

Hands-on course , 5
day(s)
Ref : LJO

Participants

Developers, engineers,
project leaders with close ties
to development.

Pre-requisites

A base Knowledges in
programming. Experience
desirable in application's
development.

Next sessions

Java Programming

OBJECTIVES

This course will allow you to master the principles of the object approach and the features of the Java language. The language constructions will be introduced progressively starting from basic concepts. The course will also cover design problems (via the UML notation) and will present the main standard libraries and APIs: inputs/outputs, utilities, graphics classes (AWT and Swing), applets. This course briefly presents the new Java Tiger features.

1) "Object" techniques

2) An initial language approach

3) Defining and instancing classes

4) Inheritance

5) Exceptions

6) Presentation of some standard classes and libraries

7) New Java Tiger features

8) Conclusion

Workshop

The practical exercises have been designed to illustrate all the elements of the language and to implement the concepts of object-oriented design: all the exercises contain an analysis/design stage followed by a programming stage.

1) "Object" techniques

- The general principles of "object" modelling and programming. Abstraction and encapsulation: the interfaces. Various types of inheritance, polymorphism.
- An introduction to models and to UML notation: static models, dynamic models, cooperation models, and scenarios.

Workshop

The UML specification for a case study that will be the basis for the exercises that follow.

2) An initial language approach

- Variables: declaring and classifying.
- Defining fields.
- Methods: defining.
- Expressions.
- Control instructions: conditional, loop, and branch instructions.
- Tables.
- Compilation Units and packages: controlling the visibility of classes, import mechanisms.

Workshop

A series of simple exercises allowing familiarisation with the development environment and the realisation of a simple programme. Using packages.

3) Defining and instancing classes

- Classes and objects.
- Fields, methods.
- Constructors.
- Self-reference.
- Static fields and methods.
- Aspects of methodology: designing classes.

Workshop

Programming the case study.

4) Inheritance

- The different types of inheritance: extension and implementation.
- Interfaces and the implementation of interfaces. Polymorphism and its utilisation.
- Extension. Defining derived classes, constructors, and references. Aspects of methodology. Constructing hierarchies of classes. Code factorisation: abstract classes.
- Simultaneous use of implementation and extension. Abstract classes. Aspects of methodology: Regrouping constants, specifying services. Constructing hierarchies of classes and interfaces.

Workshop

Designing and constructing a hierarchy of classes and interfaces. Implementing polymorphism and genericity in the case study.

5) Exceptions

- The try blocks, generating exceptions.
- The catch selection algorithm ().

- Aspects of methodology: constructing an exception hierarchy, using exceptions.

Workshop

Introducing exceptions into the case study.

6) Presentation of some standard classes and libraries

Input/output programming

- The hierarchy of input/output classes.
- Some file system manipulation classes.
- Some input/output classes working on byte flows, character flows.
- Keyboard input/output.

Graphics programming

- Basic concepts: the principles of displaying and managing events from jdk1.1.
- Displaying graphics components: containers and Layouts.
- Some graphics components: labels, buttons, text areas.
- Handling events: Listeners and Adapters. The relationship of handlers to graphics components.

Programming applets

- Applets: principles, life cycle, etc.
- The Applet class.
- Integrating them in a HTML page.

Some utility classes

- System classes.
- Container classes.

7) New Java Tiger features

- The new loop instruction.
- Enumerated types, autoboxing.
- Methods with a variable number of arguments.
- Static imports.
- Generic types.

8) Conclusion

- The first assessments on the language.
- The latest trends.
- Bibliography items.