SCHEME OF EXAMINATION 2020-2021
BCA PART- III

Subject Code	Subject Paper	Theory Marks		Internal Marks		Teaching Load per Week		
		Max. (A)	Min. (B)	Max. (C)	Min. (D)	L	T	P
BCA301	Statistical Analysis	80	27	20	8	4	2	-
BCA302	Programming in Java	80	27	20	8	4	2	-
BCA303	Dot Net Technology	80	27	20	8	4	2	-
BCA304	Software Engineering	80	27	20	8	4	2	-
BCA305	Data Structure	80	27	20	8	4	2	-
BCA306	Computer System Architecture	80	27	20	8	4	2	-
BCA307	LAB VII: Programming Lab in Java	100	50	40	16	-	-	3x2
BCA308	LAB VIII: Dot Net Technology Lab	100	50	40	16	-	-	2x2
BCA309	Project	100	50	20	8	-	-	1x2
TOTAL		780	312	220	88			
GRAND TOTAL	(PAPER + INTERNAL)	(A+C) 1000		(B+D) 400				

- ***Student will have to pass individually in all theory, practical and sessional***

Statistical Analysis
Subject Code - BCA-301

Max Marks : 80 **Min Marks : 27**

Note : The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

UNIT-I

COMBINATORICS: Permutation and Combination, Repetition and Constrained Repetition, Binomial Coefficients, Binomial Theorem.

UNIT-II

Frequency distributions, Histograms and frequency polygons, Measures of central tendency: Mean, Mode, Median, Dispersion, Mean deviation and standard deviation. Moments, Skewness, kurtosis,

UNIT–III

Elementary probability theory: Definition, conditional probability, Probability distribution, mathematical expectation

Theoretical distribution: Binomial , Poisson and Normal distribution, Relation between the binomial, poisoned Normal distribution.

UNIT-IV

Correlation and Regression: Linear Correlation, Measure of Correlation, Least Square Regression
lines.

Curve fitting: Method of least square, least square line, least squares Parabola. Chi-square test: definition of chi-square; signification test: contingency test, coefficient of contingency.

UNIT-V

Basic of sampling theory: Sample mean and variance, students t-test, test of Hypotheses and significance, degree of freedom, Z-test, small and large sampling, Introduction to Monte Carlo method.

TEXT BOOKS:

1. Advanced Engineering Mathematics: H.K. Dass; S. Chand & Co., 9 Revised Edition, 2001.
2. Discrete Mathematics: S.K. Sarkar; S. Chand & Co., 2000.
3. Numerical Analysis: S.S. Sastry; Prentice Hall of India, 1998.
4. Mathematical Statistics: J.N. Kapoor and H.C. Saxena.
5. Mathematical Statistics: M. Ray and H. Sharma

Programming in Java
Subject Code - BCA-302

Max Marks : 80 **Min Marks : 27**

Note : The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

UNIT - I

Introduction: Genesis of java, importance to the Internet, overview of features. **OOP** : OOP features, data types, control structures, arrays, methods and classes, nested & inner classes, string and String Buffer class, Wrapper Class, vectors,

UNIT-II

Operators: Arithmetic Operators, Relational Operators, Logical Operators, Bit wise Operators, Conditional Operators, new operator, [ ] and instance of operator. Control Statements: Java's Selection statement, Iteration Statement, Jump Statement, Array: Declaring Array variables, Constructing an Array, Initializing an Array, Multidimensional Arrays, Anonymous Arrays.

UNIT - III

Introducing Classes: Class Fundamentals, Declaring Object, Assigning Object Reference Variables, Defining Methods, method overloading, Using objects as parameter, Constructors, Garbage collection, finalize () method. Inheritance: Inheritance basic, method overloading, object reference this and super, Chaining constructor using this () and super (), Member accessibility modifier: public, protected, default accessibility of member, private protected, private.

UNIT – IV

Package: Define package, CLASSPATH, importing package, **Interface**: Define an interface, implementing interface, extending interface, variable in interface, Overview of nested class: Top level nested class and interface, Non static inner class, Local class.

Exception Handling : Fundamental: exception types, using try and catch, throwing exceptions, defined exceptions.

UNIT-V

Multithreaded Programming : Java spread model, creating threads, and thread priorities, synchronization. Suspending resuming and stopping threads. **Input/Output:** Basic Streams, Byte and Character Stream, predefined streams, reading and writing from console and files. Using standard Java Packages (lang,util,io), **JDBC:** Setting the JDBC connectivity with backend database.

BOOKS RECOMMENDED :

1. The Complete Reference Java 2 - Herbert Schildt, Publisher- TMH
2. A Programmer Guide to Java - Khlid A. Mughal, R.W. Rasmussen.
3. Web Enabled Commercial Application Java 2 - Ivan Bayross Publisher- B.P.B
4. Java Primer - by E.Balaguruswami
5. Java Programming - Khalid Mughal

Dot Net Technology
BCA 303

Max Marks : 80 **Min Marks : 27**

Note : The Question Paper Setter is advised to prepare unit-wise question with the provision of internal choice.

UNIT-I Inside the .Net Framework

Overview of .Net framework, Features of .Net, CLR, Common Language Specification, JIT compilation, MSIL, Namespace, FCL, Assemblies, Common Type System, Cross Language, Interoperability, Garbage Collection.

UNIT- II Programming with VB.Net

Data types, Variables, Constant, Type Conversions, Operators, Control Structure : Conditional Statement, loops(do loop, for loop, while loop, for Each...Next loop), arrays, Declaring arrays and dynamic arrays, Types, Structure, Enumeration, Sub Procedure, Functions.

Unit- III Windows Form:

Windows Form: Working with visual Studio IDE, Creating a .Net Solution, simple forms, MDI forms, windows forms: Control class, TextBox, Richtextboxes, Labels, Button, Checkbox, Radio Button, Panels, Group box, Listbox , Checked list box, Combobox , Picture box, Scrollbar, Timer, Trackbar, Progress bar. Msgbox Function, Message Box. Show Method, Input Box function, Creating MDI application. Menus, creating Menu, sub menu Items, Context Menu.

Unit- IV OOPS concept

Class and objects, creating classes, objects, creating data member, creating class shared data member, shared methods, shared properties, overloading methods and properties, with statement, constructor, Destructor(using finalize method), Inheritance, overriding base class member, inheriting constructor, overloading base class member.

Unit- V Database Programming

Database concept, Ado.net Architecture, .Net Data Provider(Connection class: OledbConnection,SqlConnection, Command class : SqlCommand class, OleDbCommand class, DataAdapter class, DataReader class), Dataset Component, Creating Database application using windows forms(DB connectivity through ADO.Net), accessing data from database, navigate in data, working with Data Grid.

BOOKS RECOMENDED:

- MSDN online – By Microsoft.
- Visual Basic .NET Complete – BPB Publications, New Delhi.
- The Complete Reference VB. NET – Jeffery R. Shapiro, Tata McGraw Hill.
- Visual Basic .NET Programming Black Book – Steven Holzner by Dreamtech Press.

Software Engineering
Subject Code - BCA-304

Max Marks : 80 **Min Marks : 27**

Note : The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

UNIT – I

Software Engineering Fundamentals: Definition of software product; software development paradigms; software engineering; knowledge engineering and end user development approaches.

Software Analysis:

Abstraction; partitioning and projection; system specification; software requirements specification (SRS) standards; formal specification method; specification tools; flow based, data based and object orientated analysis.

UNIT - II

Systems Design: Idealised and constrained design; process oriented design (Gane and Sarson and Yourdon notations); data oriented design (Warnier – (Orr, E-r modeling); Object oriented design (Booch approach); Cohesion and coupling; Design metrics; design documentation standards.

UNIT - III

Role of Case Tools: Relevance of case tools; High-end and low–end case tools; Automated support for data dictionaries, data flow diagrams, entity relationship diagrams. **Coding And Programming**: Choice of programming languages; mixed language programming and call semantics; Re-engineering legacy systems; coding standard.

UNIT - IV

Software Quality And Testing: Software quality assurance; types of software testing (white box, black box, unit, integration, validation, system etc); debugging and reliability analysis; program complexity analysis; software quality and metrics; software maturity model and extensions. Software cost and Time estimation. Functions points; issues in software cost estimation; introduction to the Rayleigh curve3; alglorithmic cost model (COCOM0, Putnam-slim, Watson and feliix).

UNIT - V

Software Project Management: Planning software projects; work background structures; integrating software, software design and project planning; software project teams; project monitoring and controls.

RECOMENDED BOOKS:

1. Software Engineering: A Practitioner's Approach – by Essman Roger, Tata McGraw Hill
2. An Integrated approach to Software Engineering – by Jalote Pankaj, Narosa: New Delhi.

Data Structure
Subject Code - BCA-305

Max Marks : 80 **Min Marks : 27**

Note : The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

UNIT – I INTRODUCTION –
Introduction, Basic terminology, Elementary data organization, Data structure, Data structure operation, Algorithms: complexity, time-space Tradeoff. Mathematical Notation and functions, Algorithmic Notation

UNIT – II
CONCEPTS OF ARRAYS, RECORDS AND POINTERS –
Basic Terminology, Linear Array; Single Dimensional Array, Multidimensional Array, Static Array, Dynamic Array; **Pointers:** Introduction of Pointer, **Records:** Record Structures.

UNIT – III
LINKED LISTS, STACKS, QUEUES, RECURSION –
Link lists, Traversing a linked list, searching a linked list; Insertion into a linked List, Deletion from a Linked List, Stacks, Array Representation of Stack; Queues.

UNIT – IV
TREES -
Binary Trees, Representing Binary Trees in Memory, Traversing binary tree, Traversal Algorithms using stacks, header nodes; threads, Binary Search Tree, Searching and Inserting in Binary Search Tree, Deleting in Binary Search tree

UNIT - V
SORTING AND SEARCHING –
Sorting: Bubble Sort, Quick Sort, Insertion Sort, Selection Sort, Merge Sort; **Searching:** Liner Search, Binary Search, Searching and data modification, Introduction to hashing.

BOOKS RECOMMENDED :

1. Data Structure - **Seymour Lipschutz (Schaum's Series).**
2. Data Structure & Program Design - **Robert L. Kruse, 3rd Ed., Prentice Hall.**

Computer System Architecture
Subject Code - BCA-306

Max Marks : 80 **Min Marks : 27**

Note : The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

UNIT I

Data Representation – Data Types, Number System, Fixed Point Representation – 1's, 2's complements, Binary Fixed point representation, Arithmetic operation on Binary operation, Overflow & Underflow, Codes, ASCII, EBCDIC codes, Grey codes, Excess-3, BCD codes, Error detection & correcting codes.

UNIT II

Digital Logic Circuits – Logic Gates AND, OR, NOT, Gates & their truth tables, NOR, NAND & XOR Gates, Boolean algebra, Basic Boolean Law, Demorgan's theorem, Map Simplification, Minimizing technique, K Map, Sum of products, Product of sums, Combinational & sequential Circuits Half adder & Full adder, Full Subtractor, Flip Flop – RS, D, JK & T Flip Flop, Shift register, RAM & ROM.

UNIT III

CPU organization, ALU & control circuit, Idea about arithmetic circuits, Program control, Instruction sequencing, Introduction to Microprocessor, System buses, Registers, Program counter, Block diagram of a Macro computer system, Microprocessor control signals, Interfacing Devices, Introduction to Motherboard, SMPS

UNIT IV

Input output organization, I/O Interface, Properties of simple I/O devices and their Controller, Isolated versus Memory mapped I/O, Modes of Data transfer, Synchronous & Asynchronous Data Transfer, Handshaking, Asynchronous serial transfer, I/O processor

UNIT V

Auxiliary memory - Magnetic drum, Disk & Tape, Semi conductor memories, Memory Hierarchy, Associative memory, Virtual memory, address space & memory space, Address mapping, Page table, Page replacement, cache memory, Hit ratio, Mapping Techniques, Writing into cache.

REFERENCE:

1. Computer System architecture – M. Moris Mano
2. Computer Architecture and Organization – Nicholas P Carter, Schaum's Outlines
3. Computer Organization and Architecture – William Stallings

PRACTICAL WORK BCA-307 Programming Lab in Java

1. **Scheme of Examination:-** Practical examination will be of 3 hours duration. The distribution of practical marks will be as follows:

Programme 1	-20
Programme 2	-20
Programme 3	-20
Viva	-20
Practical Copy + Internal Record	-20
Total	**-100**

2. In every program there should be comment for each coded line or block of code
3. Practical file should contain printed programs with name of author, date, path of program, unit no. and printed output.
4. All the following programs or a similar type of programs should be prepared

List of Practical

1. WAP that implements the Concept of Encapsulation.
2. WAP to demonstrate concept of function overloading of Polymorphism.
3. WAP to demonstrate concept of construction overloading of Polymorphism.
4. WAP the use boolean data type and print the Prime number Series up to 50.
5. WAP to print first 10 number of the following Series using Do-While Loops 0, 1, 1, 2, 3, 5, 8, 11...
6. WAP to check the given number is Armstrong or not.
7. WAP to find the factorial of any given number.
8. WAP to sort the element of One Dimensional Array in Ascending order.
9. WAP for matrix multiplication using input/output Stream.
10. WAP for matrix addition using input/output stream class.
11. WAP for matrix transposes using input/output stream class.
12. WAP to add the elements of Vector as arguments of main method (Run time) and rearrange them, and copy it into an Array.
13. WAP to check that the given String is palindrome or not.
14. WAP to arrange the String in alphabetical order.
15. WAP for StringBuffer class which perform the all methods of that class.
16. WAP to calculate Simple Interest using the Wrapper Class.
17. WAP to calculate Area of various geometrical figures using the abstract class.
18. WAP where Single class implements more than one interfaces and with help of interface reference variable user call the methods.
19. WAP that use the multiple catch statements within the try-catch mechanism.
20. WAP where user will create a self-Exception using the "throw" keyword.
21. WAP for multithread using the isAlive(), join() and synchronized() methods of Thread class.
22. WAP to create a package using command and one package will import another package.
23. WAP for JDBC to insert the values into the existing table by using prepared Statement.
24. WAP for JDBC to display the records from the existing table.
25. WAP for demonstration of switch statement, continue and break.

BCA308- LAB VII: Dot Net Technology Lab

1. Scheme of Examination :-

Practical Examination will be of 3 hours duration. The distribution of practical marks is as follows:

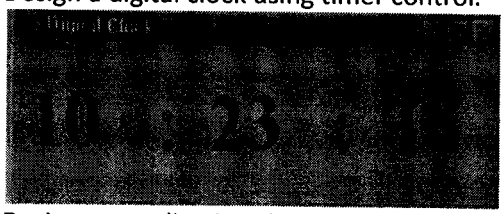
Program1	-	**20**
Program2	-	**20**
Program3	-	**20**
Viva-20		
[Practical Record + Internal Record]	-	**20**
	Total	**-100**

List of Practical

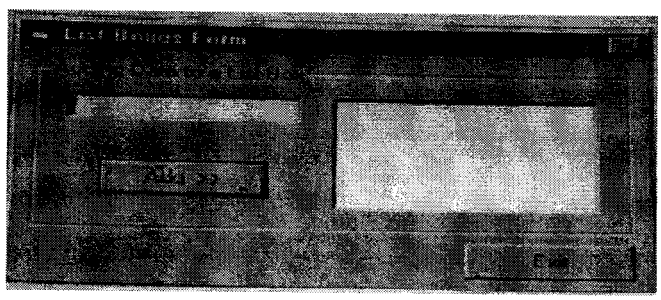
1. Write a program to find maximum between three numbers.
2. Write a program to check whether a number is negative, positive or zero.
3. Write a program to check whether a year is leap year or not.
4. Write a program to check whether a character is alphabet or not.
5. Write a program to find all roots of a quadratic equation
6. Design an application to input marks of five subjects Physics, Chemistry, Biology, Mathematics and Computer. Calculate percentage and grade according to following:
   Percentage >= 90% : Grade A
   Percentage >= 80% : Grade B
   Percentage >= 70% : Grade C
   Percentage >= 60% : Grade D
   Percentage >= 40% : Grade E
   Percentage < 40% : Grade F

7. Design an application to input basic salary of an employee and calculate its Gross salary according to following:
   Basic Salary <= 10000 : HRA = 20%, DA = 80%
   Basic Salary <= 20000 : HRA = 25%, DA = 90%
   Basic Salary > 20000 : HRA = 30%, DA = 95%
8. Design an application to input electricity unit charges and calculate total electricity bill according to the given condition:
   For first 50 units Rs. 0.50/unit
   For next 100 units Rs. 0.75/unit
   For next 100 units Rs. 1.20/unit
   For unit above 250 Rs. 1.50/unit
   An additional surcharge of 20% is added to the bill
9. Write a program to convert decimal to binary number system using bitwise operator.
10. Write a program to swap two numbers using bitwise operator
11. Write a program to create Simple Calculator using select case.
12. Write a program to find sum of all natural numbers between 1 to n
13. Write a program to find first and last digit of any number
14. Write a program to enter any number and print its reverse.

15. Write a program to enter any number and check whether the number is palindrome or not.
16. Write a program to check whether a number is Armstrong number or not.
17. Write a program to print Fibonacci series up to n terms.
18. Write a program to print Pascal triangle upto n rows.
19. Write a program to print all negative elements in an array.
20. Design a digital clock using timer control.



21. Design an application that accepts the item name from the user and add it to a listbox and combobox.



22. Create an application that offers various food items to select from check boxes and a mode of payment using radio button. It then display the total amount payable.

23. Create an application to implement the working of Context menu on textbox.

24. WAP to illustrate all functionalities of listbox and combobox.

25. WAP using checknoxes for the following font effects.

    Bold
    Italic
    Underline
    Increase Font size
    Decrease Font size
    Font Color

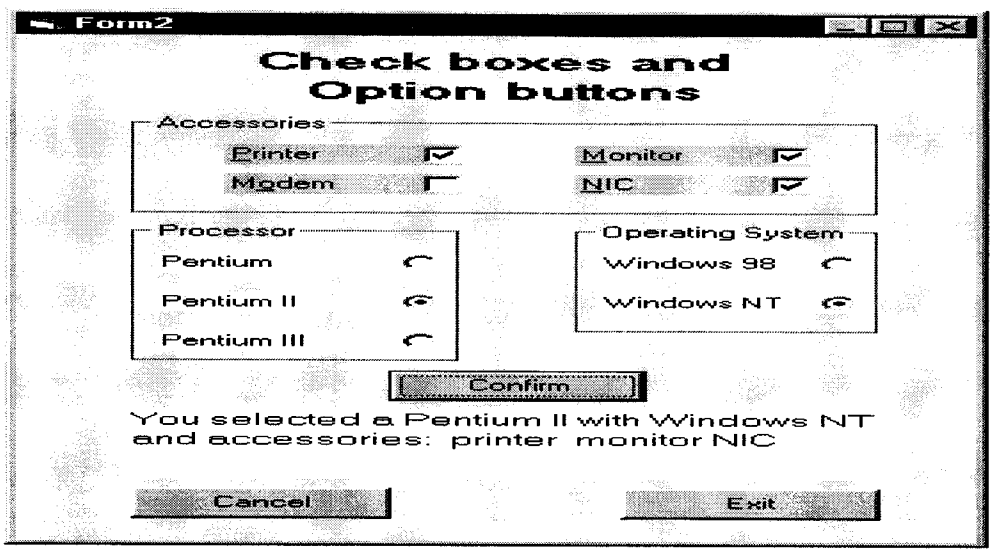
25. WAP for temperature conversion using radiobutton.

26. WAP to launch a rocket using Picturebox and Timer control.

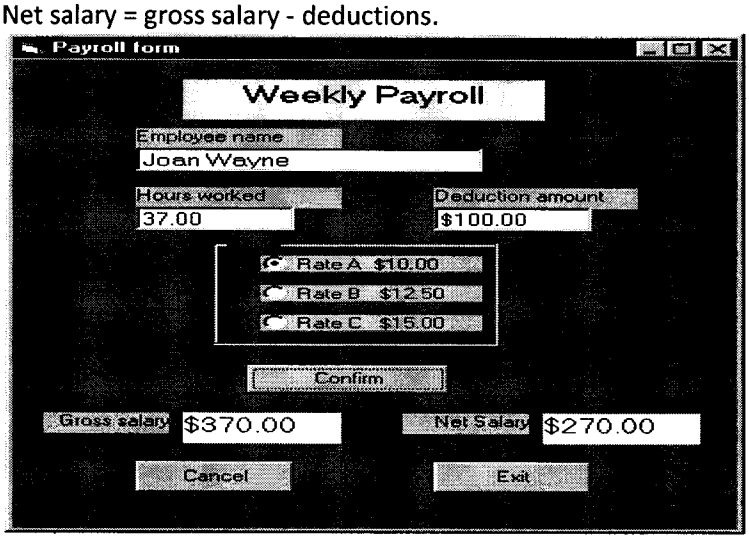
27. WAP to change the back color of any control using scrollbox.

28. WAP to search an element for one dimensional array.

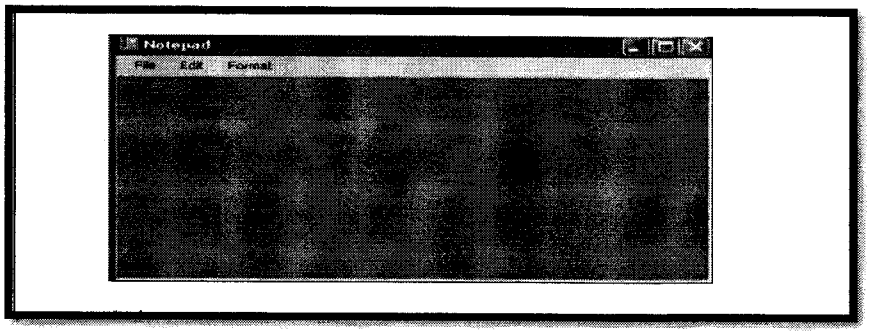
29. Design a menu such that it contain submenu such as Addition, Subtraction, Scalar Multiplication, Multiplication, Transpose of two metrics.
30. WAP to find greatest among three given number using user define procedures.
31. WAP to calculate factorial of a number using user define procedure.
32. WAP to check whether given number is neon or not using user define function.
33. WAP to check whether a given number is Niven or not using procedure.
34. WAP to check whether a given number is duck number or not.
35. WAP to check whether a given number is spy number or not.
36. WAP to check whether a given number .
37. Design the following application using radiobutton and checkbox :



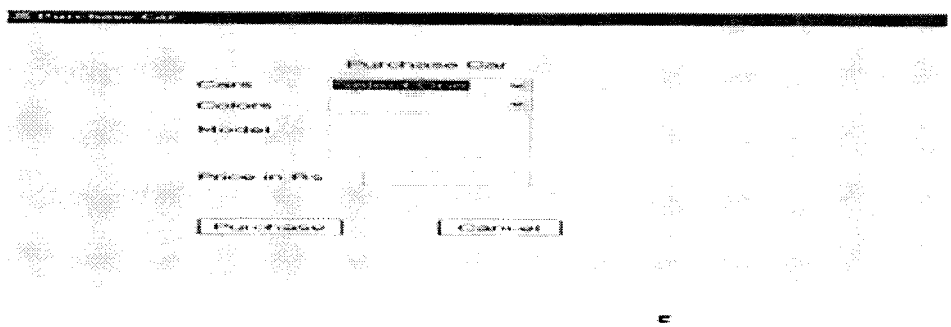
38. Design an application to Create the Payroll form shown below. Number of hours must be entered as well as the appropriate rate.
Gross salary = rate * hours.
Net salary = gross salary - deductions.



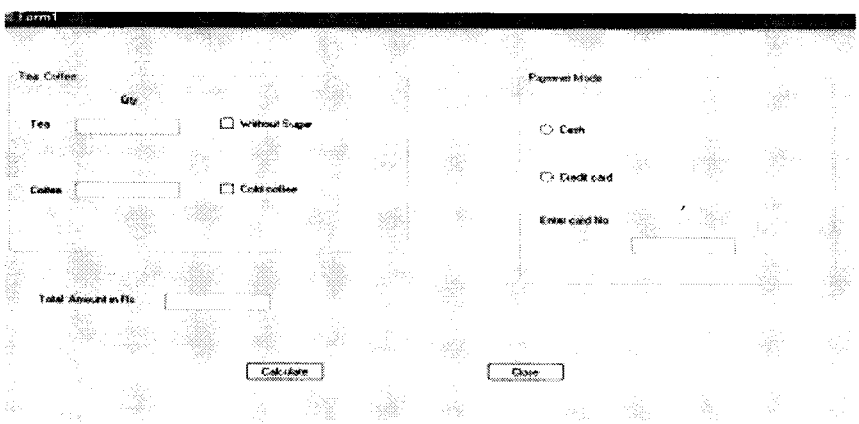
39. Develop an application which is similar to notepad using menus.



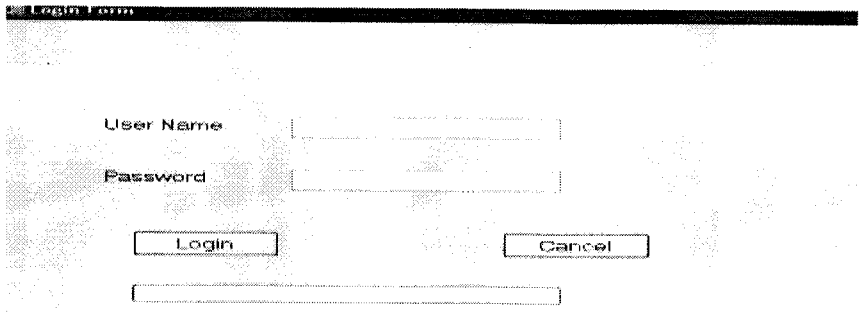
40. Develop an application for facilitating purchasing order



41. Develop an application for billing system in coffee shop

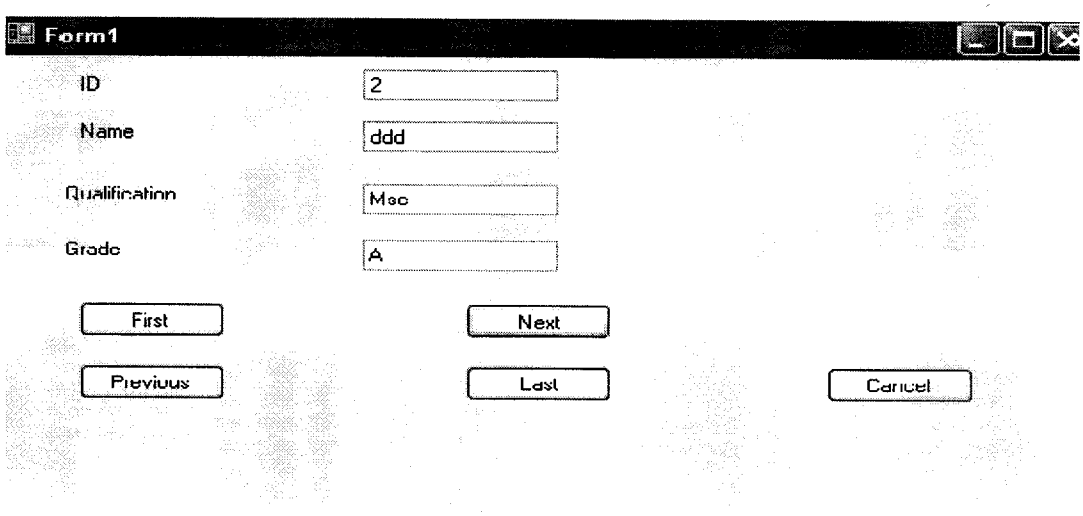


42. Develop an application which is similar to login form



43. Define a Class 'ACCOUNT' .Include following Data members: Name of depositor, Account no, type of Account, balance amount. Member Functions: To Deposit an amount, to withdraw an amount after checking balance, to show balance. Also provide proper validations wherever necessary. Write a main program to test above class.

44. Develop a project which displays the student infromation in the relevant fields from the database which already exists.



45. Define structure student. Structure student has data members for storing name, rollno, name of three subjects and marks. Write member function to store and print data.

46. Write a class having name Calculate that uses static overloaded function to calculate area of circle, area of rectangle and area of triangle.

47.Create a class account that stores customer name, account number and type of account. From this derive the classes cur_acct and sav_acct to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks:

a) Accept deposit from customer.
b) Display the balance
c) Computer and deposit interest.

d) Permit withdrawal and update the balance.
e) Check for the minimum balance, impose penalty, necessary and update the balance.

48. Create a class circle with data member radius; provide member function to calculate area. Derive a class sphere from class circle; provide member function to calculate volume. Derive class cylinder from class sphere with additional data member for height and member function to calculate volume.

49. Consider an example of declaring the examination result. Design three classes:- student, exam and result. The student class has data members such as that representing roll number, name of student. Create the class exam, which contains data members representing name of subject, minimum marks, maximum marks, obtained marks for three subjects. Derive class result from both student and exam classes. Test the result class in main function.

50. WAP that implements the Concept of Encapsulation.

51. WAP to demonstrate concept of Polymorphism (function Overloading and constructor Overloading).

52. Create a class Student having data members to store roll number, name of student, name of three subjects, max marks, min marks, obtained marks. Declare an object of class student. Provide facilities to input data in data members and display result of student.

53. Create a class Student having data members to store roll number, name of student, name of three subjects, max marks, min marks, obtained marks. Declare array of object to hold data of 3 students. Provide facilities to display result of all students. Provide also facility to display result of specific student whose roll number is given.

54. Create a class array having an array of integers having 5 elements as data member provide following facilities:
a) Constructor to get number in array elements.
b) Sort the elements.
c) Find largest element
d) Search for presence of particular value in array element.

55. WAP to display records of a table using dataadapter and code for buttons to move at first record, next record, previous record, last record in the table.

56. Create a table for employee and write a program using **Dataset** to add, delete, edit & navigate records.

57. WAP to access a database using **ADO.net &** display a key column in the combo box or list box when an item is selected in it, its corresponding records is shown in **Datagridcontrol.**