Course Name: Course in J2EE
Course Code: P6

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Course in J2EE

1. Introduction:

Java is a programming language that is a core component of Sun Microsystems' Java platform. The language derives much of its syntax from C and C++ but has a simpler object model and fewer low-level facilities. Java applications are typically compiled to bytecode (class file) that can run on any Java Virtual Machine (JVM) regardless of computer architecture. Java is general-purpose, concurrent, class-based, and object-oriented, and is specifically designed to have as few implementation dependencies as possible. It is intended to let application developers "write once, run anywhere". Java is considered by many as one of the most influential programming languages of the 20th century, and is widely used from application software to web applications.

2. Eligibility:

XIIth pass and above and basic computer knowledge

3. Duration:

80 Hours. Two and half hours each day

- Theory 20 hours
- Practical 60 hours

4. Course Details:

<table>
<thead>
<tr>
<th>Type of course</th>
<th>Professional IT Course</th>
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<tbody>
<tr>
<td>Syllabus</td>
<td>Programming Concepts</td>
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<td>o Flowcharts</td>
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<td>o Algorithms</td>
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<td>o Data Flow Diagrams</td>
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<td>o Software Life Cycle</td>
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**Understanding Java and the J2EE Platform**

- Reviewing a brief history of java
- Understanding j2SE
- Examining the origin of (J2EE)
  - Application components
  - Roles
- Working with the model-view-controller
  - The model
  - The view
  - The control
- Understanding J2EE APIs
  - J2EE standard services
  - Application component APIs
Understanding the java community process (JCP)

**Reviewing XML Fundamentals**
- Well-formed XML
- Valid XML
- Understanding XML Document structure
  - Prologue
  - Elements
  - Attributes
- Examining XML parsers
  - DOM parsers
  - SAX parsers
  - DOM versus SAX
- Implementing XML DTD’S
- Understanding XML Namespaces
- Exploring XML schema
- Working with extensible style sheet
- Language transformations (XSLT)
- Producing a simple HTML with XSLT
- Producing a wireless markup language (WML) document with XML
- Introducing J2EE XML-based API'S

**Introducing application servers**
- Implementing the J2EE platform
- Understanding the features of an application server
  - Scalability
  - Client agnosticism
  - Server management
  - Development
  - JBoss, Apache, Tomcat

**The presentation tier**

**Studying serve let programming**
- Creating a magazine publisher application using servlets
  - The server side
  - The client side
- Creating an HTML login screen
- Using the servlet context
- Performing URL Redirection
  - Using requestDispatcher
  - Using sendRedirect()
- The lost password screen example
- Session tracking with servlets
- Cookies
- URL rewriting
- Hidden fields
- The session-tracking API with HttpSession object
- Example of a LoginServlet with an access counter
Listener
Filters
Deploying servlets
The web-application archive
Examining the web.xml deployment descriptor
Mandatory servlet elements
Servlet listener elements
Servlet filter elements
Applet-servlet communication

**Going over JSP Basics**
- Introducing JSP
- Examining MVC and JSP
- JSP scripting elements and directives
  - Declarations
  - Expressions
  - Directives
  - Scriptlets
  - Comments
  - Actions
  - Implicit JSP objects
  - Working with variable scopes
  - Error pages
  - Using JavaBeans
    - Using JavaBeans in JSP
    - The scope of JavaBeans
    - Creating a login jsp using a java bean
    - Deploying the login jsp example using tomcat

Using jsp tag extension
- Explaining custom-tag concepts
  - Working with the jsp standard tag library
  - Importing a tag library
  - The tag library descriptor
- The tag-library descriptor locations
  - Explanation taglib mapping
- Understanding tag handlers
  - Classic tag handlers
  - Simple tag handlers
- Exploring dynamic attributes

**The enterprise information system tier**
- Introducing java transactions
  - atomic transactions
  - Examining transactional objects and participants
  - Reviewing atomicity and the two-phase commit protocol
    - Optimizations
    - Heuristics and removing the two-phase block
  - Understanding Local and Distributed transactions
    - Local transactions
    - Distributed transactions
    - Interposition
- Understanding consistency
Introducing isolation (Serializability)
  Optimistic versus pessimistic concurrency control
  Degrees of isolation
Understanding the role of durability
Performing failure recovery
Using transaction-Processing Monitors

Transaction Models
  Nested transactions
  Nested top-level transactions
  Extended transaction models and the J2EE activity service

Understanding transaction standards
  X/Open distributed transaction processing
  The object transaction service
Understanding the java transaction API
  The JTA’S relationship to the JTS
  The user transaction interface
  The transaction manager interface
  Suspending and resuming a transaction
  The transaction interface
  The XAResource interface
  Enrolling participants with the transaction
  Transaction synchronization
  Transaction equality
  The XID interface

Examining JNDI AND Directory services

  Explaining naming services and directory services
  Providing an overview of X.500 and LDAP
    LDAP implementation
    Configuring OpenLDAP
    LDAP schema
  Reviewing the JNDI structure
    Directories and entries
    Names and attributes
    Binding and references
    Contexts and subcontexts
    File systems
    DNS naming conventions
    LDAP mapping
  Using JNDI and LDAP
    Connecting to the server
    Specifying environment properties
    Implementing authentication
    Performing simple LDAP lookups
    Performing searches and comparing entries
    Modifying the directory
    Adding objects to a directory
  Connecting to DNS
    DNS environment properties
    DNS lookups
    Reverse DNS lookups
  Considering other JNDI service providers
File systems
COS naming for CORBA
Network information system
Directory services markup language
Application server providers
Exploring the enterprise javabeans environment

Understanding java authentication and authorization services

Examining the importance of java security
  Typical java security weaknesses
  Providing an overview of JAAS
Understanding security realms
  Single login across security domains
  Setting up for JAAS
  Callback handlers
  Pluggable/stackable authentications
Examining the java subject class
Authenticating users
  Authorizing users
  JAAS policy files
  Compiling the example
Debugging the simple JAAS module
  Hiding JAAS
  Predefined JAAS login callbacks and their handlers
  Custom login modules
  Writing your own login handler
  Writing your own callback handler
  Authenticating a web user against a windows NT domain
Brief security analysis
Security limitations
Implementations
Alternative methods

The service tier

Understanding EJB architecture and design

Explaining the EJB components model
Reviewing roles, relationships and responsibilities
  The deployment descriptor
  The bean provider
  The server/container provider
  The application assembler
  The EJB deployer
  The system administrator
The enterprise javabeans
  Entity beans
  Session beans
  Entity beans versus session beans
  Message-driven beans (MDB)
  Understating EJB container functionality
Restrictions on the bean provider
Achieving scalability by pooling resources
The life of an entity bean
The life of a session bean
Transactions and EJBs
Container-managed transactions
Examining a transactional EJB example
Naming objects
The security infrastructure
The timer service
Persistence in BMP and CMP
Distribution support
Integrating with CORBA
  Why CORBA important to J2EE
  When J2EE met CORBA
Performance and scalability issues
  Application-server availability strategies
  Transaction concerns
  Threading model
  Tools

Explaining session beans and business logic

Writing a session EJB
  The home interface
  The component interface
  The session bean class
  The deployment descriptor
  The stateless session bean
  The ejb-jar.xml deployment descriptor
Deployment
Writing an EJB client
Stateful-session-bean model
  The lifecycle of the stateful session bean
Passivation and activation
Implementing the session synchronization interface
Storing a handle
Choosing between stateless and stateful beans
  The stateless model
  The stateful model
Summary

Working with entity beans

Understanding entity beans
  Remote and local client views
  Entity-bean components
  The entity-container contract
Container-managed persistence (CMP)
Bean-managed persistence (BMP)
Using message-driven beans
Understanding the need for MDB
Reviewing MDB lifecycle methods
Examining MDB deployment descriptors
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COURSE DETAILS

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Deployment descriptor as per EJB 2.0
Changes in MDB 2.1 deployment descriptors
Internal messaging within EJB applications
Understanding clients and MDB
Working with EJBs asynchronously

The data tier

Reviewing java database connectivity

Introduction JDBC driver types
Creating your first JDBC program
Retrieving data
Database-error processing
Processing result sets
The resultsetmetadata class
Scrollable result sets
The preparedstatement class
The callable statement class
Performing batch updates
Using savepoints
Configuring the JDBC-ODBC Bridge
Explaining database connection pools and data sources
Configuring connection pools
Creating data source objects
Revisiting DBProcessor
Using the rowset interface
Working with cachedrowset
The webrowset class

Web services

Introducing web services
Defining web services
Universal resource identifiers
XML-based technologies
Why do we need web services?
Remote method invocation
DCOM
CORBA
Web-service architecture
Advantages of web services
Examining Some Web-Service Scenarios
Enterprise-application integration (EAI)
Understanding the Technologies behind Web Services
SOAP
WSDL
UDDI
Web services in a service-oriented architecture

Understanding J2EE Web Services
Integrating J2EE and Web Services
   Using Java servlets in a Web-services architecture
   Exposing EJBs as Web services
   Using JMS as a transport layer
   Exploring Products and Tools for Web Services
JSR 109—J2EE Web Services
   The client-side programming model
   The server-side programming model
   Web-service deployment descriptors

**Advanced topics**

Exploring Frameworks and Application Architecture

Frameworks versus class libraries
The pains of J2EE
Understanding Framework Principles
Inversion of control
Separation of concerns
Loose coupling
Extensibility
Configurability
Alignment
Design patterns
Examining the Struts framework example
Understanding Framework Objectives and Benefits
Design
Development and testing
Production and maintenance
Application portfolios
Reviewing Application Architecture beyond Frameworks
   Overview of architectures
   Traditional application architecture
   Services-oriented architecture
   Application architecture versus frameworks
Building Your Own Framework
   Building versus buying
   Open source
   Software vendor
   System Integrators (SIs)
Predicting the Future of Frameworks
Alternatives to Frameworks
   All-in-one proprietary environments
   Model-driven architecture
   Minimal J2EE
   Advanced Integrated Development Environments

Project Work
5. **Fee:**
   Rs. 4000/- (exclusive of all taxes)