

SCM3311 Object Oriented Programming 2

Prerequisite: SCM2311 Object Oriented Programming 1

Subject Aims:

This subject provides practice to object oriented programming and methodology using advanced features of the Java programming language and standard Java APIs as vehicles. A deeper discussion of classes and objects, encapsulation, polymorphism, relationships among objects from multiple classes combined using inheritance, composition, nested classes and interfaces. Develop applets and applications with graphical user interfaces using AWT and Swing libraries, understand the concepts of multithreading, file I/O, the core concepts for client-server computing and building networked applications using the Java networking libraries.

VUT Lecturer: Grace Tan

Syllabus:

1. Inheritance
 - Creating Subclasses
 - Class Hierarchies
 - Overriding Methods
 - Composition
 - Polymorphism
 - Abstract Classes and Methods
 - Interfaces
2. Building GUIs
 - AWT package and its components
 - Swing Hierarchy
 - Container Layouts
 - Layout Managers
 - GUI Components
 - Events and Handlers
 - User Interface Design
3. Advanced Graphical User Interface
 - Listener and Adapter Classes
 - Inner Classes
 - Sliders
 - Menus
 - Scroll Panes
 - PopUp Menus
 - Dialogs
 - JDesktopPane and JInternalFrame
4. Threads
 - Threads and threading in Java
 - Basic Control of Threads
 - Thread Synchronization
 - Thread interaction – wait() and notify()

5. Stream I/O and Files
 - Java Stream I/O
 - Basic Stream Classes
 - Files – text, binary and object files
 - Reading and Writing Objects
6. Sockets and Networking
 - Manipulating URLs
 - Reading files on a Web Server
 - Client/Server Communications
 - Network Security

References

1. Required Reading:

- R. Morelli, *Java, Java, Java – Object Oriented Problem Solving*, Prentice Hall, 2000.

2. Recommended Reading:

- J. Lewis & W. Loftus, *Java Software Solutions - Foundations of Program Design*, 2nd edition update, Addison Wesley, 2001.
- H.M.Deitel & P.J.Deitel, *JAVA How To Program*, 4th edition, Prentice Hall International Edition, 2002.
- Y. Daniel Liang, *Introduction to Java Programming*, 3rd edition, QUE Education and Training, Macmillan Computer Publishing, 2001.
- C. Horstmann & G. Cornel, *Core Java 2*, vols.1 & 2, Prentice Hall, 1999.
- J. Wigglesworth & P. Lumby, *Java Programming Advanced Topics*, Course Technology, 2000.

3. Other Useful Resources:

- You may find the tutorials available online from Sun a valuable reference that you can use for this subject at: <http://java.sun.com/docs/books/tutorial>
- Frequently Asked Questions about Java Programming
<http://www.afu.com/javafaq.html>
- Some useful material related to this subject at the VUT website:
<http://melba.vu.edu.au/~scm2311>

Teaching Methods:

- (i) Presentation : Three-hour lecture per week.
- (ii) Assessment : Final examination :80%
 Assignments: 20%

Note: To obtain a pass in the subject, student must pass **both** components of the assessment.

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PROPOSED SCHEDULE

<u>Week #</u>	<u>Topic</u>	<u>Chapter</u>	<u>Pages</u>
1 – 2	Inheritance Creating subclasses, overriding methods, class hierarchies and polymorphism. Emphasis is put on the proper use of inheritance and its role in software design. Examine inheritance hierarchies for interfaces. Discuss the use of inheritance in Java graphics frameworks. Examine and use the GUI component class hierarchy. (References are made from Chapter 7 of J. Lewis & W. Loftus, “ <i>Java Software Solutions</i> ”, 2 nd edition update, Addison Wesley, 2001.	7	322 - 371
3 – 4	Graphical User Interfaces Explore the various aspects of the development of GUI in Java embracing the Swing component of Java 2 platform. Define the concept and use of containers and layout managers such as BorderLayout, FlowLayout, GridLayout and BoxLayout. Explore the GUI components – JLabel, JTextField, JTextArea and JButton, JRadioButton, JCheckBox, JComboBox in detail. Explain the Java event model, event classes and GUI design issues.	9	470 – 509
5-6	Advanced Graphical User Interface Listener classes, inner and adapter classes, techniques for using listeners, sliders, menus, scroll panes, pop up menus and dialogs and JDesktopPane. (References will also be made from Chapter 13 of H.M.Deitel & P.J.Deitel, <i>JAVA How To Program</i> , 4 th edition, Prentice Hall International Edition, 2002.)	9	510 – 525
7 – 8	Threads and Concurrent Programming Understand the concepts of multithreading with appropriate synchronization and mutual exclusion and develop code that uses those concepts in applets and applications.	13	703 – 739
9 – 10	Files, Streams, and I/O Techniques Understand the use of InputStreams, OutputStreams, File class, JFileChooser class, and be able to read and write text files and binary files.	14	765 – 807
11 – 12	Sockets and Networking	15	818 – 864

Develop a good understanding of the core concepts for client-server computing and building networked applications using the Java networking library.

13 Revision

- Note that unless otherwise specified, all page references refer to: R. Morelli, *Java, Java, Java – Object Oriented Problem Solving*, Prentice Hall, 2000.