VEER NARMAD SOUTH GUJARAT UNIVERSITY

S.Y. Bsc.

COMPUTER SCIENCE

Paper : III : DATA STRUCTURE USING C++

With Effect From June - 2005.

Objected oriented Programming: C++

1. Introduction
   - 1.1 Introduction to Object Oriented Programming.
   - 1.2 C++ fundamentals.

2. Classes and Objects
   - 2.1 Classes
   - 2.2 Constructors and destructors
   - 2.3 Inline functions
     - 2.3.1 Defining inline functions within a class.
   - 2.4 Friend functions and classes.
   - 2.5 Static class members.
     - 2.5.1 Static data members and member functions.
   - 2.6 Local and nested classes.
   - 2.7 Passing objects to functions and returning objects from function.
   - 2.8 Object assignment.

3. Arrays, Pointers, References and the Dynamic Allocaton Operators.
   - 3.1 Array of objects
   - 3.2 References
   - 3.3 Dynamic allocation operators.
   - 3.4 Pointers to objects
   - 3.5 this pointer

4. Function overloading, copy constructors and Default arguments.
   - 4.1 Function overloading.
   - 4.2 Overloading constructor functions
   - 4.3 Copy constructors
   - 4.4 Default function arguments

5. Opertor overloading
   - 5.1 Creating a member Operator Function

5.2 Operator overloading using friend functions
5.3 Overloading new and delete
5.4 Overloading some special operators.

6. Inheritance
   6.1 Base class Access control
   6.2 Inheritance and protected members
   6.3 Inheriting multiple base classes.
   6.4 Constructor destructors and inheritance
   6.5 Virtual base class

7. Virtual functions and polymorphism

8. Templates
   8.1 Generic functions
   8.2 Applying generic functions
   8.3 Generic classes.

9. Exception handling
   9.1 Exception handling Fundamentals.
   9.2 Handling derived class exceptions.

10. I/O system
    10.1 Streams and stream classes.
    10.2 formatted I/O
    10.3 File I/O
        10.3.1 Opening and closing files.
        10.3.2 Reading and writing text files.
        10.3.3 Unformatted and binary I/O.

-: Data Structure :-

11. Primitive Data Structures and Operations on them

12. Non-Primitive Data Structures

12.1 Arrays
   12.1.1 Single and Multiple array
   12.1.2 Storage Representation.
   12.1.3 Operations
12.2 Stack
   12.2.1 Operation on Stack

12.2.2 Application in Recursion, Polish notation etc.

12.3 Queues
- 12.3.1 Types of Queue
- 12.3.2 Operation on Queue & Applications.

12.4 Linked Lists
- 12.4.1 Types of Linked List
- 12.4.2 Operations on Linkes Lists & Applications.

12.5 Tree
- 12.5.1 Concept and definition of tree & operations
- 12.5.2 Binary tree, 2-3 tree, Height and weight balanced tree.
- 12.5.3 Linked and threaded representation of tree & Applications.

13. Sorting and searching.
- 13.1 Insertion sort, selection sort, Quick sort
- 13.2 Sequential Search
- 13.3 Binary Search

Recommended Reference Books :-

1. The complete reference C++ : Herbert Schildt, TMH.
2. Object Oriented Programming in C++ : Robert Lafore - Galgotia Publication.
3. C++ : Effective Object Oriented Software Construction - Kayshav Dattari.
4. Object Oriented Programming using C++ - Addition Wesley.
5. Object Oriented Programming in C++ - Balaguruswamy.
6. Wirth, Niclaus, Algorith+Data Structure Programs, Prentice Hall.
7. Horwith E and Sahni S, Fundamental of Data Structure, Computer Science Press.
8. Knuth D., The Art of Computer Programming Vol 1-2 , Addition – Wessly.
9. Aho A.V., Hopcrott and Ullman, Data Structure and Algorithms , Addition – Wesslely.

NOTE : Practical shall be based on the above syllabus.

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Paper IV : System Development Tools

With Effect From June - 2005.

Visual Basic.NET

1. Overview of Microsoft.NET Framework
   - 1.1 What is.NET Framework and it's benefits.
   - 1.2 The Common Language Runtime (CLR), purpose of CLR
   - 1.3 Managed/Unmanaged code, Compilation & Execution
   - 1.4 Memory Management, Garbage Collection
   - 1.5 The.NET Framwork class Library
   - 1.6 NET Web Services.
   - 1.7 Introduction to Ms Visual Studio.NET

2. VB.NET Programming Language.
   - 2.1 Data Types, Type Conversion Functions, Operators and Expressions.
   - 2.2 Variable Declaration : Levels, Lifetime, Scope and Accessibility.
   - 2.3 Array : Multidimensional, Jagged Array.
   - 2.4 Collections, User-Defined Data Types.
   - 2.5 Decision Structures
   - 2.6 Loop Structures: While, Do.. Loop, For.. Next, For Each… Next, with…End With.
   - 2.7 Nested Control Statements, Exit & End Statements
   - 2.8 Procedures.

3. Console Applications
   - 3.1 Console Class
   - 3.2 Handling Strings, Characters and Dates

4. Designing User Interface
   - 4.1 Working with Forms
   - 4.2 Basic Windows Controls
   - 4.3 Menus, Timer, Common Dialog Controls, Rich Text Box.
   - 4.4 Tree View and List View Controls, ToolBar, Statusbar.
   - 4.5 SDI and MDI Applications.

5. Object Oriented Programming
    - 5.1 Classes : Methods, Properties, Fields, Events.
    - 5.2 Overloading
    - 5.3 Constructors and Destructors
    - 5.4 Creating and Using Objects, Managing groups of objects
    - 5.5 Abstraction, Encapsulation & Polymorphism

6. Files IO Streams
    - 6.1 Directory and Directory Info class
    - 6.2 File and File Info class
    - 6.3 Path and Environment class
    - 6.4 Sequential - Access File
    - 6.5 Random - Access File
    - 6.6 The File System Watcher Component

7. Data Access
    - 7.1 History of Microsoft Data Access Technologies.
    - 7.2 Overview of ADO. NET
    - 7.3 The Server Explorer and Query Builder
    - 7.4 ADO.NET Object Model
    - 7.5 Programming with ADO.NET

8. Printing with VB.NET
    - 8.1 Print Document
    - 8.2 Print Dialog
    - 8.3 Page Setup Dialog
    - 8.4 Print Preview Dialog
    - 8.5 Print Preview Control

Advanced Visual Basic.NET and ASP.NET

1. Advanced Object Oriented Programming
    - 1.1 Events and Delegates
    - 1.2 Interfaces and Inheritance
    - 1.3 Namespaces
    - 1.4 Class hierarchy design consideration for extensibility
    - 1.5 Object Serialization

2. Exception Handling
    - 2.1 Error in programming
    - 2.2 Exception Handling Overview
    - 2.3 Structures Exception Handling

- 2.4 Programmer-Defined Exception Class
- 2.5 On Error Statement
- 2.6 Debugging

3. Multithreading
   - 3.1 Introduction to Thread
   - 3.2 Life Cycle of a Thread
   - 3.3 Creating Multithreaded Application
   - 3.4 Thread Priorities and Thread Scheduling
   - 3.5 Thread synchronization

4. Networking
   - 4.1 Introduction
   - 4.2 What is Socket?
   - 4.3 Client/Server Interaction via Stream-Socket Connections
   - 4.4 Datagram

5. Extensible Markup Language (XML)
   - 5.1 Introduction
   - 5.2 XML Documents
   - 5.3 XML Namespaces
   - 5.4 Document Type Definitions (DTP_S), Schemas and Validation

6. Introduction to Web Programming.
   - 6.1 Introduction to HTML
   - 6.2 Overview of ASP.NET
   - 6.3 Building a Web Application
   - 6.4 Building Forms with Web Controls
   - 6.5 Validating User Input
   - 6.6 Session Tracking

7. ASP.NET Database Programming
   - 7.1 Understanding Data Binding
   - 7.2 Working with Data Grids

8. Introduction to Wireless Applications with ASP.NET

9. ASP.NET and Services
   - 9.1 Introduction
   - 9.2 SOAP and Web Services
   - 9.3 Publishing and Consumming Web Services

Reference Books :-

1. Mastering Visual Basic.NET
   By Evangelos Petroutsos - BPB
2. Professional VB.NET 2003, 2004 Edition
   By Bill Evjen, Billy Hollis, Rockford Lhotka et al. - Wrox, Wiley dreamtech
3. Visual Basic.NET Programming Bible
   By Bill Evjen, Jason Beres et al.-Wlley dreamtech
4. Visual Basic.NET How to program, second Edition
   By H. M. Deitel, P.J. Deitel, T. R. Nieto-Person Education(Low Price Edition)
5. Database Access with Visual Basic.NET, Third Edition.
   By Jeffrey P. Mc Manus, Jackie Goldstein - Person Education (Low Price Edition)
6. ASP.NET Bible
   By Mridula Parihar, et al. - IDG Books India.
7. Building XML Web Services for ASP.NET
   By Bill Evjen - Wiley Dreamtech.

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Paper V : Relational Database Management System

With Effect From July - 2005.

1. Introduction to DBMS
- 1.1 What is database?
- 1.2 Requirement of database system.
- 1.3 Data models and data independence
- 1.4 DDL, DML
- 1.5 Database Manager, Database Administrator.

2. Entity Relationship Models
- 2.1 Entities and Entity sets
- 2.2 Relationship and relationship sets
- 2.3 Mapping constrains
- 2.4 Primary keys
- 2.5 Entity Relationship diagram and reducing it to tables.
- 2.6 Generation and Specialization.
- 2.7 Aggregation

3. Relational Model
- 3.1 Structure of relational database.
- 3.2 Relation algebra.

4. Introduction to other models
- 4.1 Network Model
- 4.2 Hierarchical Model

5. Relational Database Design
- 5.1 Functional Dependencies
- 5.2 Referential Intergrity
- 5.3 Need for Normalization
- 5.4 Normal forms
- 5.5 Data Dictionary
- 5.6 Tables, Table spaces & Data files, Views.

6. Crash Recovery

6.1 Failure Classification
6.2 Transactions
6.3 Incremental log with differed and immediate updates.
6.4 Checkpoints
6.5 Buffer Management
6.6 Shadow Paging.

7. Distributed Database

7.1 Structure of Distributed database.
7.2 Trade-off in Distributed database.
7.3 Overview of client server computing Model.

8. Security Control and Intergrity

8.1 Security and Intergrity violation
8.2 Authorization and views
8.3 Encription

9. PI / SQL

9.1 Overview of SQL
9.2 Various types of data, conventions and terminology
9.3 Retrival of information from tables. :
Making a query, SELECT command, column recordering, Use of relational operators, use of Boolean operators, operations like IN, BETWEEN, LIKE, NULL, NOT etc., Aggregate functions, COUNT, GROUP By clause, HAVING clause.
9.4 Formatting Query output :
String and expressions, Ordering output by fields, multiple columns, Aggregate Group, Column number, ORDER BY, with NULL.
9.5 Querying multiple tables :
Joining tables through Referential Intergrity, Equijoins and other kinds of joins, joins of more than two tables, Joining a table to itself.
9.6 Subqueries :
DISTINCT with subqueries, Predicates with subqueries, Aggregate Functions in subqueries, Correlated subqueries, Correlating tables to itself, Correlated subqueries in HAVING, Correlated subqueries and joins EXISTS operator, using EXISTS with Correlated subqueries, combining EXISTS and joins, special operator ANY or SOME, ALL, UNION classes.
9.7 Entering Deleting and Changing Field Values :

DML Update command, UPDATE with multiple columns, UPDATing to NULL values, INSERT command, using subqueries with UPDATE commands.

9.8 CREAT TABLE Command :

Indexing, Altering a table, Dropping a table, Constraining a Table, Declaring Constraints, PRIMARY KEY constraint, Foreign and Parent keys, Multicolumn Foreign keys, FOREIGN KEY constraint, Foreign key restrictions.

9.9 CREAT VIEW Command :

Updating views, Group views and Joins, Views and subqueries, Changing values through views, Grant command, using ALL and PUBLIC arguments, GRANT OPTION.

9.10

9.10.1 Using Variables, Constants & Data types.

9.10.2 User-Defined RECORD and TABLE data types.

9.10.3 Assigning Database Values to variables
SELECT……INTO…….CURSORS

9.10.4 Using Flow Control Statements.
The IF…THEN Statement, The LOOP statement
WHILE loops, the GOTO statement.

9.10.5 Error handling Built in PL/SQL Exceptions, User-defined Exceptions, un handled Exceptions.

9.10.6 PL/SQL Programs
Anonymous PL/SQL Blocks, procedures, Functions, packages, Triggers.

Recommended Reference Books :

1. Henry Kroth & Silbershats, Database System Concept.
2. C.J. Date, Introduction to Database Design, Addition Wesley, Nasora.
3. Martin Gruber, Understanding SQL, BPB Pub., New Delhi.
4. Ivan Baross, SQL, PL/SQL The Programming Language of ORACLE, BPB Pub., New Delhi.
5. James Martin, Computer Database Organization, PHI, New Delhi.
6. J Ullman, Principles of Database Systems, Galgotia Pub., New Delhi.
7. ORACLE Manuals.
8. SQL Manuals
9. George Koch and Kevin Loney<ORACLE 8 The Complete Reference, ORACLE Press, TMH, Delhi.
10. Oracle PL/SQL programming - Oracle press - Tata Megrawhill.
11. Microsoft Sql server - pretince hall of India.

NOTE : Practical.