Aspects for User Interfaces

Aspect-Oriented Programming by Example
• Founder and Principal Engineer of PostSharp (SharpCrafters).
• Msc. in mathematical engineering from Universite de Louvain, Belgium, 2001
• Resident in Czech Republic; father of 3.
• http://www.postsharp.org/blog
• gael@sharpcrafters.com
Software Developers hate writing the same code twice!
This is why we like WPF.
But it’s not enough!

Exception Handling

Data Binding

Undo/Redo

Caching

Threading

Disposing

Validation
There is a solution!
Aspects!

GUARANTEED WITHOUT THEORY
1. Exception Handling
2. Status Text
3. Thread Dispatching
4. Cache
5. Validation
6. Binding
7. Undo/Redo
8. Locking
9. Weak Dictionaries
Requirement

“Display my dialog box whenever an exception happens in an event handler.”

Demonstration

- OnExceptionAspect
- VS Add-In
- Result in Reflector
- Multicasting
Requirement

“Display a message in the status bar during long operations.”

Demonstration

- OnMethodBoundaryAspect
- Aspect parameters

Change Status Text
**Requirement**

“A pair of custom attributes telling the method to execute in the background or in the GUI thread”

**Demonstration**

- MethodInterceptionAspect
- Compile-Time Validation

**Thread Dispatching**
**Requirement**

“Same inputs, same outputs: don’t retrieve the same data twice”

**Demonstration**

- MethodInterceptionAspect
- Compile-Time Initialization
**Requirement**

“Validate my domain objects using regular expressions”

**Demonstration**

- LocationInterceptionAspect
- Runtime Initialization

**Validation**
Requirement

“Implement INotifyPropertyChanged automatically.”

Demonstration

- Complex Aspect with Instance Scope
- Import Member
- Introduce Members, Interface
- Advice, Method Pointcut
Requirement

“Record changes to the object model so that we can undo or redo.”

Demonstration

- Complex Aspects with Instance Scope
- Method Import
- Advice, Multicast Pointcut

Undo/Redo
Challenges

- Multithreaded Model / Singlethreaded View
- Model-View Binding
- Conflict Prevention → Object Status Tracking
- Object Uniqueness → Weak Dictionary
- ObjectDisposedException

A more realistic example
Available Technologies

- **Run-Time Frameworks**
  - **Products**
    - Spring.NET
    - Castle
    - Microsoft PIAB (Enterprise Library)
  - **Limitations**
    - Not usable on GUI objects!
    - Strong technological limitations

- **Build-Time Frameworks**
  - PostSharp
  - LinFu
• Talk prepared with PostSharp 2.0.1.733
• [http://www.postsharp.org/download](http://www.postsharp.org/download)
• All demonstrated samples are part of example project “SimpleContactManager” or “AdvancedContactManager”.

**Resources**
"That's all Folks!"

Cartoon Songs From
MERRIE MELODIES & LOONEY TUNES