HACKERU

Advanced .NET with C#

BT104

40
Academic Hours

Advanced .NET with C#

Outline

The .NET platform is everywhere, not just on desktop but on mobile and web. The C# language is evolving rapidly thanks to the .NET Compiler Platform ("Roslyn"). Developers need to learn and adapt quickly to the evolving ecosystem. This course provides experienced C# developers with a deeper understanding of the CLR and the .NET platform, while utilizing advanced features of the platform. The course includes hands-on lab exercises to make learning more concrete.

Target Audience

Experienced .NET/C# Programmers

Prerequisites

At least one year developing with C# in .NET 3.5+

Objectives

- Gain a deeper understanding of the .NET platform and the CLR
- Use threading and parallel execution mechanisms effectively
- Use features in the latest C# versions (5.0, 6.0, 7.x) effectively
- Understand how the garbage collector works and manage memory correctly
- Use LINQ features effectively

Content

Module 01

Reflection

- Types at runtime
- Metadata and Reflection
- Obtaining type information
- Dynamic invocation
- Custom attributes
- Introduction to the Managed Extensibility Framework (MEF)
- Summary

Module 02

Generics

- The need for Generics
- Boxing and Unboxing
- Generic Types
- Generic Methods
- Generic Constraints
- Generic Collections
- Generic Interfaces
- Generic Variance (C# 4)
- Summary

Module 03

Delegates, Events and Lambdas

- Delegate Basics
- Delegate Internals
- Generic delegates
- Anonymous delegates and closures
- Lambda Expressions
- Summary

Module 04

C# 3.0 and LINQ

- Partial types and partial methods
- Iterators
- Expression Trees
- C# 3.0 basic features
- Language Integrated Query
- LINQ to XML
- LINQ to Entities
- Summary

Module 05

Resource Management

- CLR Memory management
- Object creation and destruction
- How the GC Works
- Finalizers
- The Dispose Pattern
- Controlling GC
- The Large Object Heap
- Monitoring Memory
- Best Practices
- Summary

Module 06

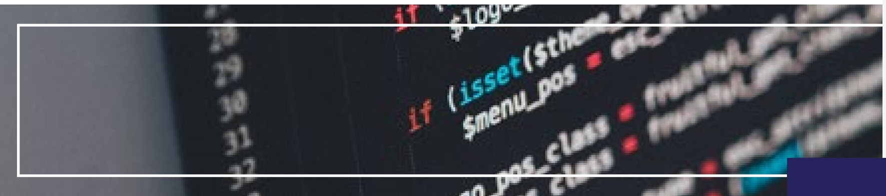
Processes, Thread and AppDomains

- Windows Process
- Windows Thread
- CLR AppDomains
- Assemblies and AppDomains
- Crossing AppDomains
- Summary

Module 07

Threading and Synchronization

- Native vs. Managed Threads
- Thread Creation and Control
- Thread Synchronization
- Thread Local Storage
- Kernel Object Synchronization
- The Thread Pool
- Summary



Module 08

Parallel & Asynchronous Programming

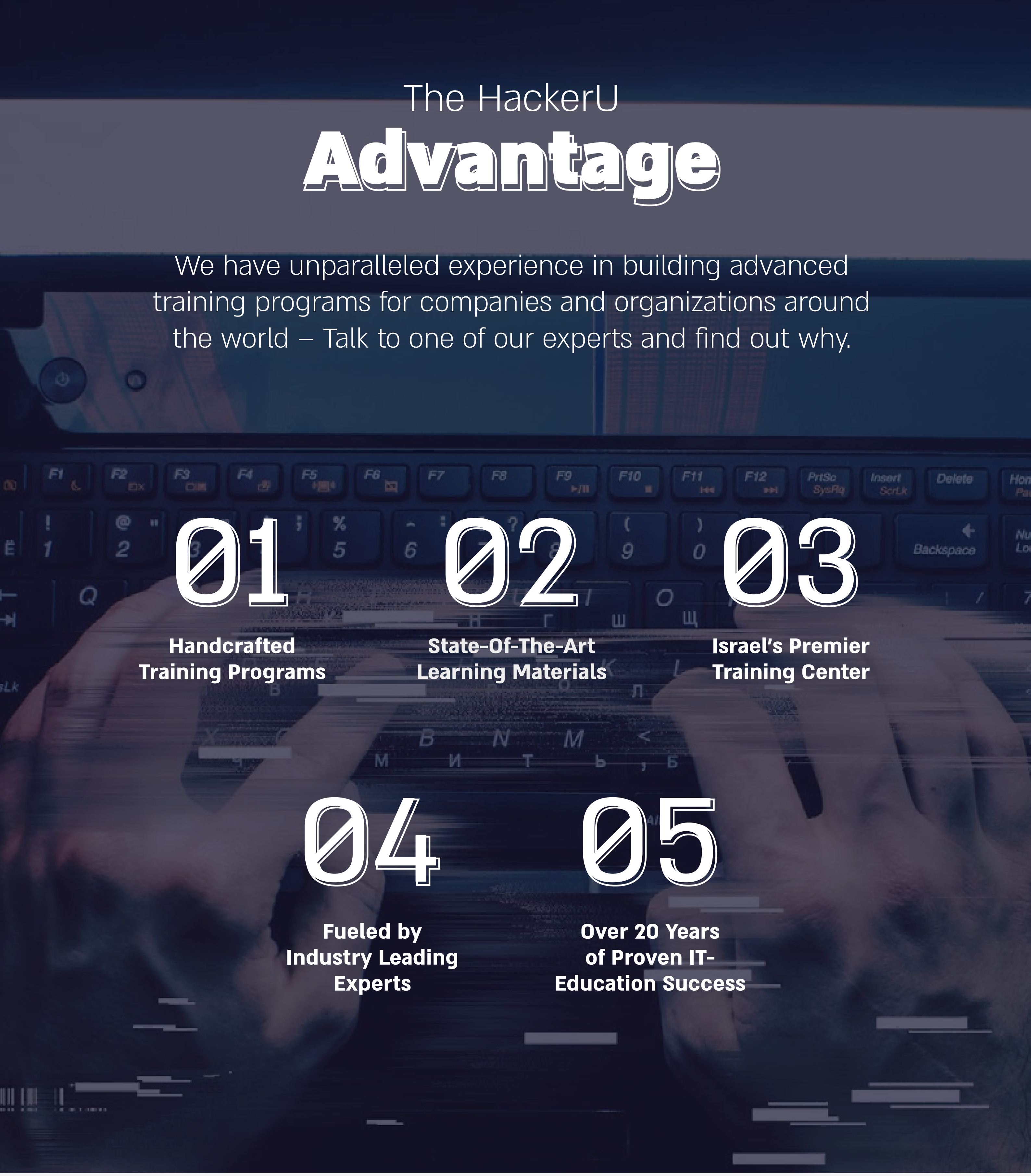
- Introduction to Tasks
- Tasks vs. Threads
- Working with Tasks
- Task Schedulers
- The Parallel Class
- Parallel LINQ
- Concurrent Collections
- Asynchronous Calls
- Async Patterns in .NET
- Using C# 5.0 for asynchrony
- Summary

Module 09

C# 6.0 and C# 7.x

- C# Evolution
- The .NET Compiler Platform
- C# 6.0 Useful features
- C# 7.x Useful features
- What's expected in C# 8.0?
- Summary

> “Build **effective multithreading** applications”



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