Ref No. BCS/ /2022-2023

Date :12/04/2022

Minutes of the BoS Meeting held on 12.04.2022

The meeting of Board of Studies in Computer Science was convened online on April 12, 2022 at 12:30PM to discuss and approve the following agenda.

1. Confirmation of minutes of last BoS meeting held on September 8, 2021.

2. Approval for UG syllabus of SEM III and IV to be implemented from 2022-23 academic session.

3. Approval to the panel of examiners for odd semesters for the session 2022-23.

4. Any other point with the permission of the Chair.

The Chairman, BoS in Computer Science, welcomed the members and addresses the meeting online and following members attended the meeting online.

1.	Dr P A Saudagar	Chairman
2.	Dr P K Butey	VC nominee
3.	Dr Kavita Khobragade	Subject Expert
4.	Dr V M Lichade	Industry Expert
5.	Mr S A Durge	Faculty Member
6.	Mr M M Wasu	Faculty Member

The meeting was opened for discussion with reference to above agenda.

AGENDA ITEM 1:
Confirmation of minutes of last BoS meeting held on September 8, 2021.
        The minutes of the BoS meeting held on September 8, 2021were read out by the chairman and were confirmed by the members of board of studies in Computer Science.

AGENDA ITEM 2:

Approval for UG syllabus of SEM III and IV to be implemented from 2022-23 academic session.

The syllabus of B. Sc. Semester III and IV of Computer Science subject was approved by the members with little modification. This would be implemented from the academic session 2022-23.

AGENDA ITEM 3:

Approval to the panel of examiners for odd semesters for the session 2022-23.

The chairman sought the approval to the panel of examiners for Semesters I, III and V for the examinations to be conducted in academic session 2022-23.
The panels were approved by the members.

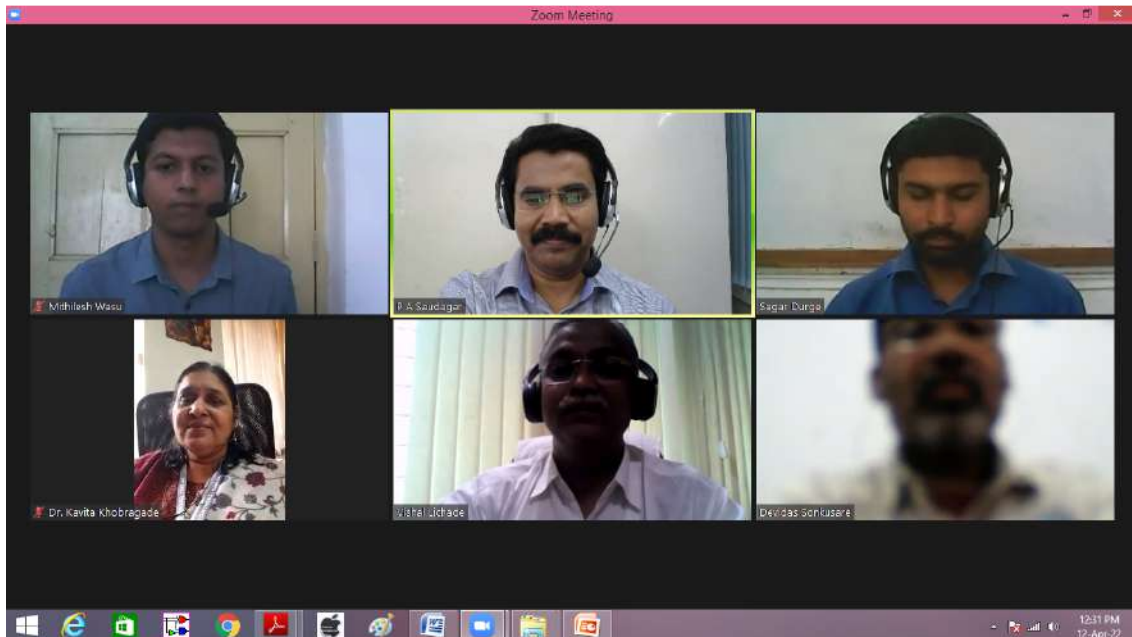**AGENDA ITEM 4:** Any other point with the permission of the Chair

NIL

The meeting was concluded after vote of thanks by the chairman.

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Department of Computer Science

Board of Studies in Computer Science

Meeting held on 12.04.2022 at 12.30pm

Attendees

Shiksha Mandal's
Bajaj College of Science, Wardha
(Formerly known as Jankidevi Bajaj College of Science, Wardha)

SYLLABUS FOR UNDERGRADUATE PROGRAMME B. Sc. Semesters III and IV
(Subject: COMPUTER SCIENCE)
(To be implemented from Academic Session 2022-23, approved in BoS dated 12.04.2022)

B. Sc. Semester III
DATA STRUCTURES and OPERATING SYSTEMS
Course Code: UG-CS (05)-S3-T

Course Outline

Unit I

Stacks: Stacks terminology, Representation of Stacks in Memory, Operation on Stacks, Polish Notations, Translation of infix to postfix & prefix expression, Infix to Postfix Conversion, Evaluation of Postfix Expression, Recursion, Problems on Recursion, Quick Sort and Tower of Hanoi Problem.

Queue: Representation of Queues in Memory, Circular Queue. Dequeue and Priority Queue, Operations of above Structure using Array and Linked Representation.

Unit II

Linked List: Linked List, Representation of Single, Double, Header, Circular Single and Double Linked list, All possible operations on Single and Double Linked List using Dynamic representation, Polynomial Representation and its Manipulation.

Unit III

Sorting and Searching: Selection Sort, Insertion Sort, Merge Sort, Efficiency of Sorting Methods, Big-O Notations. Hash Tables, Hashing Technique, Collision Resolution Technique.

Trees: Basic Terminologies, Representation of Binary Trees in Memory, Traversing of Binary tree, Binary Search Tree, Operation on Binary Search Tree, Heap Tree, Operation on Heap Tree, Heap Sort Method.

Graphs: Basic Terminologies, Definition and Representation of Graphs in Memory: Linked List and Matrix Representation. Traversing graphs: BFS, DFS Method.

Unit IV

Structure of Operating System, Operating System functions, Characteristics of Modern OS. Process Management: Process states, Creation, Termination, Operations on Process, Concurrent processes, Process Threads, Multithreading, Micro Kernels.

CPU Scheduling: Schedulers, Scheduling Methodology, CPU Scheduling Algorithms: FCFS, SJF, RR, Priority Scheduling.

Unit V

Performance Comparison: Deterministic Modeling, Queuing analysis, Simulators. Deadlock and Starvation: Resource Allocation Graph, Conditions for Dead Lock, Dead Lock Prevention, Dead Lock Detection, Recovery from Deadlock.

Memory Management: Logical Vs. Physical Address Space, Swapping, Memory Management Requirement, Dynamic Loading and Dynamic Linking, Memory Allocation Method: Single Partition allocation, Multiple Partitions, Compaction, paging, segmentation, segmentation with paging, protection.

Unit VI

I/O Management: I/O hardware, I/O Buffering, Disk I/O, Raid, Disk Cache.

File Management: File Management system, File Accessing Methods, File Directories, File Allocation Methods, File Space Management, Disk Space Management, Record blocking.

Protection Mechanisms: Cryptography, Digital Signature, User Authentication.

B. Sc. Semester III
COMPUTER SCIENCE PRACTICALS

Section A

1. Program to insert a node at the beginning, at the end and in the middle of the given linked list.
2. Program to delete a node at the beginning, at the end and in the middle of the given linked list.
3. Program to create a linked list of customer names and their telephone numbers. (Using Menu Driven and include features of adding a new Customer and deleting an existing Customer.)
4. Program to reverse a linked list.
5. Program to search a value in the given linked list.

6. Program to insert a node at the beginning, at the end or in the middle of a given doubly linked list.
7. Program to delete a node from the beginning, at the end or in the middle of a given doubly linked list.
8. Program to create, insert and delete a node in Circular linked list.
9. Program to push and pop an element into / from a stack implemented using linked list.
10. Program to push and pop an element into / from a stack implemented using Array.
11. Program to evaluate postfix expression.
12. Program to sort an array using quick sort.
13. Program to solve Towers of Hanoi problems using recursion.
14. Program to perform insertion and deletion operation in linear queues.
15. Program to perform insertion and deletion operation on circular queues.
16. Program to sort an array using: Insertion sort.
17. Program to sort an array using: Selection sort.
18. Program to insert an element in a binary search tree.
19. Program to traverse inorder of a binary tree.
20. Program to traverse preorder of a binary tree.
21. Program to traverse postorder of a binary tree.

Section B

Minimum five study experiments based on unit IV through Unit VI

REFERENCE BOOKS:

1. Classical Data Structures: D. Samantha. PHI, New Delhi.
2. DATA STRUCTURE : LIPSCHUTZ SCHAUM OUTLINE SERIES
3. Data Structures Using C++ : Y. Kanetkar
4. Data Structures Using C++: Tanenbaum
5. Data Structures by Tremblay Sorenson
6. Operating Systems by P. Balakrishna Prasad [Scitech Publication]
7. Operating System Concepts:Silberschatz (Addision Education)
8. Operating Systems – H.M. Deitel–Addision Wesley.
9. Operating Systems– John J. Donoven.
10. Operating System : A.S.Godbole (TMH)
11. Modern Operating Systems : Tanenbaum (Pearson Education)
12. Operating Systems : Peterson

Web Resources:

Students are advised to make use of the resources available on the Internet. Some useful links related to computer science are given below.

1. www.tutorialspoint.com/data_structures_algorithms

2. www.onlinetutorialspoint.com/data-structures/what-is-data-structures
3. www.topcoder.com/community/data-science/data-science-tutorials
4. www.tutorialspoint.com/operating_system
5. www.researchgate.net/publication/3786159_Tutorial

B.Sc. SEMESTER IV
(To be implemented from Academic Session 2022-23, approved in BoS dated 12.04.2022)

JAVA PROGRAMMING and
LINUX OPERATING SYSTEM

Course Code: UG-CS (05)-S4-T

Course Outline

Unit I

Introduction to Java: History of Java, features of Java, getting started with Java. **Java programs:** Introduction of Application & Applets. **Variables:** Variable naming, variable initialization, assign values, Rules of variables, Scope of variable. **Operators:** Arithmetic, Assignment, Unary, Comparison, Shift, Bit- wise, Logical, Conditional, new, Special, Relational. **Data types:** Integers, Char, String, Float etc., Typecasting. **Tokens:** Java tokens, Order of precedence of operators, **Streams:** Input and output. **Creating a class & subclass:** Declaring a class, Naming a class, Rules to assign Class & Subclass, Creating a new object, Class of an object. **Data members:** Declaring data member, Naming variables, using class members. **Methods:** Using data members, Invoke a method, passing arguments to a method, calling method. **Access Specifiers & Modifiers:** Public, Private, Protected, Static & Final. **Overloading:** Method overloading, Constructor overloading. **Java class library:** Different types of classes.

Unit II

Decision making & loops: If-then-else, Switch, ?: operator, While-loop, do-while loop, for loop. **Arrays:** Creating an array, one-dimensional array, two dimensional array. **String:** String array, string methods. **Inheritance:** Single & multiple inheritances. **Interfaces:** Defining interfaces, extending interfaces, implementing interfaces.

Packages: Java API packages, creating packages, accessing packages, adding a class to packages. **Import statement:** Introduction & implementation of import statement. **Applets:** Introduction to Applets & Application, how applets and application are different, creating an applet. Applets life cycle, designing a web page, creating an executable applet, running the applet, applet tags, passing a parameter to applet, HTML tag, Converting applet to application. **Threads:** Overview of threads,

single & multiple threads, life cycle of threads, stopping & blocking threads, working with threads, priority to thread, synchronization. **Exceptions & Errors:** Introduction, types of error, exception, syntax of exception, handling techniques, exception for Debugging.

Unit III

Event: Event driven programming, handling an (AWT) events. **Graphics class:** Introduction, the Graphics classes, drawing & filling of lines, rectangle, circle & ellipse, arcs, polygons, text & fonts, creating a font class, font objects, text, coloring object. **Streams:** Introduction, Abstract stream classes, file input & output. **AWT Applications:** Creating a GUI using AWT toolkit, using component class, frames. **Components & Control:** Textfield, Textarea class, label, button, choice, list, checkbox, class, and combo. **Menus:** Creating a popup menus. **Image:** Type of image, Properties of an image, Displaying an image. **Layouts:** Using Window Listener interface, Different types of Layout, Layout manager, Flow manager, Grid manager. Container: Different types of container (Frame, Dialog, Panel).

Unit IV

Logging In and Logging Out, Anatomy of Linux OS, Directory Structure, /usr Directory, **File Types:** User data files, System data files, Executable files. Naming files and directories, Spawning Processes. **Shell:** Creating User Account, Shell Program, bash shell, Changing shell prompt. **Commands:** Basic Syntax for a command, Exploring the Home Directory, ls, mkdir, rmdir, stat, cat, rm, mv, cp. **Editor:** Vi editor. **Hooking up Hardware Devices:** Formatting a Floppy Disk, Gathering important system information.

Unit V

Backing Up and restoring the File System: Simple Backup, gzip, gunzip, tar. **Printing files:** Print Spool directory, Sending files to Printer. **Sharing Files with other Users:** Maintaining User Accounts, Changing Password, Creating Group Accounts, Granting Access to files, Changing File Ownership, Protecting Files, Making a File Read-Only. **Working with Processes:** Types of processes, ps Command, Creating process, killing process, free command and top utility.

Unit VI

Managing Disk Space: df, du commands, Creating Additional Free Disk Space, Locating Unused Files, Setting System Clock. **Communication Utilities:** who, who am i, finger, mesg, write, wall, talk, Creating a message of the day. X Window System, **Graphical User Interfaces:** KDE and GNOME Desktop Environment.

B.Sc. Semester IV
COMPUTER SCIENCE PRACTICALS
Section A

1. A) Write a program that declares a class, object and also it accesses the data member of it's class.

    B) Write an applet that accepts a value from the user and display it.

2. A) Write a program that accept marks of 5 subject, calculate total, percentage and display the grade according to their percentage.

    B) Write a program that will print the multiplication table from 1 to 10.

3. A) Write a program to accept a set of values from the user into an array, display the values as well as their average.

    B) Accept string into a textfield, sort the characters in the string and display the sorted string into another textfield.

4. A) Write a program to demonstrate the overloading of constructor.

    B) Write an applet that accepts two numbers from user and display all the numbers between them.

5. A) Write a program to demonstrate the single inheritance.

    B) Write an applet to accept 10 numbers into an array, sort the array and display the sorted array. Accept the 10 numbers into the 10 different textfields.

    C) Write a program to create a multiple selection list and also display the list of items selected by the user.

6. A) Write an applet to demonstrate the user menu bar.

    B) Write a sample program that will convert the applet to application.

    C) Write a program to demonstrate the interfaces.

7. A) Write a program for exception handling that accept two numbers as textfields, the values are added and their sum is displayed. The code traps the error when user could enter text instead of numbers.

    B) Write a program that would accept input for the user and store it in a file called Test.java.

8. A) Write a program to implement Graphics class draw (line, rectangle, fill rectangle, circle, oval).

    B) Write an applet that display a choice of menu of three buttons (Add, Modify, Delete) selecting a choice from the menu should display the appropriate button. Use the show ( ) method of the Layout Manager.

9. A) Write a Java program to read and display the information from the file ABC.dat.

B) Write a program to implement the concept of loading and displaying of images.

C) Write a program to demonstrate the Animation in Java.

Section B

Minimum five study experiments based on unit IV through Unit VI

REFERENCE BOOKS:

1. The Art of Programming through Flowcharts & Algorithms by Anil B.Chaudhari, Firewall Media, Laxmi Publication, New Publication.
2. Programming with Java a Primer II edition: E Balagurusamy (TMH).
3. Java Programming (For Absolute Beginners) - Russell, PHI
4. Black Book on Java
5. Java-Complete References
6. Programming in Java Ist Edition – Dr. S.B.Kishor, Rajani Singh, Das Ganu Prakashan.
7. SAMS Teach Yourself Linux-Craig and Coletta Witherspoon [Techmedia]
8. LINUX Complete Reference by Richard Peterson
9. Linux Operating System Ist Edition - Dr. S.B.Kishor, Suhashini Chaurasia, Das Ganu Prakashan.

Web Resources:

Students are advised to make use of the resources available on the Internet. Some useful links related to computer science are given below.

1. www.tutorialspoint.com/cprogramming/
2. www.tutorialspoint.com
3. www.javatpoint.com/java-tutorial
4. www.tutorialspointexamples.com
5. http://www.javatpoint.com/linux-tutorial
6. http://www.guru99.com/unix-linux-tutorial.html
7. www.w3schools.com

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