

1 Object Oriented Programming

DAT042
D2 lp1 2012/2013

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Course Contents

- Introduction to object-oriented programming
- software design principles
 - not just a Java course
- aimed at producing and maintaining high-quality scalable software systems

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Buzzwords

responsibility-driven design
inheritance overriding encapsulation
iterators javadoc interface coupling
cohesion refactoring abstraction
collection classes mutator methods
regression testing design patterns
polymorphic method calls

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Goals

- Sound knowledge of programming principles
- Sound knowledge of object-orientation
- Able to critically assess the quality of a (small) software system
- Able to implement a small software system in Java

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Recommended book

Jan Skansholm

Java direkt

Studentlitteratur

... or any equivalent book

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Course overview (1)

- Objects and classes
- Class definitions
- Object interaction and references
- Grouping objects, lists, arrays, iterators
- Program documentation
- Library classes
- Well-behaved objects - testing, maintaining, debugging

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Course overview (2)

- Inheritance
- Polymorphism
- Graphical user interfaces
- Error handling
- Streams and files
- Concurrent programming with active objects and threads
- Application design and design patterns
- Modelling with UML

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Activities

- Lectures
- Supervised class excercises
- Laborations (4)
- Your own work (plenty)

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Course staff

Lectures

- Uno Holmer

Lab and class exercise supervision

- Cecilia Kjellman
- Niklas Lönnerfors
- Karl Schmidt

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V.	Dag	Nr	Föreläsning	Litteratur
36	mån	1	Introduktion till kursen och OOP	S 1
	tis	2	Objekt och klass, instansvariabler, klassvariabler, metoder	S2-3
	tor	3	Objektinteraktion, referenser, listor	S2.5, S4.5.1-2, S9.7
	fre	4	Fält, iteration, iteratorer	S3.8-9, S9.1-3, S9.8-9, S17.4-5
37	mån	5	Associativa samlingar, konstanter	S17.7.1-3, S3.3, S2.3
	tis	6	Programdokumentation, kompilering av javaprogram	S19.1, S1.1-5, S9.4
	fre	7	Testning, enhetstestning med JUnit	<i>mtl utdelas</i>
38	mån	8	Arv	S10.1-3, S10.5
	tis	9	Polymorfism	S10.4, S10.6
	fre	10	Abstrakta klasser och gränssnitt	S10.7-8
39	mån	11	Grafiska användargränssnitt	S6, S12.1-9, S14
	tis	12	Grafiska användargränssnitt forts.	S8
	fre	13	MVC-modellen, observer-mönstret	<i>mtl utdelas</i> , S12.10
40	mån	14	Strukturerad felhantering	S11
	tis	15	Filer och strömmar	S16
	fre	16	Aktiva objekt och trådar	S13
41	mån	17	Kopiering av objekt, serialisering, objektströmmar	<i>mtl utdelas</i> , S10.10.4, S16.4.2
	tis	18	Objektrelationer. Likhet, ordningar och hashkoder.	S10.10.1-3, S10.11
	fre	19	Applikationsdesign, utvecklingsprocess, modellering	S4
42	mån	20	Designmönster, Singleton, Abstract factory m.fl.	S sid. 186, 341
	tis		<i>repetition</i>	
	fre		<i>reserv</i>	
43			Tentamen: tor 25/10 f 2012	

Fundamental concepts

- object
- class
- instance variable (field)
- method
- parameter
- data type

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Demo

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Objects and classes

- objects
 - represent 'things' from the real world, or from some problem domain (example: "the red car down there in the car park")
- classes
 - represent all objects of a kind (example: "car")

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Methods and parameters

- Objects have operations which can be invoked (Java calls them *methods*).
- Methods may have parameters to pass additional information needed to execute.

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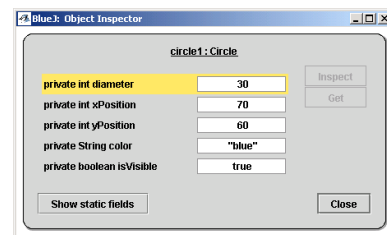
Other observations

- Many *instances* can be created from a single class.
- An object has *attributes*: values stored in *instance variables*.
- The class defines what instance variables an object has, but each object stores its own set of values (the *state* of the object).

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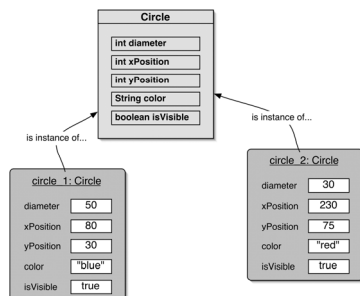
State



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Two circle objects



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Source code

- Each class has source code (Java code) associated with it that defines its details (fields and methods).

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Return values

- Methods may return a result via a return value.