Teaching and Examination scheme for
Bachelor in Computer Application
Part-II Exam. – 2022

Duration: 3 Hours   Maximum Marks: 70
                                                            Minimum Marks: 25

BCA-201 Computer Organization
Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Note: Non-Scientific Calculator is allowed to be used in examination.

Unit I
Components of a Computer: Processor, Memory, Input-Output Unit, Difference between Organization and Architecture, Hardware Software Interaction. **Number System:** Concept of Bit and Byte, types and conversion. **Complements:** 1's complement, 2's complement. **Binary Arithmetic:** Addition, overflow, subtraction.

Unit II
Logic gates: Boolean Algebra, Map Simplification. **Combinational circuits**: Half Adder, Full Adder, Decoders, Multiplexers. **Sequential circuits:** Flip Flops- SR, JK, D, T Flip-Flop.

Unit IV
Input Output Organization: Peripheral devices, I/O Interface, Asynchronous Data Transfer, Modes of Data Transfer, Direct Memory Access, I/O Processor.

Unit V
Memory Organization: Types and capacity of Memory, Memory Hierarchy, Cache Memory, Virtual Memory.

Unit III
Central Processing Unit: Introduction, General Register Organization, Stack Organization, Instruction Formats, Addressing Mode, Data Transfer and Manipulation, Program Control.

Suggested Readings-

1. Computer System Architecture, By M. Morris Mano (Pearson, Prentice Hall)
2. Carter Nicholas, "Computer Architecture", Schaun outline Sevies , Tata McGraw-Hill.
3. J.P. Hayes, "Computer Architecture & Organization", Tata McGraw Hill
4. Digital Computer Electronics By Malvino Leach, Jerald A. Brown(McGraw Hill)

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BCA-202 Operating System

Instructions for Paper setters

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Unit I

Introduction to Operating System, layered Structure, Functions, Types; Process: Concept, Process States, PCB; Threads, System calls; Process Scheduling: types of schedulers, context switch.

Unit II

CPU Scheduling, Pre-Emptive Scheduling, Scheduling Criteria- CPU Utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling Algorithms-FCFS, SJF, Priority Scheduling, Round Robin Scheduling, MLQ Scheduling.

Unit III

Synchronization: Critical Section Problem, Requirements for a solution to the critical section problem; Semaphores. Deadlock: Characterization, Prevention, Avoidance, Banker's Algorithm, Recovery from Deadlock.

Unit IV

Memory Management: Physical and virtual address space, Paging, Overview of Segmentation;Virtual Memory Management: Concept,Page Replacement technique- FIFO. Linux: features of Linux, steps of Installation, Shell and kernel, Directory structure.

Unit V

Linux: Users and groups,file permissions, commands- ls, cat, cd, pwd, chmod, mkdir, rm, rmdir, mv, cp, man, apt, cal, uname, history etc. ; Installing packages; Shell scripts: writing and executing a shell script,shell variables, read and expr, decision making (if else), for and while loops.

Suggested Readings:

1. Operating System Principals By Abraham Silberschatz, Peter Baer Galvin (John Wiley And Sons Inc.)
2. Operating System Concepts And Design By Milan Milen Kovic (Tata Mcgraw Hill)
3. Modern Operating System Andrew S. Tanenbaum, Herbert Bos
4. Linux in easy steps, Mike McGrath, in easy steps limited
5. Unix concepts and apllications , TMH, Sumitabha Das

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BCA-203 Java

Instructions for Paper setters

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Unit I

Introduction to java: evolution, features, comparison with C and C++; Java program structure; tokens, keywords, constants, variables, data types, type casting, statements, Operators and Expression; Conditional Statements and Loop Statements.

Unit II

Class: syntax, instance variable, class variables, methods, constructors, overloading of constructors and methods. Arrays, Strings and Vectors.

Unit - III

Inheritance: types of inheritance, use of super, method overriding, final class, abstract class, wrapper classes. Interface, Packages and visibility controls.

Unit - IV

Errors and Exceptions: Types of errors, Exception classes, Exception handling in java, use of try, catch, finally, throw and throws. Taking user input, Command line arguments.
Multithreaded Programming: Creating Threads, Life cycle of thread, Thread priority, Thread synchronization, Inter-thread communication, Implementing the Runable Interface;

Unit - V

Swings : Classes, Working With JFrame Windows, Working With Graphics, Working With Colour, Adding And Removing Controls, Responding To Controls, Labels, Buttons, Checkbox, Checkbox Group, Choice Control, Lists, Text Field, Text Area. Menus, Dialog Box, Handling Events.

References

1. The Complete reference Java Ninth Edition By Herbert Schildt (Tata McGraw Hill)
2. Core Java Volume I--Fundamentals (9th Edition) by Cay S. Horstmann, Gary Cornell, Prentice Hall
3. Java: A Beginner's Guide, Sixth Edition: A Beginner's Guide by Herbert Schildt, McGraw-Hill Osborne Media
4. Programming in JAVA By E. Balagurusamy (TMH)
5. JAVA 2 programming Black Book By Steven Holzner et al. (Dreamtech Press)
6. Horstmann, Cay S. and Gary Cornell, "Core Java 2: Fundamentals Vol. 1", Pearson Education.

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BCA-204 Internet Programming

Instructions for Paper setters

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Unit I

Internet Basics: Evolution of Internet, Basic internet terms and applications. ISP, Anatomy of an e-mail Message, basic of sending and receiving, E-mail Protocol; Mailing List- Subscribing, Unsubscribing.

Unit II

Introduction to World Wide Web and its work, Web Browsers, Search Engine, Downloading, Hyper Text Transfer Protocol (HTTP), URL, Web Servers, FTP, Web publishing- Domain Name Registration, Space on Host Server for Web Site, Maintain and Updating.

Unit III

HTML: Elements of HTML & Syntax, Comments, Headings, Paragraph, Span, Pre Tags, Backgrounds, Formatting tags, Images, Hyperlinks, div tag, List Type and its Tags, Table Layout, div, Use of Forms in Web Pages.

Unit IV

CSS**:**Introduction to Cascading Style Sheets, Types of Style Sheets (Inline, Internal and External), using Id andClasses, CSS properties: Background Properties, Box Model Properties, Margin, Padding, List Properties, Border Properties

Unit V

Java Script: Introduction to Client Side Scripting, Introduction to Java Script, Comments, Variables in JS, Global Variables, Data types, Operators in JS, Conditions Statements (If, If Else, Switch), Java Script Loops (For Loop, While Loop, Do While Loop), JS Popup Boxes (Alert, Prompt, Confirm), JS Events, JS Arrays, JS Objects.

Suggested Readings:

1. Thomas A. Powell , "HTML: The Complete Reference", Osborne/McGraw-Hill
2. Deitel, Deitel and Nieto : Internet & WWW. How to program, 2nd Edition, Pearson Education Asia.
3. Bayross, "Web Enabled Commercial Applications Development Using HTML, DHTML, Java Script, Perl CGI," Third Edition, BPB Publications.
4. Internet and Web Page Designing By V.K Jain (BPB)
5. Web Enabled Commercial Application Development Using HTML, DHTML , java script, Perl CGI By Ivan Bayross (BPB)

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BCA-205 (A) Cloud Computing

Instructions for Paper setters

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Unit I

Introduction to Client – Server Computing, Peer-to-Peer Computing, Distributed Computing, Collaborative Computing, Cloud Computing

Unit II

Functioning of Cloud Computing, Cloud Architecture, Cloud Storage, Cloud Services – SaaS, IaaS, PaaS, DaaS and VDI etc.

Unit II

Cloud as Web-Based Application, Cloud Service Development: Pros and Cons, Types, Software as a Service, Platform as a Service, Web Services, On-Demand computing Discovering Cloud Services, Development Services and Tools, overview of major Cloud Service providers- Amazon Ec2, Google App Engine, IBM Clouds, Eucalyptus etc.

Unit III

Application of Cloud Computing for Centralizing Email communications, collaborating on Schedules, Calendars, To-Do Lists, Contact Lists. Cloud for the Community, Group Projects and Events; Cloud Computing for the Corporation. Cloud Computing for Schedules and Task Management, Exploring Online Scheduling Applications and Online Planning and Task Management;

Unit IV

Cloud Computing Collaborating on Event Management, Contact Management and Collaborating on Project Management. Cloud Collaborating on Word Processing, Databases, Storing and Sharing Files; Evaluating Web Mail Services, Evaluating Web Conference Tools; Cloud computing and Social Networks, Groupware, Blogs and Wikis.

Unit V

Data privacy and security Issues and other risks in Cloud Computing

Suggested Readings-

1. Cloud Computing Concepts Technology and Architecture by Thomas Erl, Prentice Hall
2. Cloud Computing Principles and Paradigm by Rajkumar Buyya, James Broberg, Andrzej Goscinski, Wiley Publications
3. CloudComputingTheoryAndPractice by Dan C. Marinescu, Morgan Kaufman Publications

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BCA-205(B) Data Mining
Instructions for Paper setters
The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively.

Note: Scientific Calculator is allowed to be used in examination.

Unit I
Data mining Introduction: Definition, Data mining tasks, Data mining as a step of Knowledge discovery process, Applications of Data mining; Data objects and types of attributes, Recalling mean, median ,mode and weighted arithmetic mean.

Unit II
Data quality , overview of data preprocessing. Classification analysis- definition, Overview of various classification techniques; Decision tree induction- working, examples ,specifying attribute test conditions.

Unit III
Evaluating the performance of a classifier- Holdout method, Random subsampling , cross-validation, Bootstrap; Association analysis: support, confidence, association rules ,Frequent Item sets.

Unit IV
Frequent itemset generation - Apriori principle , Apriori algorithm and examples, FP growth algorithm and examples.

Unit V
Cluster analysis: Definition , overview of basic clustering methods, Density based methods-DBSCAN.

Suggested Readings:

1. Data Mining: Concepts and Techniques, 3rd edition, Jiawei Han and Micheline Kamber
2. Introduction to Data Mining, Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Pearson Education.
3. Data Mining: A Tutorial Based Primer, Richard Roiger, Michael Geatz, Pearson Education 2003.
4. Introduction to Data Mining with Case Studies, G.K. Gupta, PHI 2006
5. Insight into Data mining: Theory and Practice, Soman K. P., DiwakarShyam, Ajay V., PHI 2006
6. Data Mining:: Practical Machine Learning Tools and Techniques (Morgan Kaufmann Series in Data Management Systems) by Witten, Frank, Hall

Duration: 3 Hours   Maximum Marks: 70
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BCA-206 (A) Python

Instructions for Paper setters

The question paper contains 3 sections. **Section-A** consists of 10 questions (2 questions from each unit of syllabus). **Section-B** consists of 10 questions (2 questions from each unit of syllabus). **Section-C** consists of 5 questions (1 question from each unit of syllabus). The word limit of part A, B and C are 50, 200 and 500 respectively

Unit I

Basics: Python Interpreter, writing code in Jupyter Notebook, Indentation, comments, importing a module, binary operators, standard scalar data types, type casting, if-else statements, loops(while, for), pass, range, ternary expressions.

Unit II

Data Structures and Sequences: Tuples, Lists and slicing, Built-in Sequence functions, Dictionary, Sets; List, Set, and Dict Comprehensions. Functions: Namespaces, Scope, and Local Functions; Returning Multiple Values.

Unit III

Functions: Anonymous (Lambda) Functions, Partial Argument Application, Generators. Objects and Methods in Python. NumPy: creating N-dimensional arrays, arithmetic with NumPy arrays, basic indexing and slicing, Psuedorandom number generation.

Unit IV

Pandas: Overview of Series and DataFrames, reading data from csv file, DataFrame operations- working with data using functions like head, tail , info, shape, reshape, columns, isnull, dropna, mean, sum, describe, value_counts, corr, loc, iloc, apply.

Unit V

Matplotlib- plotting basic figures, subplots, line plots, bar plots, histograms, scatter plots. Overview of Scikit-learn, SciPy, networkx. Basic Errors and Exception handling. Basic File Handling. Applications of python.

Suggested Readings:

1. Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Ipython, by Wes McKinney, O'Reilly Media, 2017

2. Python All-in-One for Dummies, by John Shovic and Alan Simpson, John Wiley & Sons, Inc., 2019

3. Programming in Python 3: A Complete Introduction to the Python Language, Mark Summerfield, Pearson.

4. Swaroop, C. H. (2003). A Byte of Python. Python Tutorial.

5. Introduction to Computation and Programming Using Python. By John V. Guttag, MIT Press.

6. Learning Python , Mark Lutz, David Ascher, O'Reilly

7. T. Budd, Exploring Python, TMH, 1st Ed, 2011

Web Resources:

8. https://www.learnpython.org/
9. https://nptel.ac.in/courses/106/106/106106212/
10. http://greenteapress.com/thinkpython/thinkpython.pdf
11. **Python tutorial: https://docs.python.org/3/tutorial/index.html**

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BCA-206 (B) C#

Instructions for Paper setters

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Unit - I

What is C#, C++ vs C#, Java vs C#, History, Features, Environment, Program Structure, basic syntax, Variables, Constants, Data Types, Type Conversion, Operators, Keywords, Control Statement, if-else, switch, For Loop, While Loop, Do-While Loop, Break, Continue, Goto, Comments, Arrays, Multidimensional Array, Jagged Arrays

Unit - II

Object Class, Object and Class, attributes, Constructor, Destructor, this, static, static class, static constructor, Struct, Enum

Unit - III

Inheritance, Aggregation, Polymorphism, Member Overloading, Method Overriding, Sealed, Abstract, Interface, partial class

Unit - IV

Namespace, Strings, Exception Handling, File IO, Serialization, Collections, List<T>, Stack<T>, Queue<T>, LinkedList<T>, generics, nullable type

Unit - V

Properties, indexers, Delegates and events, Reflection, Multithreading

Suggested Readings-

- Beginning C# Object Oriented Programming by Syed Shanu (C# Corner)
- Beginning C# 6 Programming with Visual Studio 2015 by Benjamin Perkins, Jacob Vibe Hammer, Jon D. Reid (Wrox)
- C# 6.0 in a Nutshell: The Definitive Reference 6th Edition by Joseph Albahari and Ben Albahari
- Pro C# 5.0 and the .NET 4.5 Framework (Expert's Voice in .NET) 6th Edition by Andrew Troelsen
- Programming C# for Beginners (Mahesh Chand)

BCA-207 Java (Mini Project)
1. Design Digital clock using applet
2. Design Calculator using AWT with basic functionality on +,-,*,/ and =.
3. Design Indian Flag using Applet.
4. Design analog clock using applet
5. Design program to display fibonacci series in AWT Frame.

BCA- 208 Internet Programming (Mini Project)
1. Create a form in html to registration for membership on website(only HTML).
2. Change the look of the form created in question 1 by using CSS.
3. Implement validation in the form created in question 1 by using javascript.
4. Design your marksheet by using table tag.
5. Design 5 basic page website of your college.

BCA-209 Python (Mini Project)

1. Build a Python Website Blocker. When we surf the internet, many unwanted websites keep showing up. You can build a program that blocks certain websites from opening. This program is beneficial for students who want to study without any social media distractions.

2. Build a Random Password Generator. Creating a strong password and remembering it is a tedious task. You can build a program that intakes some words from the user and then generates a random password using those words. The user can remember the password with the help of the words he gave as an input.

3. Build a Contact Book. This is an excellent python project idea for beginners. Everyone uses a contact book to save contact details, including name, address, phone number, and even email address. This is a command-line project where you will design a contact book application that users can use to save and find contact details. The application should also allow users to update contact information, delete contacts, and list saved contacts. The SQLite database is the ideal platform for saving contacts.

4. Simulate a simple lottery game that involves four players using Python. At the end of game, amount left with each player should be displayed. You may take appropriate assumptions.

5. Build an email Slicer. This is a convenient program that has a lot of use in the future. The program helps get you the username and domain name from an email address. You can even customize the application and send a message to the host with this information.

BCA-209 C# (Mini Project)
1. Write a program in C# Sharp to count a total number of alphabets, digits and special characters in a string.

2. Write a program in C# Sharp to count a total number of duplicate elements in an array.

3. Design program to implement Stack in c#.

4. Write a constructor destructor program in which you make 3 constructors. One is for default constructors with default message, next is parameterized constructor which accept a stringvalue and last one is also parameterized constructor which accept two numerical value and shows add of them. Initialize all constructors and shows output.

5. Write a program using Virtual and Override keyword that does the following tasks.

A virtual function Engine() that has basic properties of engine like Power of engine, RPM, no of Cylinder etc. This function should be overridden in child class according to function.