Advanced Software Technology WT 2014/2015

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In this course, we rely on substantial self-study on your side, in particular of the various slide sets on various topics on Java and other programming languages. In order to have a concrete outcome, and also some feedback on your understanding, you are required to produce a set of cheat sheet documents. The instructions given on this page explain what we mean by "cheat sheet" and what topics need to be covered.
When writing the cheat sheets, you will assume that the reader is someone already firm in another programming language, e.g. C++. Such developers do already know what variables, types, control flow constructs, arrays, objects and classes are, but want to know the precise syntax in the new language, and other important information, e.g. *no unsigned in Java*. Give a very brief, compact code eexample, where appropriate.

25 **Cheat Sheet 1: Java Programming Basics**
Topics to be covered include:

- Hello world
- Development : editing, compiling, running, debugging
- Reserved names
- Naming conventions
- Program Layout
- Comments
- Coding conventions

25 **Cheat Sheet 2: Basic Data Types and Procedural Programming**
Topics to be covered include:

- Constants, variables, parameters, scoping
- Primitive data types
- Control flow
- Arithmetic expressions, math
- Type conversion, type casting
- Logical expressions
- Operators, operator precedence
- Characters and strings
- String expressions
- Basic I/O
- Exceptions and exception handling

25 **Cheat Sheet 3: Object-Oriented Programming**
Topics to be covered include:

- Basic OO
  - Reference types
  - Objects, classes, instances
  - Attributes (fields, members)
  - Methods (functions, procedures, subroutines)
- Advanced OO
  - Modifiers (class, attribute, method)
  - Constructors, initializers, memory allocation
  - Destructors, garbage collection
  - Inheritance
  - Polymorphism
  - Local, inner, anonymous classes
  - Modularization, packages, archives

25 **Cheat Sheet 4: Data Structures and Advanced Concepts**
Topics to be covered include:

- Data Structures
  - Arrays
  - Enumerations
  - Lists
  - Trees
  - Collections
- Advanced Concepts
  - Iterators
  - Recursion
  - Templates
  - Generics
  - Reflection
  - Annotation

25 **Cheat Sheet 5: Multithreading and Networked Computing**
Topics to be covered include:

- Threads
- Processes
- Synchronization
- IPC inter-process communication
- Protocols

25 **Cheat Sheet 6: I/O and GUIs**
Topics to be covered include:

- I/O
  - files
  - streams
  - I/O functionality
  - serialization
- GUIs
  - basic concepts of GUI programming
  - widget sets
  - 2D graphics
  - 3D graphics
  - event handling
  - applets
  - servlets

25 **Cheat Sheet 7: Java vs C++ vs Python**
Topics to be covered include:

- Compilation models of Java, C++, Python
- Commonalities and differences between Java, C++, Python
- Coding conventions differences