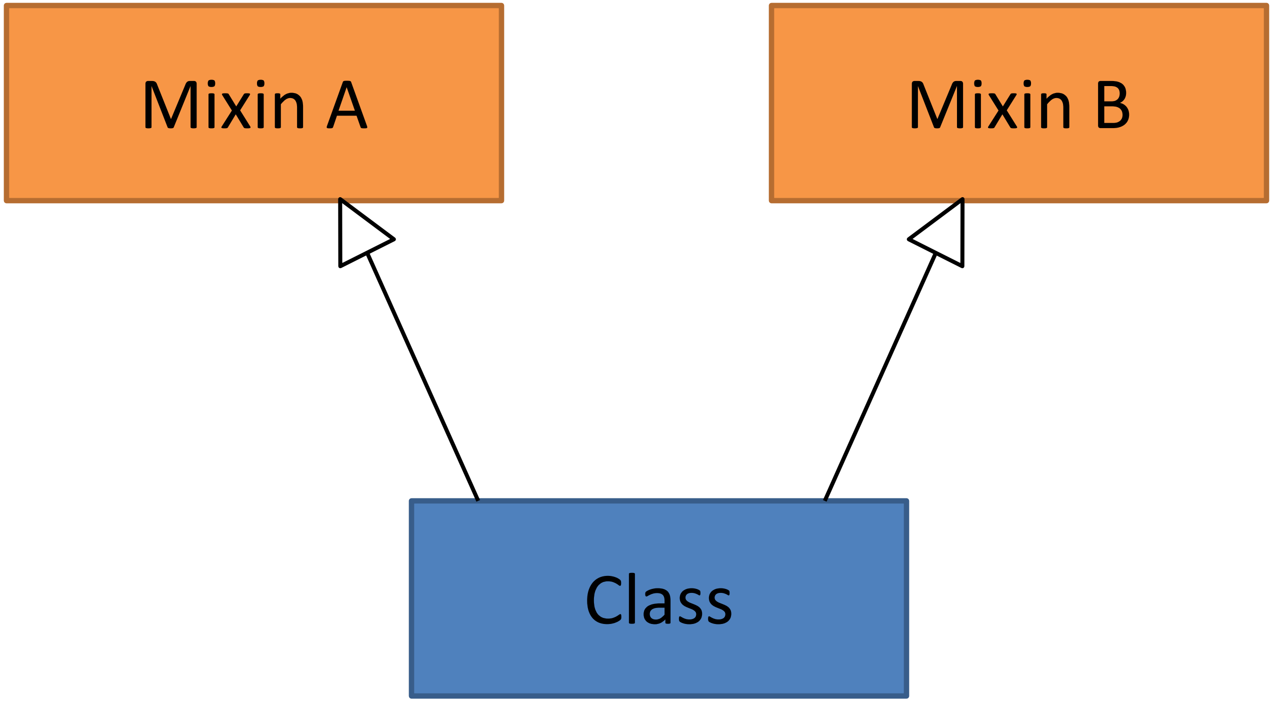


Mixin A

Mixin B

Class

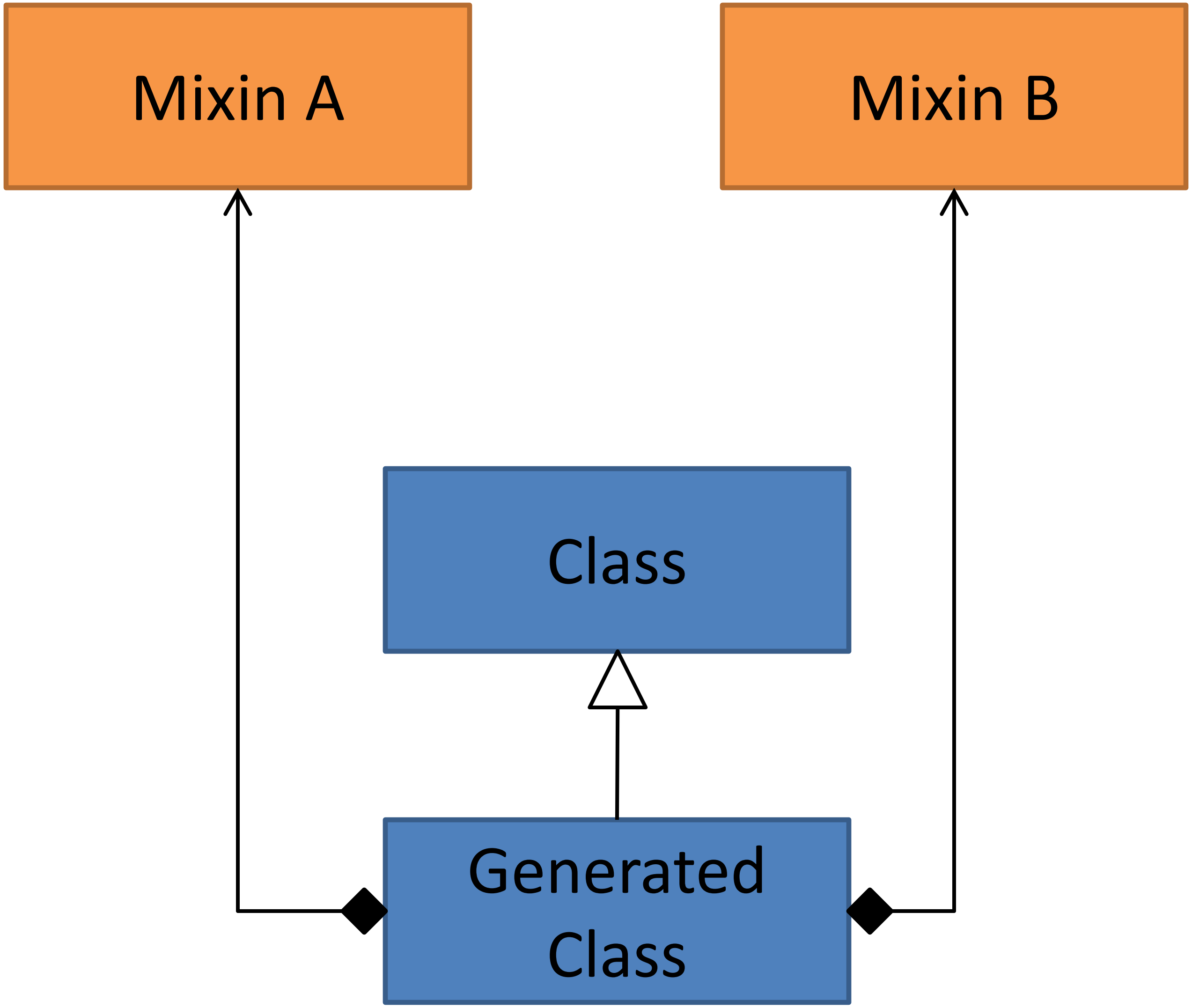
?

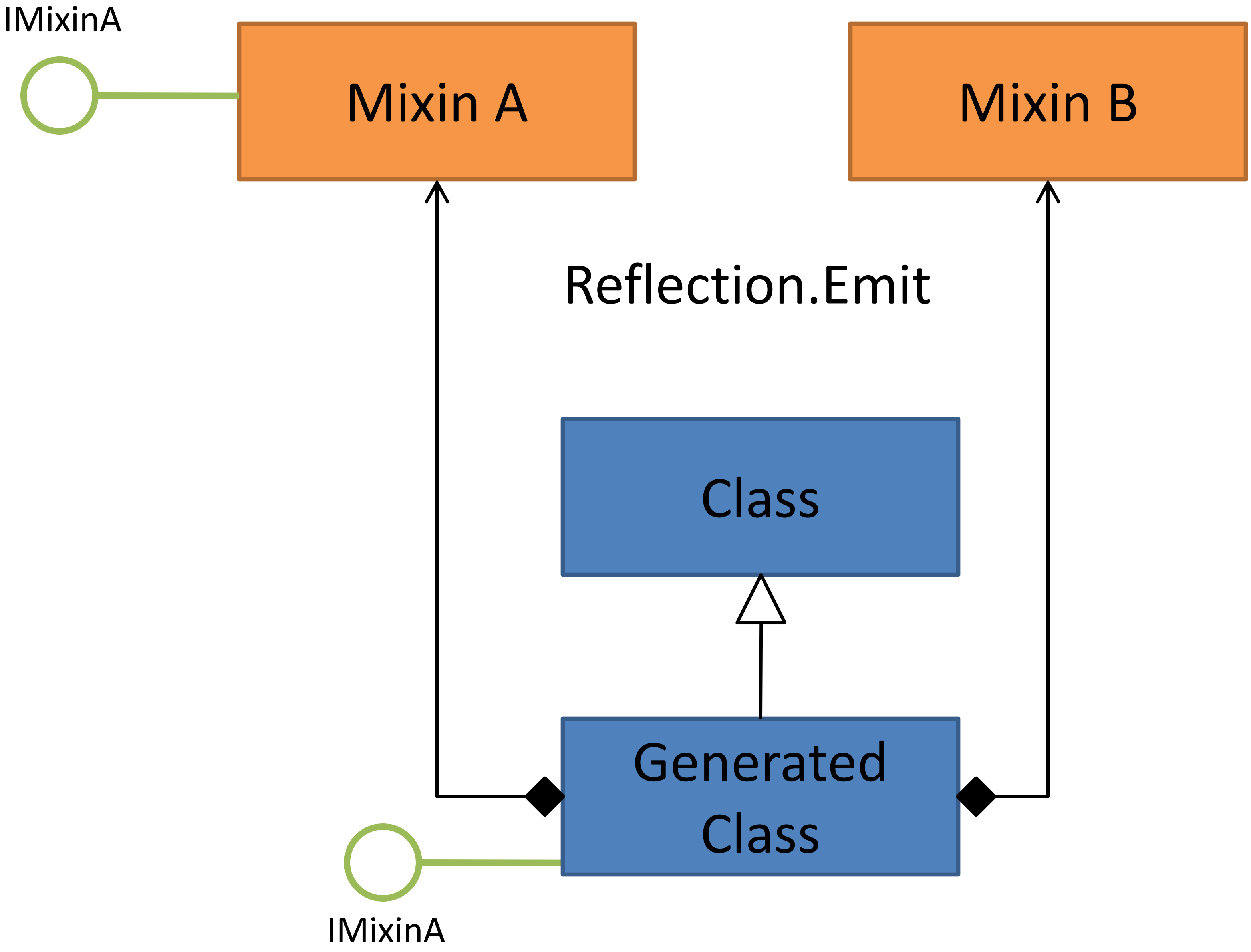


Mixin A

Mixin B

Class


Mixin A
Mixin B
Class
Generated Class



IMixinA

Mixin A

Mixin B

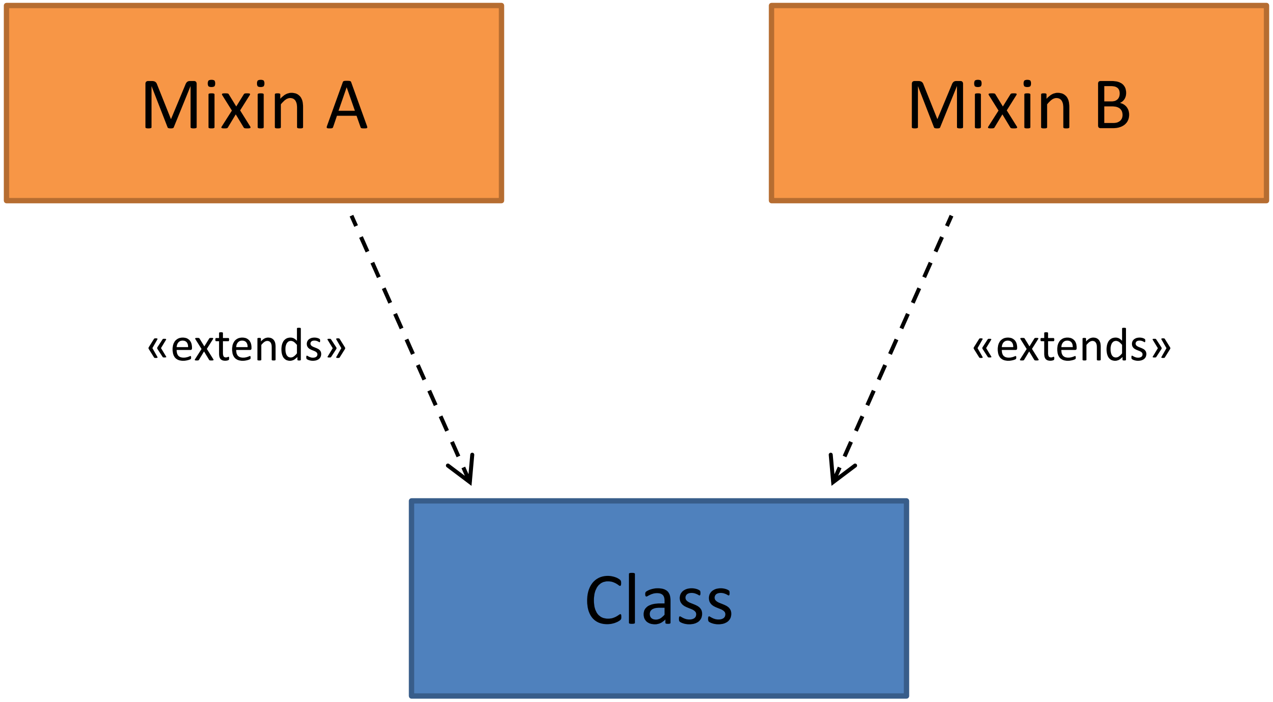
Reflection.Emit

Class

Generated Class

IMixinA

```
ObjectFactory.Create<Class>()
```



Mixin A

Mixin B

«extends»

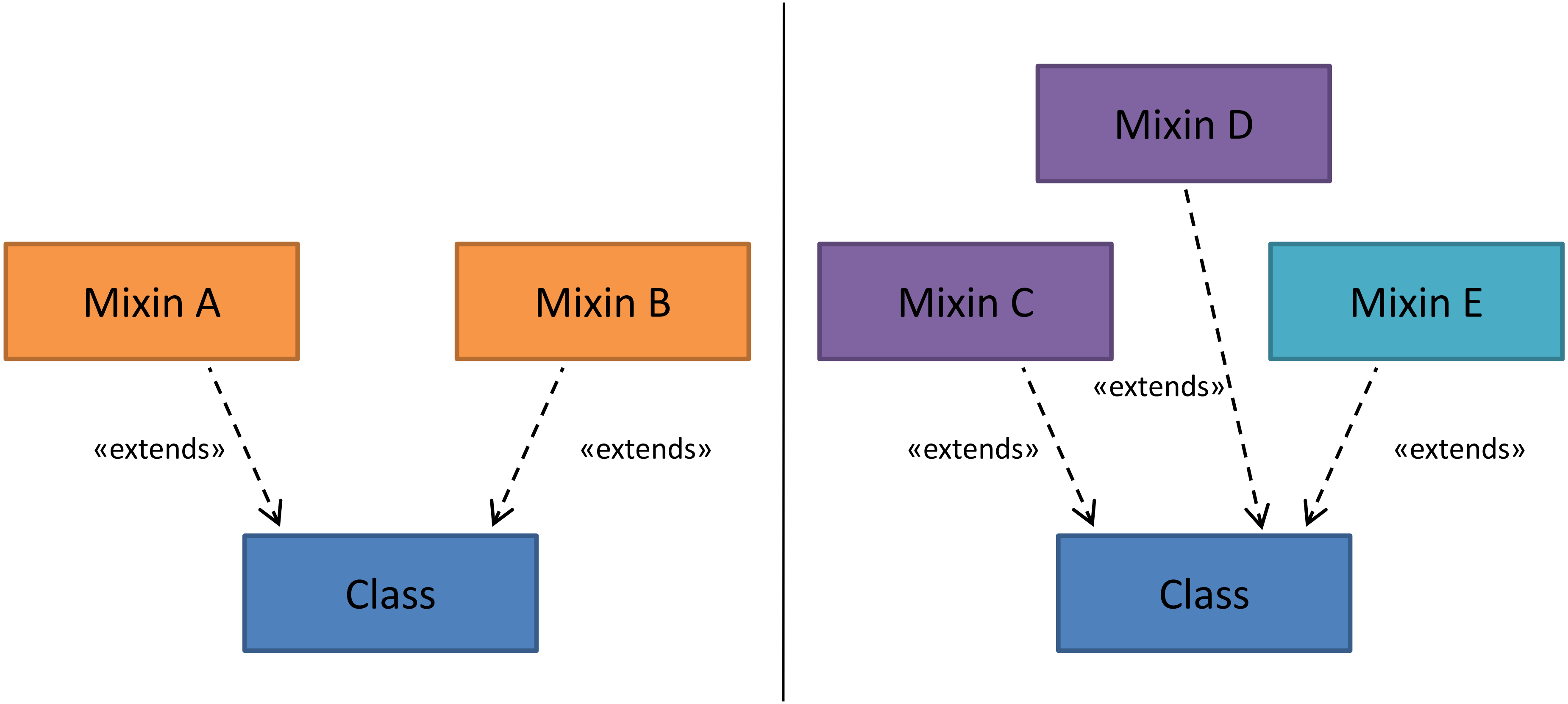
«extends»

Class

ACTA ● NOVA

ΛCTΛ • NOVΛ

ΛCTΛ • NOVΛ



Assemblies for deployment

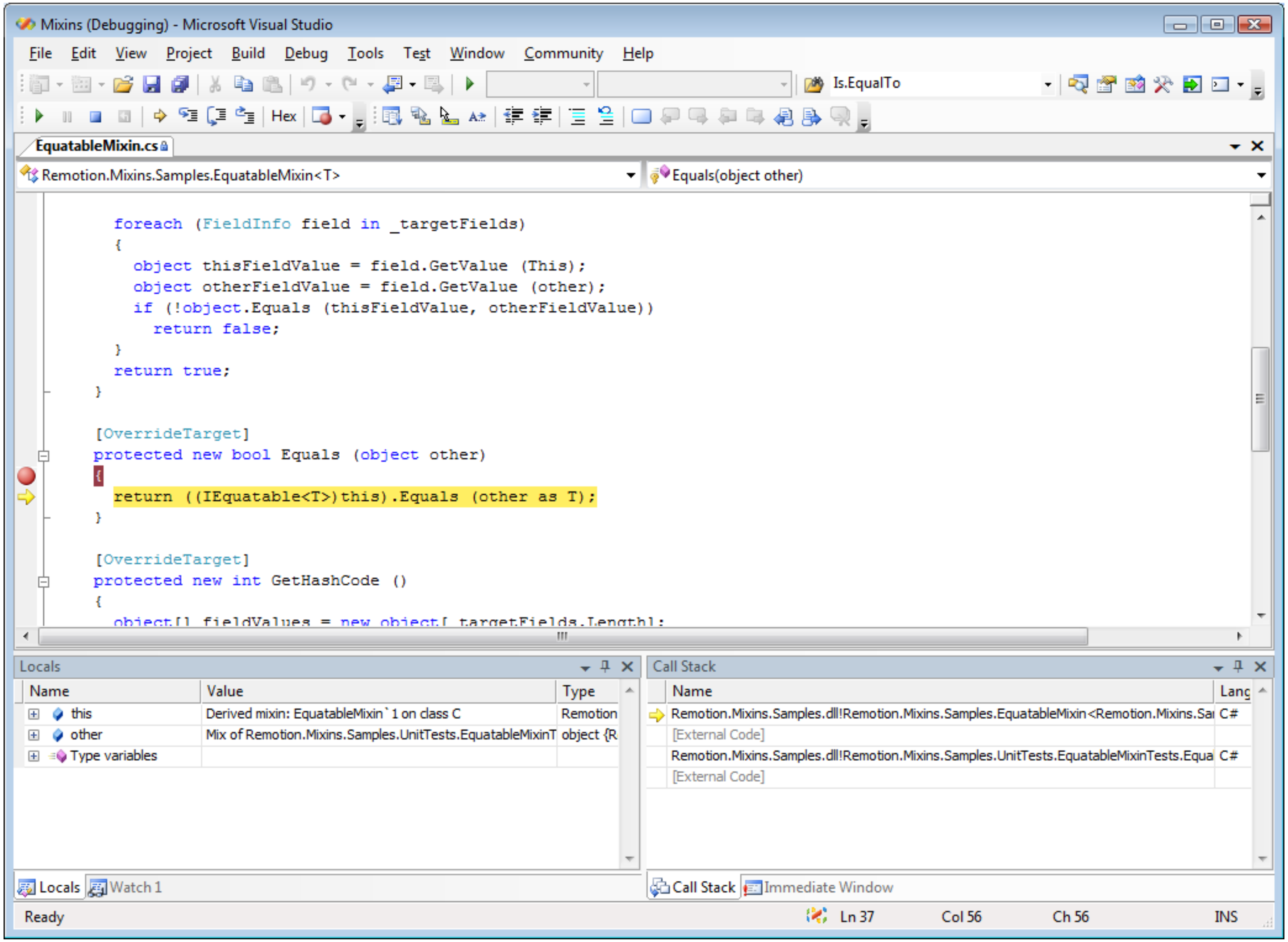
rubicon

Demo

Control over instantiation

Interfaces make things easier

Good performance


Mixins (Debugging) - Microsoft Visual Studio
File Edit View Project Build Debug Tools Test Window Community Help
Is.EqualTo
Hex
EquatableMixin.cs
Remotion.Mixins.Samples.EquatableMixin<T>
Equals(object other)

```
      foreach (FieldInfo field in _targetFields)
      {
        object thisFieldValue = field.GetValue (This);
        object otherFieldValue = field.GetValue (other);
        if (!object.Equals (thisFieldValue, otherFieldValue))
          return false;
      }
      return true;
    }

    [OverrideTarget]
    protected new bool Equals (object other)
    {
      return ((IEquatable<T>)this).Equals (other as T);
    }

    [OverrideTarget]
    protected new int GetHashCode ()
    {
      object[] fieldValues = new object[_targetFields.Length];
```

Locals

Name	Value	Type
⊞ this	Derived mixin: EquatableMixin`1 on class C	Remotion
⊞ other	Mix of Remotion.Mixins.Samples.UnitTests.EquatableMixinT	object {R
⊞ Type variables		

Call Stack

Name	Lang
Remotion.Mixins.Samples.dll!Remotion.Mixins.Samples.EquatableMixin<Remotion.Mixins.Sa	C#
[External Code]	
Remotion.Mixins.Samples.dll!Remotion.Mixins.Samples.UnitTests.EquatableMixinTests.Equa	C#
[External Code]	

Use responsibly!

[re:motion] mixins

[re:motion] mixins

Mixins for static languages on .NET

[re:motion] mixins

Avoid code duplication

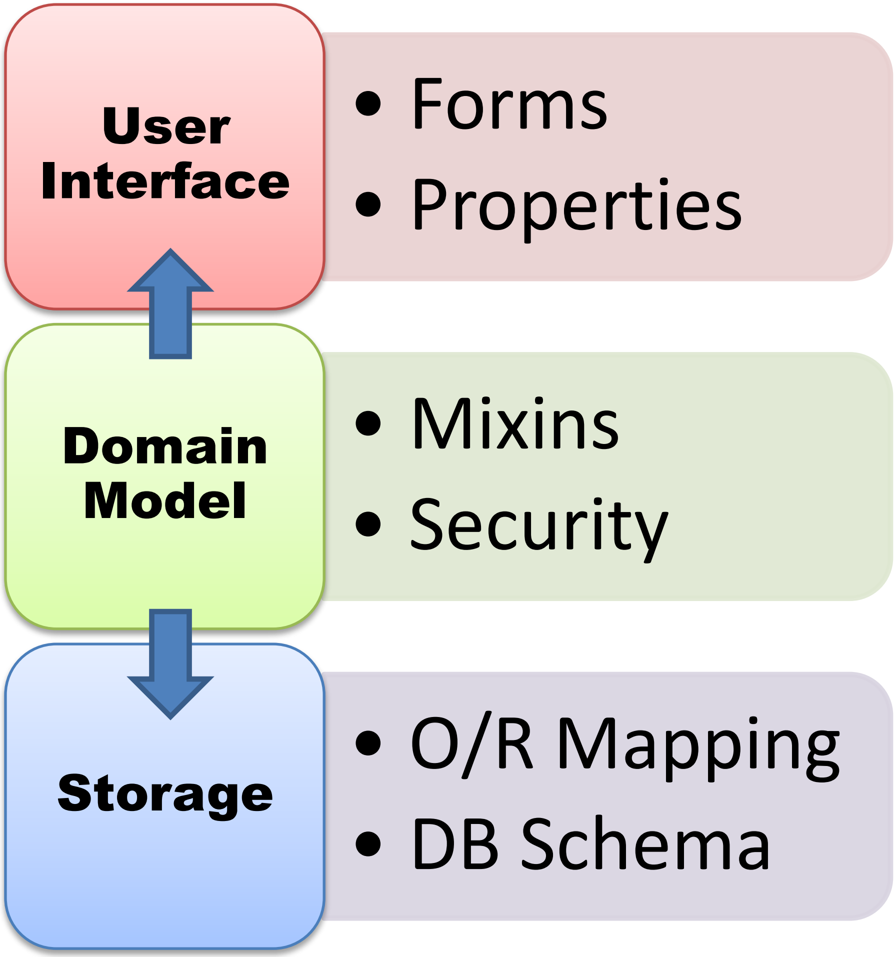
Product line development

General extensibility

[re:motion] mixins

Simple but powerful

[re:motion]



User Interface

- Forms
- Properties

Domain Model

- Mixins
- Security

Storage

- O/R Mapping
- DB Schema

[re:motion]

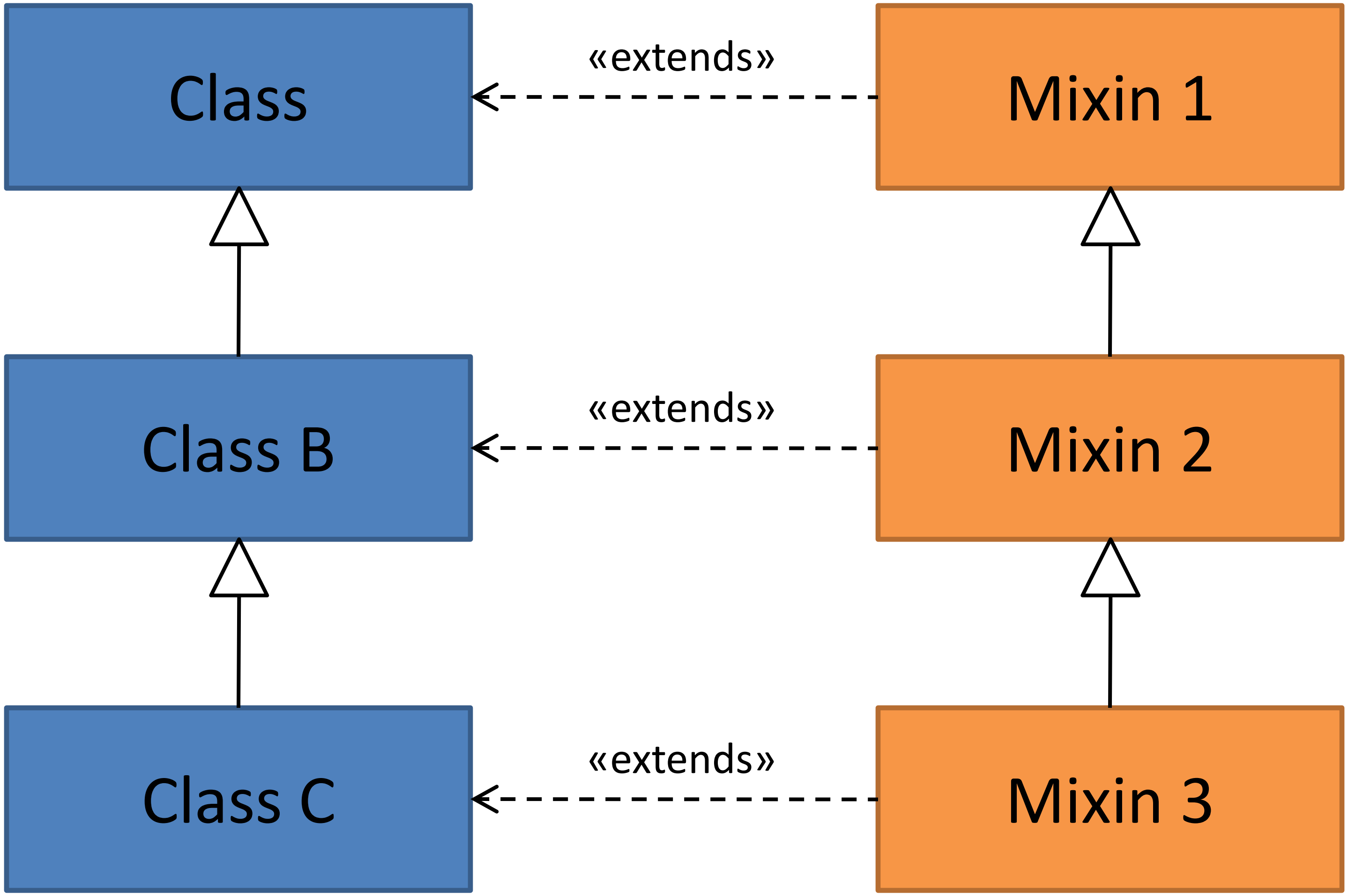
Open source
re-motion.org

stefan.wenig@rubicon.eu

fabian.schmied@rubicon.eu

```
public class LocalizationMixin : Mixin<object>
{
  [OverrideTarget]
  public new string ToString()
  {
    return Resources.GetString (Base.ToString());
  }
}
```

```
public class CloneableMixin : Mixin<object>, ICloneable
{
  public object Clone()
  {
    return Serializer.SerializeAndDeserialize (This);
  }
}
```



Class
«extends»
Mixin 1
Class B
«extends»
Mixin 2
Class C
«extends»
Mixin 3