Fun with Enumerators

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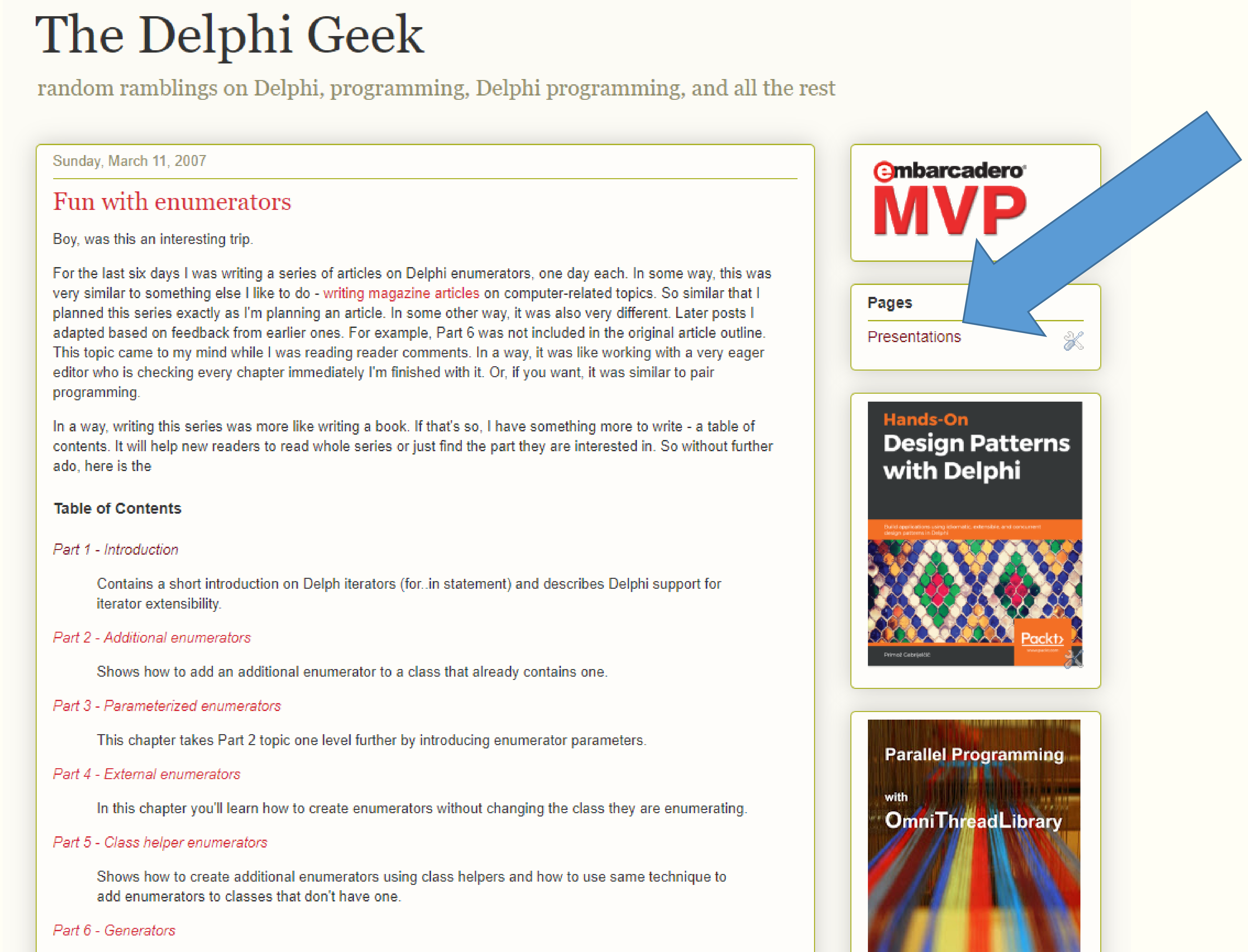
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The Delphi Geek

random ramblings on Delphi, programming, Delphi programming, and all the rest

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Fun with enumerators

Boy, was this an interesting trip.

For the last six days I was writing a series of articles on Delphi enumerators, one day each. In some way, this was very similar to something else I like to do - writing magazine articles on computer-related topics. So similar that I planned this series exactly as I'm planning an article. In some other way, it was also very different. Later posts I adapted based on feedback from earlier ones. For example, Part 6 was not included in the original article outline. This topic came to my mind while I was reading reader comments. In a way, it was like working with a very eager editor who is checking every chapter immediately I'm finished with it. Or, if you want, it was similar to pair programming.

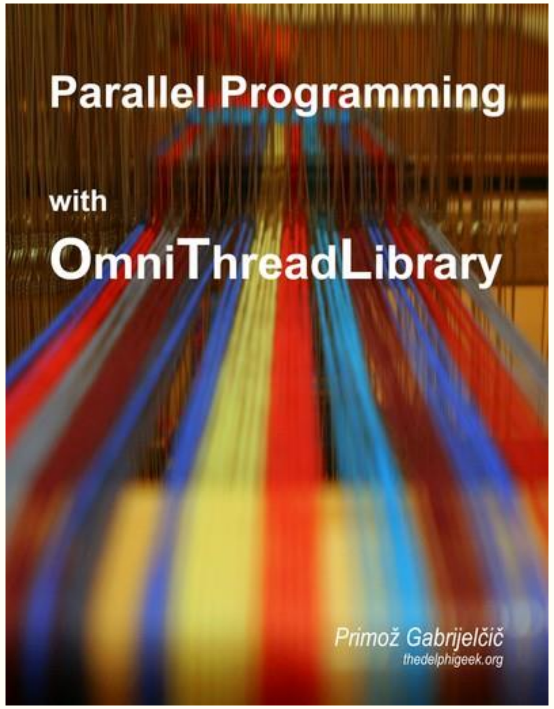
In a way, writing this series was more like writing a book. If that's so, I have something more to write - a table of contents. It will help new readers to read whole series or just find the part they are interested in. So without further ado, here is the

Table of Contents

Pages

Presentations

Books



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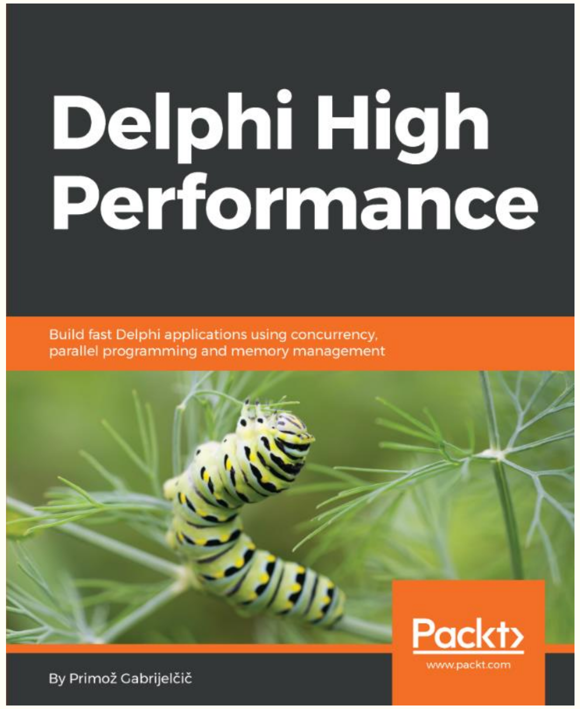
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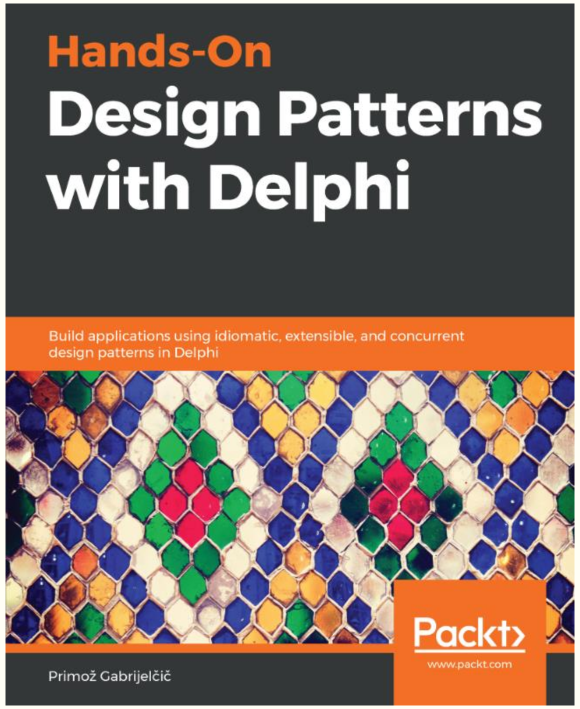
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Build applications using idiomatic, extensible, and concurrent design patterns in Delphi
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More books

- **Delphi Programming Projects** by William Duarte
- **The Complete Guide to RAD Server** by David Intersimone
- **Delphi Cookbook** - Third Edition by Daniele Spinetti and Daniele Teti
- **Delphi Memory Management For Classic And ARC Compilers** by Dalija Prasnikar
- **Expert Delphi** by Paweł Głowacki
- **Coding in Delphi**, **More Coding in Delphi**, **Dependency Injection in Delphi** by Nick Hodges
- **Delphi XE2 Foundations** by Chris Rolliston
- **Delphi Succinctly** by Marco Breveglieri

- http://glooscapsoftware.blogspot.com

Enumerators

For-in

- **for [var]** *element* **in** *collection* **do**
- *Iterator pattern*

- *collection* = set
  string
  array
  “collection”

- *element* = readonly!

Collection enumeration

- Class/interface/record: T
  - public function GetEnumerator(): E
- E: class/interface/record
  - public function MoveNext(): boolean
  - public property Current: V, readonly
  - ~~function GetCurrent: V~~

```
var collection: T;
for var element: E in collection do
  DoSomething(element);
```

Hidden implementation

```
var collection: T;


for var element: E in collection do
  DoSomething(element);
```

```
var collection: T;

var element: E;
var enum := T.GetEnumerator;

while enum.MoveNext do
  DoSomething(enum.Current);

enum.Free; // if required
```

RTL

- System.Classes.TList
- System.Classes.TCollection
- System.Classes.TStrings
- System.Classes.TInterfaceList
- System.Classes.TComponent
- Vcl.Menus.TMenuItem
- Vcl.ActnList.TCustomActionList
- Vcl.ComCtrls.TListItems
- Vcl.ComCtrls.TTreeNodes
- Vcl.ComCtrls.TToolBar
- Data.DB.TFields
- Data.DB.TDataSet

Access to private data

- Enumerator needs access to private data!

- Possible solutions
  - Enumerator “knows” about internal implementation ☹
  - Enumerator = internal class/interface/record ☺
  - Enumerator = collection itself ☺
    - Interfaces/records only!

Multiple iterators

- X = class/record
    - GetEnumerator(): XEnumerator
    - AnotherEnumerator(): AnotherFactory

- AnotherFactory = record
    - GetEnumerator(): AnotherEnumerator

- TDictionary<K,V>
    - .Keys
    - .Values

Reusing enumerators

- GetEnumerator returns existing enumerator

Creative use

- Chaining enumerators
  - Spring4D
  - .Skip(3).Take(10).Reverse
- Enumerating external entities
  - Files
  - Network interfaces
  - …
- Enumerating without data
  - Enumerator as a factory

Enumerators “on the budget”

- For..in works on arrays, so…
- …just return TArray<T>
    - Slower, but simpler

Q&A