Tilak Maharashtra Vidyapeeth, Pune

Department Of Computer Science

Syllabus of Master Of Computer Management (MCA)

SEMESTER – IV

Subject: Advanced JAVA (MCA – 431)

1. **Swing**:

MVC Architecture, Advantages pf swing over AWT, JApplet, JFrame, JPanel etc

2. **Collection Framework**

Collection Interfaces:- Set, List, Map. Collection Classes:- ArrayList, LinkList, HashSet etc. Legacy Classes & Interfaces:- Enumeration, Iterator, Vector, Stack, Dictionary, Hash table, Properties

Socket Programming

Networking eg:- Socket, Client/Server, Reserve Sockets, Proxy Servers, Internet Addressing. TCP/IP Client /Server Sockets. URL , Client/Server Programming. Datagrams.

3. **Java Beans using BDK and JBuilder**

Introduction, Advantages of Java Beans, Bean Life Cycle, Properties of Beans, BDK, Bean Event Model.

4. **Java Database Connectivity:**

JDBC introduction, JDBC Vs ODBC, JDBC Architecture,

Types of JDBC Drivers, JDBC Interfaces eg: Connection, Statement, Prepared Statement, CollableStatement, DatabaseMetaData, ResultSet, ResultSetMetaData.

JDBC Classes eg:- DriverManager, Executing SQL Query, Transactions eg:- Commit, Rollback, SetAutoCommit(), Batch Updates.

5. **Remote Method Invocation**

Distributed Object Systems eg: Remote Procedure Call, Java Remote Invocation.

RMI Architecture, RMI Services – Naming/Registry Services, Object activation, Distributed garbage Collector.

6. **Java Servlet Programming**

Introduction of Servlet, Implementation, GenericServlet Class, SingleThreadModel

Interface, Http Request/Response, HttpServlet Class, Servlet Configuration, Servlet Life Cycle, Session Tracking:- Hidden Fields, Cookies, URL rewriting, Session object, Request Dispatcher Interface, sendRedirect., Servlet Chaining.

7. **Java Server Pages**

Introduction, Scripting Elements:- Declaration, Scriptlets, Expression. JSP Directives:- Page, include, taglib. Standard Actions:- useBeans, setProperty, getProperty, param, include, forward, plugin. Implicit Objects:- request, response, pageContext, Session, Application, out, Config, page.

8. **Enterprise Java Beans**

Introduction of EJB, EJB Components, Enterprise Java Bean, Session Beands:- Stateless & Statefull, Entity Beans:- Container-managed & Bean-managed

9. **CORBA**

CORBA Architecture, IDL,IDL Data Types & Services, CORBA services & facilities.

Subject: Mobile computing (MCA – 432)

1. HTMH5

Introduction, features, elements & attributes in HTML5, <canvas>, <video>, <audio>.
Introduction to Scalable Vector Graphics (SVG), Geolocation,
Form input types, HTML5 web storage.
Introduction of HTML5 Web worker.
CSS: Introduction to Style Sheet, types of style Sheets: Inline, External, Embedded CSS, Text formatting properties, CSS Border, margin properties, Positioning.Use of classes in CSS, color properties, use of &

2. Introduction to Android

Introduction to Android: A little Background about mobile technologies, Android - An Open Platform for Mobile development, Android SDK Features, Android versions and features.

3. Tools for Development

Installing Android, First Android application, Running on Emulator, Android

development Tools, Eclipse, IDEs and Tools

4. Android Architecture and OOPS

Building Blocks of Android, Java Classes and Objects, Class Methods and Instances, Inheritance and Polymorphism in Java, Interface and Abstract class.

5. Android UI & Advance JAVA

Fundamental Android UI Design, Introducing Views, In Creating new Views, Introducing Layouts, Creating new Views, Using resources, Complex UI components, Building UI for performance, Using themes, Debugging Android Code.

6. Android Graphics and Multimedia

Basic Graphics, Input Handling, Playing Audio & Video, Recording Audio and Video, Adding new media to media store, Raw Audio Manipulation.

7. Database and Content Providers

Introducing Android Databases, Introducing SQLite on Android, SQLiteOpenHelper and creating a database, Opening and closing a database, working with cursors Inserts, updates, and deletes, Creating new content Provider, Using Content providers, Native Android Content provider.

Reference Books :

1. Hello, Android by Ed Burnette

2. Professional Android 2 Application Development Paperback, Author, Reto Meier, Wrox Publications

3. Professional Android Application Development

4. by Reto Meier, Wiley India Pub.

5. http://developer.android.com

Subject: Linux & Shell Programming (MCA – 433)

1. Unix and Linux Fundamentals

Unix and Linux history, concept and architecture. Basic features of Linux. Advantages of Linux. Help in Linux. Linux commands. Linux File System Hierarchy (FSH). Overview of Linux kernel, kernel space and user space.

System Initialization – boot process of Linux. Startup and shutdown processes.

Functions of /etc/rc.d/rc.sysinit, /etc/rc.d/rc and /etc/rc.d/rc.local.

2. Installation

Hardware requirement of Linux operating system. Installation methods- Local installation and Network Installation. Detailed Local installation procedure.

3. Basic Linux Commands

Basic Linux commands like date, cal, passwd, whoami, wall ,login, logout, shutdown, halt etc. File manipulation commands eg ls,md, rm ,cp, mkdir, rmdir, touch, pwd, file, more, less, cat, paste, mv etc. Hard links and soft links in Linux. Inodes in Linux. File types in Linux. Shells in Linux. BASH shell features.

4. Package Management

RPM package manager. Installing and removing software. Updating a kernel rpm, rpm queries, rpm verifications. Package management using yum. Configuring repositories using yum.

5. VIM Editor

Introduction to VIM. Three Modes of VIM. Manipulating text, using multiple windows, search and replace, file saving options, running commands etc. Advance VIM options

6. Standard I/O and Pipes and Print Management in Linux.

Standard input and output, redirecting output to a file, redirecting error to a file. STDIN, STDOUT and STDERR. Piping and output redirection. Print management to configure printer in Linux through GNOME. Study of printing commands.

7. User and Group Management

Users, groups and permissions, ls, chmod, chown and chgrp commands. Symbolic and Numeric method to change permissions. Useradd, usedel, groupadd, groupdel, usermod, passwd commands. SUID, SGID and sticky bit permissions. Uname, su commands. / etc/passwd, /etc/shadow and /etc/group files.

8. File Management, Disk Management and Backup Management in Linux

Types of hard disk controllers. File systems supported by Linux; ext2, ext3, ext4 file systems. Swap file system, LVM and RAID file systems in Linux. Disk management commands like du, df,fdisk, mkfs, e2label, fsck, mount, umount etc. Commands to

create swap file and big file. Partitioning in Linux. Swap partition and data partition. Backup Management commands like tar, cpio and dump, gzip, bzip2, gunzip and gzip etc.

9. Process Management

What is process? Listing process, finding processes, signals, sending signals to processes, scheduling priority of processes. crond service, crontab command. Process management commands like ps, kill, jobs, fg,bg,test ,nice, renice sleep etc. . Services in Linux – init services, sys V launched services and xinetd services. Commands like service, chkconfig and ntsysv etc. Daemons in Linux.

10. Network Management

Configuring NIC, viewing an IP address, enabling and disabling NIC. Configuring multiple IP addresses . Enabling system as router. Verifying NIC connectivity. Defining hostname, verifying DNS connectivity.

Study of Network Management commands like ifconfig, setup, hostname, arp, traceroute, dhclient, ifup, ifdown etc.

11. Troubleshooting

Method of fault analysis, Things to check for GUI environment, networking, file system corruption, file system recovery, recovery of run-levels, rescue environment, Rescue environment utilities. Some examples of boot and login problems.

12. Shell Scripting

Scripting basics. Creating shell Scripts. Simple filter commands like head, tail, sort, uniq etc. Filters using regular expressions like grep, sed, etc Introduction to variables – system and user variables. Operators in Linux – Mathematical and string .If… else, if…elif… else statements. Loops - The while, for loop, until & infinite loop. Functions and arrays.

Reference Books:

1. Linux Bible - Christopher Negus
2. Mastering Shell Scripting - Randal K. Michael
3. Unix Concept and applications - Sumitabha Das
4. Linux Command Line and shell scripting - Richard Blum

Tilak Maharashtra Vidyapeeth, Pune

Some Important Web Sites

1. www.linux.org
2. www.whatislinux.org
3. www.redhat.com
4. www.tldp.or

Subject: Micro processor system (MCA – 434)

1. 8 Bit Microprocessor

Digital systems, Data conversion: Binary, Decimal, Hexadecimal. 1s complement, 2s complement. Types of data: Nibble, Byte, Word, Double word. Bus: definition, types of Buses: data bus, address bus and control bus. Processor: Definition, Applications.Evolution of Microprocessor and types, Features of 8085, description, Architecture of 8085 - Functional Block diagram, Pin Diagram, Register organization.

2. 16 Bit Microprocessor: 8086

Features of 8086, Pin descriptions, Architecture of 8086, Functional Block diagram, Register organization, Concepts of pipelining, Memory segmentation, Physical memory addresses generation. Operating Modes of 8086: 8284 Clock Generator, 8288 Bus Controller, 74LS245 Bi-directional Buffer, 74LS373 Octal Latch, Minimum Mode operation and its timing diagram, Maximum Mode operation and its timing diagram

3. Instruction Set of 8086 Microprocessor

Understand the different types of instructions, Identify the addressing modes of instructions, State the operation of an instructions, Machine Language Instruction format, addressing modes, Instruction set of 8086, Groups of Instructions, Arithmetic Instructions, Logical Instructions, Data transfer instructions, Bit manipulation instructions, String Operation Instructions, Program control transfer or branching Instructions, Process control Instructions

4. The Art of Assembly Language Programming

Know the program development steps, Use the different program development tools, Illustrate the functions of assembler directive and operators, Program development

steps, Defining problem, Writing Algorithms, Flowchart, Initialization checklist, Choosing instructions, Converting algorithms to assembly language programs, Assembly Language Programming Tools Editors, Assembler, Linker, Debugger, Assembler directives and Operators.

5. Procedure and Macro in Assembly Language Program

Understand the purpose of procedure and macros, Use procedure and macros, Procedure, Defining Procedure - Directives used, FAR and NEAR,CALL and RET instructions, Re-entrant and Recursive procedures.

6. 8051 Microcontroller

Introduction, Features of 8051 microcontroller, Block diagram of 8051, Pin diagram and Architecture of 8051, Applications of 8051 microcontroller.

Reference Books:

1. Microprocessor & interfacing (programming & hardware) Revised Second Edition by Douglas V. Hall.
2. Microprocessor Architecture, Programming and Applications with the 8085 Ramesh S. Gaonkar.
3. The 8088 and 8086 Microprocessors Walter A. Triebel, Avtar Singh.
4. Microprocessor & Programming – Vijay N. Kukre.
5. 8051 Microcontroller –Mazidi

Subject: Software Quality Testing (MCA – 435)

1. Overview of software engineering

- Software applications
- generic view of software engineering
- Software Development Life Cycle
- The role of System analyst
- Waterfall model
- Spiral Model
- Prototyping
- RAD

2. Quality Concept

- Definition of Quality, QA, SQA
- Quality factors
- SoftwareQuality Metrics
- Process Improvement
- Process and Product Quality
- The SEI Process Capability Maturity model, ISO, Six-Sigma
- Process Classification

3. Software Quality Assurance

- Need for SQA
- SQA Activities
- Building blocks of SQA
- SQA Planning &Standards

4. Software Reliability

- Reliability Measures
- Reliability models

5. Verification & Validation

- Verification & Validation Planning
- Software inspections
- Automated static Analysis
- Clean room Software Development

6. Software Testing Fundamentals

- Testing objectives
- How test information flows
- Testing lifecycle
- Test Cases– What it is?, Test Case Designing (Concept & introduction should be covered here. Detailed techniques should be covered in Unit No. 2.4)

7. Levels of Testing

- UnitTesting
- Integration Testing

- System Testing
- Acceptance Testing Alpha testing & Beta testing
- Static vs. Dynamic testing
- Manual vs. Automatic testing
- Testers workbench
- Steps of testing process (Only steps should be covered)

8. Different types of Testing

- Installation Testing
- Usability testing
- Regression testing
- Performance Testing

- Load Testing
- stress testing

- Security testing

9. Static & Dynamic Testing

- Static Testing Techniques
- Review types: Informal Review, Technical or peer review, Walkthrough, Inspection, static analysis
- Review Meeting,
- Review Reporting & Record keeping, Review guidelines & Review checklist
- Data flow analysis
- Control flow analysis
- Cyclometric Analysis
- Dynamic testing– need & Advantages

10. Black Box & White Box Testing (Test CaseDesign Techniques)

- Functional Testing (Black Box) Equivalence partitioning, BVA, Cause- Effect graphing, Syntax testing (Concept & Test case generation only)
- Structural Testing (White Box) Coverage testing, Statement coverage, Branch & decision coverage, Path coverage
- Domain Testing

- Non functional testing techniques
- Validation testing Activities Low level testing, High level testing
- Black box vs. White Box

11. Testing specialized Systems and Applications

- Testing object oriented software
- Testing Web based Applications
- Computer Aided Software testing tools (CAST) (only type & their purpose should be covered)

Reference Books:

1. Software Engineering - R. Pressmen – 6th Ed
2. Software Engineering - Sommerville
3. Introducing Software Testing - Louise Tamres
4. Effective Methods for software Testing - William Perry
5. Software Testing in Real World - Edward Kit
6. Software Testing Techniques - Boris Beizer
7. Software quality assurance: Principles and Practices - Nina Godbole, Narosa Publishing