

## Core Paper -5 : Semester –V

### **CC-5 Programming Using Java**

#### **BLOCK – I**

**Unit-1:** Java Language History, evolution, features, comparison with C and C++, java SE8, phases and block diagram of execution of java program, first java program, java program with reading input and printing output.

**Unit-2:** Java – Data types, variables, keywords, literals, escape sequence characters, type casting, type conversion, type promotion,

**Unit-3:** Operators and control statements.

#### **BLOCK-II**

**Unit-4:** Java classes, objects, new operator, object references, methods, box class, types of constructors, this key word, instance variable hiding, garbage collection, finalize method, stack class,

**Unit-5:** overloading methods and constructors, access controls, final method, static method, static variables nested and inner classes, string class, command line arguments with vararg

**Unit-6:** Inheritance – member access & inheritance, subclass and super class, second use for super, multi-level hierarchy, method overriding, dynamic method dispatching, abstract classes, using final with inheritance

#### **BLOCK-III**

**Unit-7:** Packages –defining package, setting class path, access protection, importing packages. Interfaces – defining, implementing, nested interfaces, applying interfaces, default interface methods, use static method in an interface

**Unit-8:** Java Exception Handling – frame work, types of exceptions, uncought exceptions, try and catch, nested catch, multiple try, throw, throws, finally, java built-in exceptions, user-defined exceptions, chained exceptions, recently added 3 exceptions

**Unit-9 :** Java Applet basics – creating applets, including an applet on a web page, applet tag, passing paramentrs to applets. Java- animation – painting, re-painting, starting, stopping, reducing animation flicker

#### **BLOCK-IV**

**Unit-10 :** Java database connectivity – JDBC definition, JDBC structure, registering and calling JDBC drivers, JDBC URL and the connection, using JDBC drivers, installing JDBC-ODBC bridge, setting up ODBC drivers, Accessing ODBC services through JDBC, ODBC URL, JDBC to ODBC calls

**Unit-11:** Java Event Hanling – event handling mechanism, event classes, key event class, source of events, event listener interfaces, using delegation event model, adaptor classes, inner classes

**Unit-12** Introducing Visual programming with Swing – Sewing is built on AWT, MVC connection,swing packages, swing event handling, JLabel and Image icon, JTextField, swing buttons, JTabbedPane, JScrollPane, JList, JComboBox, JTable, JTree

## PRACTICALS:

Unix / Linux/ Ubuntu

<http://www.ee.surrey.ac.uk/Teaching/Unix/unix6.html>

<https://www.includehelp.com/cpp-programs/cpp-programs-classes-and-objects-solved-programs.aspx>

1. Write java program to find largest number in an array
2. Write java program to add two mataices
3. Write java program to demonstrate bit wise operators
4. Write java program to demonstrate java applets
5. Write java program to demonstrate all types of construcotrs
6. Write java program to demonstrate static methods and static variables
7. Write java program to demonstrate multiple inheritance in java
8. Write java program to demonstrate JDBC and ODBC connectivity with mysql or MS-Acess and write sql database queries

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9. Write java program to demonstrate exception handling with nested try and multiple catch
10. Draw login form with swing and connect and validate the user id and password from student database
11. Design student data entry form with all GUI controls and enter all details into student database
12. Write java program to demonstrate event handling

## Discipline Specific Elective-1 :Semester –V

### **DSE-1    Operating Systems**

#### **BLOCK – I**

**Unit-1:** Operating System - definition, history, concepts, structure, system calls, the world according to C, research on operating systems

**Unit-2:** Processes and threads - Processes, threads, Inter Process Communication (IPC). Scheduling, classical IPC problems, research on processes and threads

**Unit-3:** Memory management – no memory abstraction, address spaces, virtual memory, page replacement algorithms, design and implementation issues in paging, page segmentation, research on memory management.

#### **BLOCK-II**

**Unit-4:** File Systems – Files, directories, file system implementation, management, and optimization, and example file system, research on file system.

**Unit-5:** Input / Output – Principles of I/O hardware and software, software layers, disks, user interfaces, keyboard, mouse, monitor, thin clients, power management, research on input/output

**Unit-6:** Dead-locks- resources, deadlocks, the ostrich algorithm, deadlocks detection and recovery, deadlocks avoidance and prevention, other issues, research on dead-locks

#### **BLOCK-III**

**Unit-7:** Virtualization and the cloud – History, requirements, type-1 and type-2 hypervisors, techniques, memory virtualization, i/o virtualization, virtual machines on multi-core CPUs, licensing issues, clouds,

**Unit-8:** Virtualization and the cloud - case study VMWARE, research on virtual management. Multiple processor systems – multiple processors, multi-computers

**Unit-9 :** Multiple processor systems – Distributed Systems, research on multiple processor systems

#### **BLOCK-IV**

**Unit-10 :** Security – security environment, operating system security, controlling access to resources, formal models of security, basics of cryptography, authentication

**Unit-11:** Security – exploiting software, inside attacks, malware, defenses, research on security

**Unit-12** Android Case Study - Android and google, History, design goals, architecture, Linux extension, Dalvik, binder IPC, Android applications, intents, application sand boxes, security, process model

#### **PRACTICALS:**

**Unix / Linux/ Ubuntu**

1. Execute the Unix commands ls,cd,pwd,mkdir,mv,cp,rm,rmdir,clear,less,head, tail with various options
2. Execute the Unix commands cat,grep,wc with various options
3. Execute the Unix commands who,sort, wc with <, >, >>, <<, !
4. Execute the Unix commands man, whatis, approve, wildcard characters
5. Execute the Unix commands Chmod, ps, sleep, jobs, fg, kill with various options
6. Execute the Unix commands quota,df,du,gzip,zcat, file, diff, find, set, history
7. Write a Java program. to Set date and time in Linux Operating System
8. Write a Java program Reading date and time from Linux operating system.
9. Write a Java program to set network settings for IPv6 Network in Linux Devices.

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10. Write a Java program to set MAC address in Linux Devices.
11. Write a Java program to get MAC address of Linux based network device.
  - a. Write a Java program to set IP address, subnet mask, network gateway in Linux System.

## Discipline Specific Elective-2 :Semester –V

### **DSE-2 Data Structures and Algorithm Analysis using Java**

#### **BLOCK – I**

**Unit-1:** Mathematics review, Recursion revisited, Generic Templates in C++, Algorithm Analysis-definition,model, running time calculations,

**Unit-2:** Lists-the list ADT, vector and list as Standard Template Library, implementation of vector, Implementation of List

Stacks- The stack ADT, stack model implementation of stacks, applications of stacks

**Unit-3:** Queues - The Queue ADT, Queue model implementation of Queues, applications of Queue.

#### **BLOCK-II**

**Unit-4:** Trees –preliminaries, binary trees, search tree ADT for Binary search tree, AVL Trees

**Unit-5:** Trees - Splay trees, tree traversals revisited, B-Trees, Sets and Maps in the Standard Library

**Unit-6:** Hashing - General idea, hash function, separate chaining, hash tables without linked lists, rehashing, hash tables in the standard library, hash tables with worst case O(1) access, universal hashing, extendible hashing

#### **BLOCK-III**

**Unit-7:** Priority Queues (heaps) - model, simple implementation, binary heaps, application of heaps, leftist heaps, skew heaps, Binomial queues, heaps in STL.

**Unit-8:** Sorting- Preliminaries, insertion sort, A lower bound for simple sorting algorithms, shell sort, heap sort, merge sort

**Unit-9 :** Sorting – quick sort, decision trees, lower bound for decision trees, adversary lower bound, linear-time sorts - bucket sort, radix sort, external sorting

#### **BLOCK-IV**

**Unit-10 :** Graph-Algorithms – definition, topological sort, shortest path algorithms, network flow problems,

**Unit-11:**, Graph-Algorithms - Minimum spanning trees, Application of Depth first search method, NP – Complete problem

**Unit-12** Advanced Data Structures implementation – top-down splay trees, red-black trees, treaps, suffix array and suffix trees, k-d trees, pairing heaps

#### **PRACTICALS:**

13. Implementation of linked lists and double linked lists in Java
14. Implementation of stack in Java
15. Implementation of queues in Java
16. Implementation of binary tree traversals,

17. Implementation of Binary trees or Binary search trees
18. Implementation of AVL trees
19. Implementation of splay trees and B-trees
20. Implementation of hashing
21. Implementation of heaps and heap sort
22. Implementation of linear sorting – bucket sort, radix sort
23. implementation of merge sort, quick sort, insertion sort
24. implementation of network flow and depth first search algorithms