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Exception Patterns

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.NET Application System Architecture

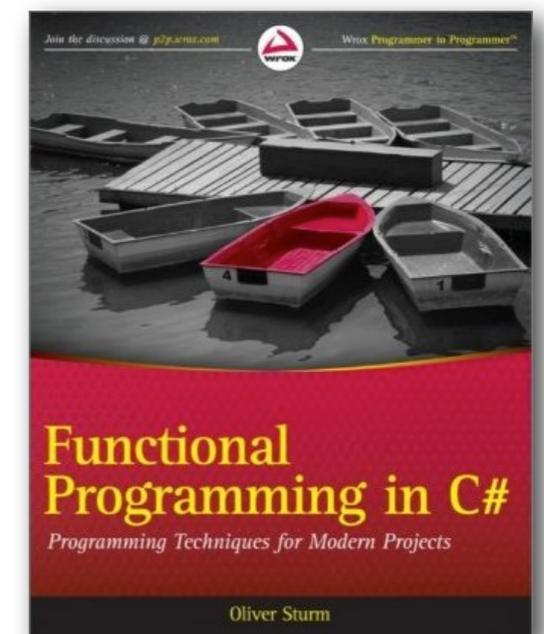
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Agenda

Technical Stuff

- Why exceptions?
- Catching exceptions
- Throwing exceptions
- Which types to use

The architectural side

- Guidelines and approaches
- Anti-patterns

Old Style: Return Codes

Cons:

- You had to define them
- You had to define them *all*
- Really no fun to do when function calls nest
- Technically difficult due to single return value
- In error conditions, they don't tell you very much

Pros:

- You had to define them
- You had to define them *all*

Throwing and Bubbling

Exceptions are objects that are “thrown”

They “bubble” up the call stack until they are “caught”

Language compilers enforce particular types for the exception objects themselves

Exception types carry lots of useful information about error conditions

- General stuff like the stack trace
- Specific info related to the problem at hand

Catching Exceptions

```
try {  
    // do something that may throw an exception  
    // ...  
}  
catch (Exception ex) {  
    // get here if an exception has been thrown  
    // in the block above - handle it using  
    // the 'ex' variable  
}
```

A 'finally' block

```
try {  
    // do something that may throw an exception  
    // ...  
}  
catch (Exception ex) {  
    // get here if an exception has been thrown  
    // in the block above - handle it using  
    // the 'ex' variable  
}  
finally {  
    // you come here in all cases, for instance  
    // to do cleanup work  
}
```

Demo

Catching exceptions
Using catch/finally
Bubbling in action

Exception Filters considered harmful!
Exceptions need compiler support

Throwing Exceptions

```
throw new SomeException("Error!");
```

Demo

Throwing exceptions

Which Exceptions to Use?

Standard exceptions:

- ArgumentException
- ArgumentNullException
- ArgumentOutOfRangeException
- InvalidOperationException
- Others from standard System.XXX namespaces, like FileNotFoundException, ...
- If it's there, you should use it - but read the description and see that it matches!
 - Example description of FileLoadException: “The exception that is thrown when a managed assembly is

Might want to use code contracts instead in .NET 4.0

Which Exceptions to Use?

Custom exceptions

- If there's no matching standard exception
- If there's a particular way of recovering from the error in question, so having a special type is useful
- If you have relevant additional information to supply
- Take care when implementing:
 - [Serializable] and ISerializable
 - Constructors
 - SecurityPermissions
 - Message and/or ToString overrides

Demo

Custom exceptions

Architectural Guidelines

Catch exceptions in one “place” in your application, on a high level, so that you catch everything

Accept that exceptions are exceptional. Don’t assume it makes sense to keep the app running.

- Being able to recover would make the unexpected expected, right?

Catching, logging and reporting exceptions flawlessly is a difficult task. Consider leaving it to experts.

Demo

Example:
Catching exceptions in a Windows Forms app

Anti-patterns

Throwing from helper methods

Using exceptions for flow control

Catching the wrong way

Catching and swallowing

Rethrowing the wrong way

Catching too much

Demo

Exception anti-patterns

Your own anti-patterns?

What are your experiences?

What do you see people do right or wrong with exceptions?

Summary

Exceptions are a powerful tool

Easy to use, easy to get wrong, easy to abuse

You should definitely use exceptions, but use them the right way!

Thank you!

Please feel free to contact me about the content anytime!

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