Slide 1

Object-oriented programming

Object-oriented programming #7-2
What's next

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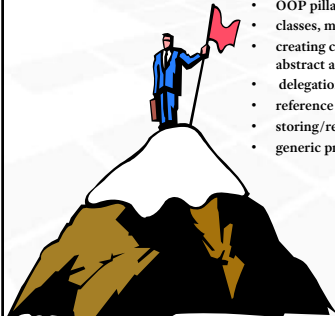**e-mail: Wojciech.Complak@wsb.poznan.pl**

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Slide 2

Object-oriented programming

Summary

- object-oriented programming using the C# programming language
- OOP pillars: abstraction, encapsulation, polymorphism,
- classes, members: fields, methods, properties,
- creating class hierarchy, inheritance models "is-a", "has-a", abstract and final (sealed) classes,
- delegations, events, interfaces, operators, converters,
- reference (classes) and value types (structures),
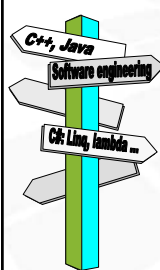- storing/restoring state (serialisation),
- generic programming

Object-oriented programming (2/8)

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Slide 3

Object-oriented programming

What to invest in …

- other object-oriented programming languages:
  - *Java* – very popular general-purpose programming language, 1. place in TIOBE index,
  - *C++* - ancestor of languages such as Java or C #, continually extended, supported on many platforms, numerous libraries available; stable popularity
  - *Python* – multi-paradigm interpreted language gradually gaining popularity, enables the creation of concise programs both large and small scale,
  - *Visual Basic .Net* – extension of Visual Basic/Basic languages, similar capabilities to the C# language with different syntax, the second most popular language in the .NET platform,
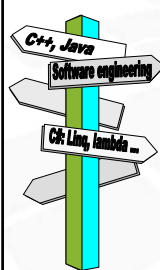
Object-oriented programming (3/8)
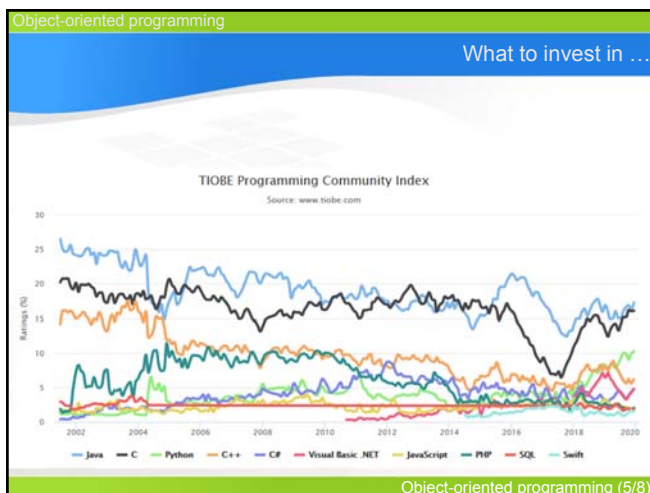
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Slide 4

Object-oriented programming

What to invest in …

Dec 2019	Dec 2018	Change	Programming Language	Ratings	Change
1	1		Java	17.253%	+1.32%
2	2		C	16.086%	+1.93%
3	3		Python	10.308%	+1.93%
4	4		C++	6.196%	-1.57%
5	6	▲	C#	4.801%	+1.35%
6	5	▼	Visual Basic .NET	4.743%	-2.38%
7	7		JavaScript	2.090%	-0.97%
8	8		PHP	2.048%	-0.39%
9	9		SQL	1.843%	-0.34%
10	14	▲	Swift	1.490%	+0.27%
11	17	▲	Ruby	1.314%	+0.21%
12	11	▼	Delphi/Object Pascal	1.280%	-0.12%
13	10	▼	Objective-C	1.204%	-0.27%
14	12	▼	Assembly language	1.067%	-0.30%
15	15		Go	0.995%	-0.19%
16	16		R	0.995%	-0.12%
17	13	▼	MATLAB	0.986%	-0.30%
18	25	▲	D	0.930%	+0.42%
19	19		Visual Basic	0.929%	-0.05%
20	18	▼	Perl	0.898%	-0.11%

Object-oriented programming (4/8)

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Slide 5

Object-oriented programming

What to invest in …

TIOBE Programming Community Index
Source: www.tiobe.com
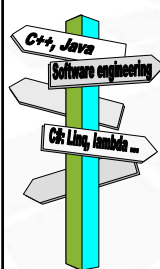
Object-oriented programming (5/8)

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Slide 6

Object-oriented programming

What to invest in …

software engineering:

- IT systems modelling: UML language, diagrams: classes, objects, components, packages, interactions …; modelling tools: built-in in Visual Studio, extensions to Eclipse, extensions to NetBeans (JDeveloper), external programs (ArgoUML),
- design patterns: proven, documented solutions to typical repetitive design problems; patterns are generally applicable only to object-oriented languages, implementation details depend on the language used,
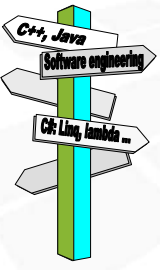- software testing/automation and available tools,

Object-oriented programming (6/8)

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What to invest in …
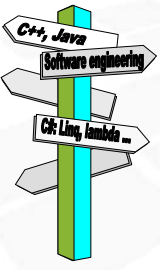
other technologies around C#:
- *LINQ (Language-Integrated Query)* – integrated query language is a mechanism conceptually a bit reminiscent of SQL (but significantly different) facilitating work with data collections (collections implementing the *IEnumerable<T>* interface, databases and XML documents),
- *lambda expressions* – functional techniques modelled on the lambda calculus, a compact and convenient form of writing anonymous methods (unlike the classic lambda calculus, can cause side effects),
- *WinForms* (*Windows Forms*) - classic GUI application development platform for Windows,
- *WPF* (*Windows Presentation Foundation*) – modern platform supporting GUI applications for Windows and web applications, based on XAML (XML), offers better performance, greater possibilities and a uniform programming model,
- *WCF* (*Windows Communication Foundation*) – network services platform focused on creating efficient distributed applications,
- *ADO .NET, ASP .NET, *.NET, ...*

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What to invest in …

- other languages and technologies:
  - *SQL* – SQL:2016 standard, *MS SQL*, *PostgreSQL*, *MySQL*, *FireBird* ...
  - *PHP* – interpreted, scripting language for web pages development,
  - *JavaScript* – (! *JavaScript* has little in common with *Java*!), scripting programming language (create by *Netscape* (R.I.P.) company, not *Sun* (R.I.P.)) frequently used for web pages and cloud developing,
  - *HTML5.?* – a language for WWW pages development,
- embedded systems, automation, mechatronics – *C*, *C++*, *Asm*, *Java*, *JavaScript*, *Python* ...

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