Programming in Java

The objective of the course is to familiarize students with basics and Advance Java. This course is job oriented course and designed to produce java professionals capable of developing java based application developments .

Outline of the course

S.No.	Topic	Minimum nos. of Hours
1	An Introduction to Java	1
2	The Java Programming Environment	1
3	Fundamental Programming Structures in Java	2
4	Objects and Classes	2
5	Inheritance	2
6	Interfaces and Inner Classes	2
7	Introduction to GUI	2
8	Graphics Programming	4
9	User Interface Components with Swing	4
10	Deploying Applets and Applications	2
11	Exceptions and Debugging	2
12	Streams and Files	3
13	Database Programming	5
14	Software Project	13
	Total	45

Lecture : 45 hrs
Practical : 45 hrs
Project: 30 hrs
Total : 120 hrs

Detailed Syllabus

1) An Introduction to Java
Java as a Programming Platform, The Java "White Paper" Buzzwords,Java and the Internet, A Short History of Java, Common MisconceptionsAbout Java.

2) The Java Programming Environment
Installing the Java Development Kit, Choosing a DevelopmentEnvironment, Using the Command-Line Tools, Using an IntegratedDevelopment Environment, Compiling and Running Programs from a TextEditor, Running a Graphical Application, Building and Running Applets.

3) Fundamental Programming Structures in Java
A Simple Java Program, Comments, Data Types, Variables, Operators, Strings, Input and Output, Control Flow, Big Numbers, Arrays.

4) Objects and Classes

Introduction to Object-Oriented Programming, Using Predefined ClassesDefining Your Own Classes, Static Fields and Methods, MethodParameters, Object Construction, Packages, Documentation Comments,Class Design Hints.

5) Inheritance

Classes, Superclasses, and Subclasses, Object: The Superclass,Generic ArrayLists, Object Wrappers and Autoboxing, Reflection,Enumeration Classes, Design Hints for Inheritance.

6) Interfaces and Inner Classes

Interfaces, Object Cloning, Interfaces and Callbacks, Inner Classes, Proxies.

7) Introduction to GUI

AWT Architecture, Light-Weight vs Heavy-Weight, AWT Event Model,AWT Event Hierarchy & Event Handling, Using Top-Levels, componentsand containers, Introduction to Layouts, Focus Architecture.

8) Graphics Programming

Java2D Rendering Model, Strokes & Fills, Geometries, Fonts and TextLayout, Transformations, Display and manipulation of Images andoffscreen buffers, Using Color, Printing through Java, Doing More withImages using Image IO, Hardware Acceleration and Active Renderingtechniques.

9) User Interface Components with Swing

The Model-View-Controller Design Pattern, Introduction to LayoutManagement, Text Input, Choice Components, Menus, SophisticatedLayout Management, Dialog Boxes.

10) Deploying Applets and Applications

Applet Basics, The Applet HTML Tags and Attributes, Multimedia, TheApplet Context, JAR Files, Application Packaging, Java Web Start, Storage of Application Preferences.

11) Exceptions and Debugging

• Dealing with Errors, Catching Exceptions, Tips for Using Exceptions, Logging, Using Assertions, Debugging Techniques, Using aDebugger.

12) Streams and Files

The Complete Stream Zoo, ZIP File Streams, Use of Streams, ObjectStreams, File Management, New I/O, Regular Expressions.

13) Database Programming

The Design of JDBC, The Structured Query Language, JDBCInstallation, Basic JDBC Programming Concepts, Query Execution, Scrollable and Updatable Result Sets, Metadata, Row Sets, Transactions, Advanced Connection Management, Introduction to
LDAP.

<u>Recommended Books:</u>

1. H. Schildt, “The Complete Reference -Java2”, Tata McGraw-Hill, 2008.
2 P. J Dietel and H. M Dietel, “Java How to Program”, 7th Edition, Pearson Education, 2008.

Assignments:

Assignment 1

Write a program that can create a concordance (A concordance lists every word that occurs in the document, and for each word it gives the line number of every line in thedocument where the word occurs).The document should be read from an input file, and theconcordance data should be written to an output file. The names of the input file and outputfile should be specified as command line arguments when the program is run.

Assignment 2

Assume that a bank maintains two kinds of accounts for customers, one called as savings account and the other as current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimumbalance and if the balance falls below this level, a service charge is imposed.
Create a class **account** that stores customer name, account number and type ofaccount. From this derive the classes “cur_acct” and “sav_acct” to make themmore specific to their requirements. Include necessary functions in order toachieve the following tasks:
a) Accept deposit from a customer and update the balance.
b) Display the balance.
c) Compute and deposit interest.
d) Permit withdrawal and update the balance.
e) Check for the minimum balance, impose penalty, necessary, and updatethe balance.

Assignment 3

Write a Java Program to find all the strings that match a given Regular Expression in one or more files or other sources.

Assignment 4

Write a Java Program to create three new types of exceptions. Write a class with a method that throws all three. In main( ), call the method but only use a single catch clause that will catch all three types of exceptions.

Assignment 5

Write an applet with a JTextArea where the user can enter some text. The applet should have a button. When the user clicks on the button, the applet should count the number of lines in the user's input, the number of words in the user's input, and the number of characters in the user's input. This information should be displayed on three labels in the applet.

Assignment 6

Design a Calculator using Java Applet/Swing. The display should have all the digit buttons along with buttons for operations +,-,*, / and =. There is a designated panel to show the current results. If a digit button is clicked, the number is displayed on the panel. If anoperator button is clicked the operation is to be performed. The calculator can operate in
two modes.
a. When, the operator buttons are pressed the intermediate results should be

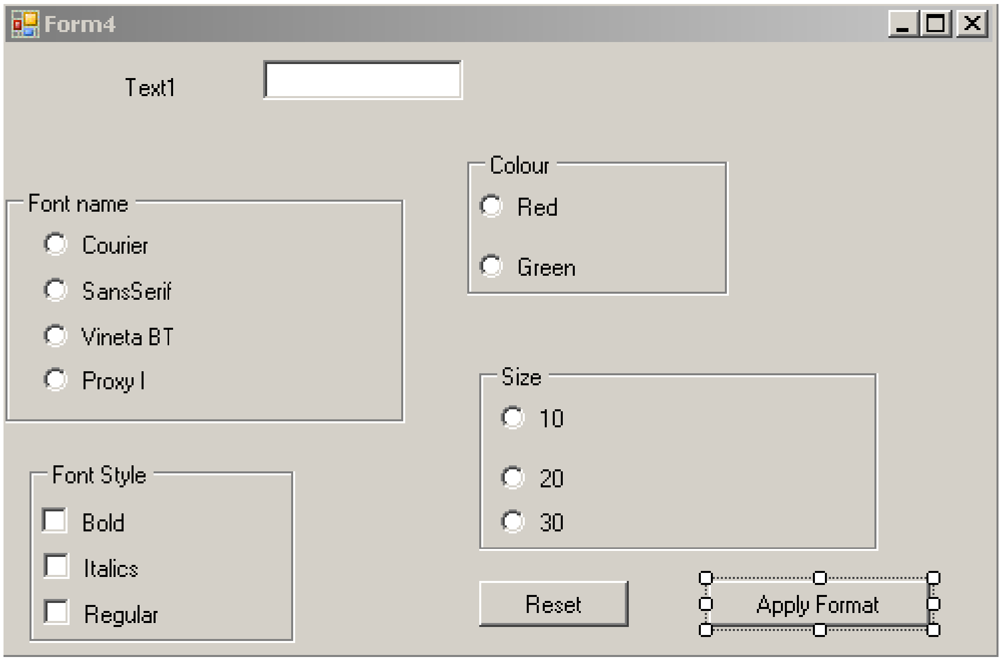
displayed.
b. The operations can take in any number of arguments and the final result is displayed only when the = button is pressed.

Assignment 7

Write a little applet that lets the user draw polygons. As the user clicks a sequence ofpoints, count them and store their x- and y-coordinates in two arrays. These points will bethe vertices of the polygon. Also, draw a line between each consecutive pair of points togive the user some visual feedback. When the user clicks near the starting point, draw thecomplete polygon. Draw it with a red interior and a black border. The user should then beable to start drawing a new polygon. When the user shift-clicks on the applet, clear it.

Assignment 8

Create the following form using java applet/Swing and the text in textbox should be formatted as per the selections:



Assignment 9

Create a layout prototype of Ms-Paint in Java swing using menus and layout management. You can also add functionality to some of the menu item/toolbar items.

Assignment 10

Create an image from an Array of Color-Indexed Pixel Values in the byte buffer. A 16-color index color model is used to represent the pixel colors.