

**Informatics Practices (Code 065)
CBSE Curriculum 2011**

Learning Objectives:

- 1.To understand the application development environment.
- 2.To gain programming Skills in GUI Programming Tool
- 3.To gain skills in Database Creation in RDBMS.
- 4.To learn database connectivity
- 5.To design, program and develop database driven web applications using GUI Programming Tool and RDBMS in open source technologies.
- 6.To develop ability to use Open Source Technologies

Competencies:

- 1.Student will become familiar with Application Development
- 2.Student will be able to develop & debug programs Independently.
- 3.Student can use ANSI SQL for storing and retrieving data from the RDBMS.
- 4.Ability to arrive at a normalized design of tables and other database objects in RDBMS.
- 5.Student will be able to develop a Web Application using Front end and Back end tools.

Class XI (Theory)

Duration: 3 hours

Total Marks: 70

Unit No	Unit Name	Marks
1.	INTRODUCTION TO COMPUTER SYSTEM AND BUSINESS NETWORKING	15
2.	INTRODUCTION TO PROGRAMMING	25
3.	RELATIONAL DATABASE MANAGEMENT SYSTEM	30
		70

UNIT 1: COMPUTER SYSTEM AND BUSINESS NETWORKING

Evolution of computers; Basics of computer and networking: Functional Components of a Computer and their inter-connections, concept of Booting;

Hardware concepts:

To be taught through practicals. Refer to the practicals section.

Role of Input, Processing and Output Devices in a computer system

To be taught through practicals. Refer to the practicals section.

Secondary Storage Devices:

To be taught through practicals. Refer to the practicals section.

Units of Memory:

Bit (Binary Digit), Byte, Kilobyte, Megabyte, Gigabyte, Terabyte, Petabyte

Software Concepts:

Types of Software: System Software, Utility Software, Application Software and Developer Tools

System Software:

Introduction to Operating Systems, Need of operating systems, Functions of Operating System, Types of operating system, Free/Open Source Operating Systems (GNU Linux, OpenSolaris, OpenBSD, Microsoft Windows, Android, Symbian).

Utility Software: Compression tools, Anti Virus, SPAM Filters, File Management tools, Archiving, Backups, Time snapshots of disk and Disk Management tools;

Application Software as a tool: Word Processor, Presentation Tool, Spreadsheet Package, Database Management System; Business software (for example: Inventory Management System, Purchasing System, Human Resource Management System, Payroll System, Financial Accounting, Hotel Management and Reservation System);

Developer Tools: Compilers, Integrated Development Environment (IDE e.g. Netbeans), Debugging Tools, Bug tracking tools (e.g. Bugzilla)

Development of programming languages (History of programming languages)

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- Machine Language, Assembly Language, High Level Language (BASIC COBOL, FORTRAN, PASCAL, LISP, Java, C++); GUI based languages - Visual Basic, Visual C++; C#, Java, vb.net; Scripting Languages – JavaScript

GUI Operating System

Important: Students/Teachers will find it easier to teach these concepts using any operating system that uses a GNOME desktop environment such as Ubuntu, OpenSolaris, Fedora, etc

General features of Desktop: Panel, Icon, Links, Trash, System File Browser, Folder
To be taught through practicals. Refer to the practicals section.

Word Processing

To be taught through practicals. Refer to the practicals section.

Spreadsheet

To be taught through practicals. Refer to the practicals section.

Computer Networking: Network Topologies, TCP/IP addressing, MAC, Switched Network, Packet Networks.

Business Applications: Procurement systems, Inventory systems, Accounting systems, General Ledger, Cash Management, Order Processing, Human Resource Management Systems, Payroll systems, Customer Relationship Management Systems, ERP, Business Intelligence

Industries and Business Computing: Examples of Industries (Production, Shipping, Travel, Hotel, Insurance, Construction, Automobile), Applications of Business Computing in Industries, Ethics in Business Computing, Privacy and Security

UNIT 2: INTRODUCTION TO PROGRAMMING

Introduction to Programming – Modular Programming, Object Oriented Programming, Event Driven Programming

Programming Tool: Java using Netbeans Integrated Development Environment (IDE)

Introduction to Netbeans; How to create a Form, How to use Netbeans Wizards to create an application.

Rapid Application Development using Netbeans IDE ;

Familiarization of IDE using basic Java Swing user Interface components- JLabel, JTextField, JTextArea, JButton, JCheckBox, JRadioButton,

Concept of Java Project Options – General Application (Desktop), Web Application, Mobile Application;

How to create Java Applications, Writing a Hello World Application.

Creating a Simple Hello World Swing Application

Developing General Application- Getting Familiar with Java Swing User Interface components.-

JFrame, JDialog, JOptionPane, JPanel, JScrollPane, JLabel, JTextField, JPasswordField, JTextArea, JButton, JCheckBox, JRadioButton, JComboBox, JList, JTable, JFileChooser, JColorChooser, JToolBar, JMenu, Understanding JAR

Event Listener – ActionListener, FocusListener, KeyListener, MouseListener.

The functionality and the packages have been defined in the Appendix (Refer Appendix I)

Programming Fundamentals

Data Types:

byte, short, int, long, float, double, char, String (or any object), boolean

Variables:

Need to use variable, Declaring Variables, Variable Naming Convention, Assigning value to Variables, Data Types of variable, Scope and lifetime of Variables (Public and Private);

Control Structures:

Decision Structure – IF, IF--ELSE, Switch;

Looping Structure- WHILE, DO WHILE, FOR;

Object Oriented Programming using Java: Features of Java, Classes in Java.

Programming Methodology:

General Concepts; Modular approach; Stylistic Guidelines: Clarity and Simplicity of Expressions, Names, Comments, Indentation; Documentation and Program Maintenance; Running and Debugging programs, Syntax Errors, Run-Time Errors, Logical Errors;

Problem Solving Methodology and Techniques: Understanding of the problem, Identifying minimum number of inputs required for output, Step by step solution for the problem, breaking down solution into simple steps, Identification of arithmetic and logical operations required for solution, Using Control Structure: Conditional control and looping (finite and infinite);

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UNIT 3: RELATIONAL DATABASE MANAGEMENT SYSTEM

Database Management System

Introduction to database concepts: Relation/Table, attribute, Tuple / Rows, field, Data, Concept of String, Number and Date values, Data type and Data Integrity (Domain and Referential Integrity). Candidate key, Alternate key, Primary Key, Foreign Keys; Data Normalization-first, second, third, ;

Examples of Commercially available Database Management System's (Back-End) – MySQL, Ingres, PostGres, Oracle, , DB2, MsSQL, Sybase.

Examples of Integrated Development Environments: Netbeans

RDBMS Tool :

Introduction to MySQL, Login Prompt, Entering Name and Password;
(Only ANSI SQL 99 commands to be used for teaching. ANSI SQL 99 standard is supported by most commercial and open source databases such as MySQL)

Classification of SQL Statements: DML (SELECT, INSERT, UPDATE, DELETE), DDL (CREATE, DROP, ALTER, RENAME, DCL (GRANT, REVOKE), TCL (START TRANSACTION, COMMIT, ROLLBACK);

SQL SELECT Statement: SQL SELECT statement, Selecting All the Columns, Selecting Specific Column, Using Arithmetic Operators, Operator Precedence, Working with NULL values, Defining and using Column Alias, Duplicate rows and their Elimination (DISTINCT keyword), Displaying Table Structure (DESC command);

SELECT Statement Continued: Limiting Rows during selection (using WHERE clause), Working with Character Strings and Dates, Using Comparison operators, BETWEEN Operator, IN Operator, LIKE Operator (_,%), IS NULL Comparison, IFNULL() function, Logical Operators, Use of Logical Operators (AND/OR/NOT Operators), Logical Operator Precedence, ORDER BY Clause, Sorting in Ascending/Descending Order, Sorting By Column Alias Name, Sorting On Multiple Columns;

Functions in MySQL:

String Function- ASCII(), CHAR(), CHAR_LENGTH(), CONCAT(), DECODE(), ENCODE(), INSTR(), LCASE(), LEFT(), LOWER(), LENGTH(), LTRIM(), MID() REPLACE(), RIGHT(), RTRIM(), REPEAT(), REVERSE(), SUBSTR(), SUBSTRING(), TRIM(), UCASE(), UPPER().

Mathematical Functions- MOD(), POWER(), ROUND(), SQRT(), TRUNCATE().

Date and Time Functions- ADDDATE(), CURDATE(), CURTIME(), DATE_ADD(), DATE(), DATEDIFF(), DATE_FORMAT(), DAYNAME(), DAYOFMONTH(), DAYOFWEEK(), DAYOFYEAR(), MONTH(), LAST_DAY(), NOW(), SYSDATE(), TIME(), TIMEDIFF(), YEAR().

Grouping Records: GROUP BY, group functions (MAX(), MIN(), AVG(), SUM(), COUNT()), Using AVG and SUM Functions, Using MIN and MAX Functions, Using the COUNT Function, using COUNT(*), DISTINCT clause with COUNT, Group Functions and Null Values, Using IFNULL Function with Group Functions

Displaying Data From Multiple Tables: Concept of Join, Result of Join, Cartesian Product and Generating Cartesian Product example using Mathematical Set), Types Of Joins (EQUI, SELF, NON-EQUI, OUTER (LEFT and RIGHT)), Equi-join: Retrieving Records with Equi-join, Additional Search Conditions using AND operator, Non-Equi join and its Implementation, Outer-Join and Its Usage, Self-Join (Joining a table to Itself); SubQuery using operators ANY, IN, ALL and arithmetic operators.

Manipulating Data of A Table/Relation: Concept of DML (Data Manipulation Language), INSERT Statement, Inserting New Rows, Inserting New Rows with Null Values, Inserting Date Values, Use of Substitution Variable to Insert Values, Copying Rows From Another Table, Update Statement to Change Existing Data of a Table, Updating Rows In A Table, Updating Rows Based on Another Table, Delete statement/ Removing Row/Rows from a Table, Deleting Rows Based on condition from another Table; Making Data Manipulation Permanent (COMMIT). Undo Data Manipulation Changes (ROLLBACK)

Database Objects: View, Table, Naming Convention, Creating Views, Retrieving Data From a View, Querying a View, Modifying a View,

Including Constraints: Constraints, Concept of using Constraints, Constraint Guidelines, Defining Constraints, NOT NULL, UNIQUE KEY, PRIMARY KEY, FOREIGN KEY, CHECK, Adding a Constraint, Enabling Constraints, Viewing Constraints, Viewing The Columns Associated with Constraints;

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Creation of a Table/Relation: CREATE TABLE Statement, Data types (INT, FLOAT, CHAR, VARCHAR, DATE). The DEFAULT option, Creating Tables, Referencing Another User's Tables, Querying the Database Dictionary to view all tables in the MySQL Database, Creating a Table by Using a Query;

Managing Existing Tables and other Database Objects: The ALTER TABLE Statement, Adding a New Column in a Table, Modifying Existing Column, Dropping a Column, Renaming an Object, Drop Views, Drop Tables;

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Duration: 3 Hours

Total Marks: 30

1. Hands on Experience

15

A problem should be given covering the following

- Table definition (The table must include constraints)
- A form with JLabel, JTextField, JPasswordField, JTextArea, JButton, JCheckBox, JRadioButton, JComboBox, JList, JTable.
- Using JDBC access tables in the database
- Using JDBC to view Database fields in the form.

2. Practical Exercise File

05

The practical file should contain print outs from each of the following topics. (Refer to Appendix 1)

1. Create a Java Desktop application using NetBeans with a JTextField component to print "Hello World" in a message box.
2. Create a Java Desktop Application having two JTextField components on the Window. Get First Name and Last Name in it. On clicking Ok button a message should appear by joining First Name + Last Name. e.g. if user enters Rajyash in First Name, and Swami as Last Name then the message to be printed should be "Rajyash Swami".
3. Create a Java Desktop Application to perform simple Addition Problem using message box.
4. Create a Java Desktop Application to perform simple Addition Problem displaying output on TextBox
Create a small Java Desktop Application working as a general purpose calculator.(+, -, x, ÷)
5. Create a Java Desktop Application to calculate discount for a given Price
6. Create a Java Desktop Application to find the Eligibility to vote for the given age (using the if construct)
7. Create a Java Desktop Application perform the following Calculation :
 - a) calculation of Total and Average Marks
 - b) Displaying the Distinction/Average Marks based on the Total Marks scored.
 - c) Displaying the grade (A, B, C, D) based on the Total Marks Scored.
8. Create a Java Desktop Application to calculate the Allowance and the Income Tax for given Basic Salary.
9. Create a Java Desktop Application to find Salary of the employee on the basis of "Designation" selected using JList
10. Create a Java Desktop Application to find the Discount of an item on the basis of Category of item [Electrical Appliance/Electronic Gadget/Stationary – JRadioButton] and its Cost [Below 1000/Above or equal to 1000 – JRadioButton].
11. Create a Java Desktop Application to find the incentives for a Sales Person on the basis of his [Maximum Sales, Excellent Customer Feedback, Maximum Count of Customer – JCheckBox]
12. SQL assignments setup the **school** DEMO database in MySQL. (Steps to create the database and the database schema have been specified in the appendix
(Refer to Appendix II)
SQL assignments using the DEMO database for example employees table, departments table, dept_manager table):
 - Display all the records (all columns) from table employees.
 - Display emp_no and first_name of all employees from table employees.
 - Display emp_no and salary added with commission from table employees.
 - Display first_name joined with last_name with heading "Employee Name", salary*12 as "Annual Salary" from table employees.
 - Display distinct salary of employees from table employees.
 - Show the Structure of table departments
 - Write a query to display emp_no and salary of employees whose salary is greater than or equal to 30000 from table employees.
 - Write a Query to display first_name, salary who are not getting commission from table employees.
 - Write a Query to display emp_no, salary and salary*12 as "Annual Salary" whose commission is not NULL from table employees.
 - Write a Query to display employee name (first_name) and salary of those employee who don't have their salary in the range of 1500 to 2000 from the table employees.
 - Write a Query to display first_name, salary, and hire_date of employees who are hired between February 20, 1981, and May 1, 1981. Order the query in ascending order of hire_date.

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- Write a Query to display the first_name and hire_date of all employees who were hired in 1982.
- Write a Query to display the first_name, designation and salary of employee where designation is not manager.
- Write a Query to display the first_name of employee whose name contains 'A' as third alphabet.
- Write a Query to display the first_name of employee whose name contains 'T' as the last alphabet.
- Write a Query to display the first_name of employee whose name contains 'M' as first alphabet 'L' as third alphabet.
- Write a Query to display the first_name of employee who is having 'L' as any alphabet of the name.
- Write a query to display the current system date.
- Write a Query to display emp_no, first_name, salary, salary increase by 15% expressed as a whole number. Label the column as New Salary.
- Write a Query to display the employee's first_name and "Salary review date, which is the date after six months of hire_date.
- Write a Query to display the employee's first_name and "Salary Review Date", which is the date after six months of hire_date in format of 'Sunday, 7 SEP, 1981'.
- For each employee display employee first_name and total number of weeks lapsed between hire_date and Today.
- Create a query that produces display in the following format
- <first_name> Earns \$<salary> Monthly and working as <designation>
- Write a query which displays the employee first_name with the first letter capitalized and all other letters lower case and length of there name string.
- Write a Query to to display the employee first_name and commission amount. If the employee does not earn commission, put "No Commission". (using IFNULL() function)
- Write a query to display the grade of all employees based on the value of the column designation as per following scheme:

DESIGNATION	GRADE
PRESIDENT	A
MANAGER	B
ANALYST	C
SALESMAN	D
CLERK	E
NONE OFTHE ABOVE	O
- Write a query to display the first_name and dept_no and dept_name for all employees using tables employees and departments.
- Write a Query to display employee first_name, dept_name and location of all employees who have emp_no between 7500 and 7900.
- Write a Query to display the employee first_name, dept_no and all the employees that worked in the same department as a given employee.
- Write a Query to display employee first_name and hire_date of employees who are employed after Employee named 'BLAKE'.
- Write a Query to display employee number (emp_no), first_name and manager's name with their manager number.
- Write a Query to Display the Sum, Average, Highest and Lowest salary of the employees.
- Write a Query to Display the Sum, Average, Highest and Lowest salary of the employees grouped by department number(dept_no).
- Write a Query to Display the Sum, Average, Highest and Lowest salary of the employees grouped by department number (dept_no) and sub-grouped by designation.
- Write a query to display the number of employee with same designation.
- Write a query to display the average of Highest and lowest salary of each department.
- Write a query to display the difference of Highest and lowest salary of each department having maximum salary > 4000.
- Write a query to display the employee first_name and designation for all employee in the same department as 'ALLEN'
- Write a query to display employee first_name and salary of those who either work in department 10 or have salary greater than employee 7521. (recheck)

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13. Before the following exercise please ensure that you are provided with a table emp with structure mentioned in **Appendix II**

- Use DESCRIBE command to ensure the table structure.
- Add the following data in the above Table as instructed

ID	First_Name	Last_Name	User_ID	Salary
1	Dim	Joseph	Jdim	5000
2	Jagannath	Mishra	jnmishra	4000
3	Siddharth	Mishra	smishra	8000
4	Shankar	Giri	sgiri	7000
5	Gautam	Buddha	bgautam	2000

- Populate table with first record mentioning the column list in the insert clause.
 - Populate table with next two records without mentioning the column list in the insert clause.
 - Populate table with 4th record and enter only ID and First_Name
 - Populate table with 5th record and enter ID, User_ID, and Last_Name only.
 - For record with ID = 4 update record with Last_Name User_ID and Salary.
 - For record with ID = 5 update records with First_Name and Salary.
 - Make the changes permanent.
 - Modify the Last_Name, of the employee 3, to Gautam.
 - Modify the Salary and increase it by 1000, for all who get salary less then 5000.
 - Delete the employee record having First_Name as Siddharth.
 - Make the changes permanent.
 - Remove the entire contents of the table
 - Undo the above step.
 - Create a table emp1 with columns ID, First_Name and Dept_ID from table employees and also confirm the existence of table emp1
 - Create a view VU_Emp1 which should include column emp_no, first_name and dept_no from the table employees.
 - Create a view VU_Emp2 which should include column emp_no, first_name and dept_no from the table employees and change the column headings as EmpNumber, Employee, Department..
- Create the table Department table based on the following table instance chart.

Column Name	ID	Name
Data Type	NUMBER	VARCHAR
Length	8	25

- Populate the table Department with data from table departments. Including only required columns.
- Create the table Employee1 based on the following table instance chart.

Column Name	ID	First_Name	Last_Name	Dept ID
Data Type	NUMBER	VARCHAR	VARCHAR	NUMBER
Length	8	25	25	8

- Rename table Employee1 to Employee2.
- Drop table Employee2.
- Drop table emp and Department
-
- Create table Customer as per following Table Instance Chart.

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- Add one column Email of data type VARCHAR and size 30 to the table Customer.
- Change the data type of column pincode to VARCHAR(10) in the table Customer.
- Add one more column CustomerIncomeGroup of datatype VARCHAR(10).
- Insert few records with relevant information, in the table.

Column Name	Cust_ID	Cust_Name	Cust_Add1	Cust_Add2	Pincode	Cust_Phone
Key Type						
Nulls/Unique						
Fk Table						
Fk Column						
Datatype	number	varchar	varchar	varchar	int	varchar
Length	7	30	20	30	6	10

- Drop the column CustomerIncomeGroup from table Customer.
- Create table Department as per following Table Instance Chart.

Column Name	DeptID	DeptName	DeptLocation
Key Type	Primary		
Nulls/Unique		NOT NULL	
Fk Table			
Fk Column			
Datatype	NUMBER	VARCHAR	VARCHAR
Length	2	20	20

- Create table Employee as per following Table Instance Chart.

Column Name	EmpID	EmpName	EmpAdd	Phone	EmpSal	DeptID
Key Type	Primary					Foreign
Nulls/Unique		NOT NULL				
Fk Table						Department
Fk Column						Dept ID
Datatype	number	varchar	varchar	varchar	int	varchar
Length	6	20	30	10	9,2	2

- Create table Employee1 as per the above Table Instance Chart but now use table level primary key addition method.
- Create table Employee2 as per the above Table Instance Chart without any constraint while table creation.
- Add a PRIMARY KEY constraint to the table Employee2 using the EmpID column.
- Add a FOREIGN KEY reference on the Employee2 table.
- Add a NOT NULL constraint to the table Employee2 on column EmpName.
- Add a CHECK constraint to ensure, at the time of record insertion, that employee records with salary less than 2000 are to be prohibited.
- Disable NOT NULL Constraint on the column EmpName from the table Employee2
- Drop UNIQUE constraint from the column DeptName in table Department

13. Create an Application in Java through NetBeans having Menu Bar, Tool Bar and other components to View, Add and Modify records present in the Database Tables.

3. Project

05

The following case study is to be used to develop a team project.

A cable company in Delhi is working since 1998. They have about 2 Lac customers in different zones (North, South, East, and West). Company wants to computerise its working, which involves Customer Registration, Customer Billing, and Bill Collection on monthly basis.

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Develop a Database Handling Software for the company. The software should have option to enter customer data and information of bill collection. The data entry form should also have option to navigate through the records.

The software should allow to store following information of customer and billing (Normalize this to store data in tabular form).

- Customer Name
- Customer Address
- Customer City
- Customer Zone
- Customer Pin Code
- Customer Phone
- Customer Interest (Movies, Games etc)
- Customer Monthly Income
- Customer Monthly Installment
- Customer Joining Date
- Bill Cycle
- Bill Collection Date

(Suitable assumptions can be made)

The user interfaces should be designed in Java and must be user friendly with correct tab order.

Note: Similar type of cases can also be encouraged, provided it should include almost every aspect of course undertaken.

4. Viva Voce

05

Five questions from topics covered in the curriculum

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COMPUTER LAB BASED EDUCATION (CLASS XI)

Hardware concepts (To be taught by opening a PC and showing the components):

Microprocessor; Hard Disk, RAM; Mother Board; Boards; USB port; RJ45 LAN port; serial port; CD/ DVD drive;

Components to be shown through Charts and CBSE video:

Central Processing Unit (CPU); Arithmetic Logic Unit (ALU), Control Unit, Memory Unit (RAM - Random Access Memory & ROM - Read Only Memory)

Role of Input, Processing and Output Devices in a computer system (Shown by a combination of CBSE video and real-life devices where available):

Input devices: Keyboard, Mouse, Light pen, Touch Screens, Graphics Tablets, Joystick, Microphone, , OCR, Scanner, Smart Card reader, Barcode reader, Biometric sensor, web cameraThin Clients;

Output Devices: Monitor/Visual Display Unit (VDU), LCD screen, Television, Printer (Dot Matrix Printer, Desk jet/ Ink jet/ Bubble jet Printer, Laser Printer), Plotter, Speaker, Thin Clients;

Secondary Storage Devices: Floppy Disk, Hard Disk, Compact Disk, Magnetic Tape, Digital Versatile Disk (DVD) USD Drive, Memory cards;

General features of Desktop: Panel, Icon, Links, Trash, System File Browser, Folder

Panel: Applications menu, Places menu, System menu

Applications Menu: Accessories - Calculator, Text Editor, Graphics Image Viewer, Open Office.org Drawing; Internet-Web Browser, Internet messenger, Mail Client; Office – OpenOffice.org; Sound & Video - (CD Player, Sound Recorder, PMovie Player, Music Player, Universal Access- Orca Screen Reader and Magnifier.

Places Menu: Home Folder, Desktop, Computer, Network, Search for Files.

System Menu: Preferences- About me, Appearances, Assistive Technologies, Keyboard shortcuts, Main Menu, Mouse, Network Proxy, Preferred Applications, Screen Resolution, Screen Saver, Sound; Administration – Hardware Driver/Device Driver Utility, Package Manager, Printing/Print Manager, Update Manager, Users and Groups, Time and Date, Language Support; Help; Log Out; Shut Down.

Word Processing

Purpose of using word processing software, opening a new/existing document, closing a document, typing in a document, saving a document, page preview, printing a document, setting up of page as per the specifications, selecting a portion of document, copying selected text, cutting selected text, pasting selected text; changing font, size, style, color of text; Inserting symbol; Formatting: Alignment – Left, Right, Center; Converting from word processing to PDF format directly from OpenOffice.org

Spreadsheet

Purpose of using spreadsheet software, opening a new/existing spreadsheet, closing a spreadsheet, understanding what is a cell, row and column, typing in numbers in the cell, saving a spreadsheet, page preview, printing a spreadsheet, setting up of page as per the specifications, selecting a portion of spreadsheet, writing formulas for addition, subtraction and multiplication in cells, writing simple arithmetic formulas in spreadsheet, copying formulas across cells, Converting from spreadsheet to PDF format directly from OpenOffice.org

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Class XII (Theory)

Duration: 3 hours

Total Marks: 30

Unit No	Unit Name	Marks
1.	BUSINESS COMPUTING	10
2.	PROGRAMMING	25
3.	RELATIONAL DATABASE MANAGEMENT SYSTEM	25
4	IT Applications	10
		70

UNIT 1: IT CONCEPTS

General Concepts : User Interface (Front End User Interface), Graphical User Interface (Back End Database), Integration of User Interface and Database

Client Server Computing: Concept of Client Server Computing.

Data Dictionary, Data Warehousing, Data Mining, Meta Data;

Introduction to Free and Open Source based software and Open Standards:

Terminology: FLOSS, GNU, FSF, OSI, W3C, OASIS .

Definitions: Free/Open Source Software, Open Standards, Freeware, Shareware, Proprietary software, Localization, UNICODE

Softwares : Linux, OpenSolaris, Mozilla web browser, Apache server, MySQL, Postgres, Pango, OpenOffice.org, Tomcat, PHP, Python, Netbeans

Open Standards : Open Document Format, ANSI SQL 99, HTML, XML, J2EE, TCP/IP

Websites : www.sourceforge.net, www.openrdf.org, www.opensource.org, www.linux.com, www.linuxindia.net, www.gnu.org, www.mysql.com, dev.java.net, opensolaris.org, code.google.com, jcp.org

More application areas of IT:

Inventory control, Financial Accounting, Pay-Accounting System, Invoicing Management System, Personal Management System / HRD System, Fees Management system, Result Analysis System, Admission Management System, Income Tax Management System;

Advanced Program Development Methodology: System Development Life Cycle, Relational Database Concept, Relational Database, Management System, Data Models (Entity Relationship Model), Entity and Entity Set, Attributes (Single, Composite and Multi-Valued), Relationship (One-to-One, One-to-Many and Many-to-Many), Entity Relationship Modeling Conventions, Communicating with an RDBMS using SQL, Relational Database Management System, SQL Statements, About programming language in SQL.

Object Modeling: Introduction to object oriented modeling using (Concepts only).

UNIT 2: PROGRAMMING: Java

Review of Class XI;

Programming Fundamentals

Object Oriented Programming : Classes in Java Understanding JAR, ;
Introduction to Netbeans; How to create a Form, How to use Wizards to create an application.

Procedures: Procedures (General, Event, Function, Property);

Control Structures:

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Revision of Decision Structure – IF, IF-ELSE, Switch;
Revision of Looping Structure- While...Loop, Do... While, For ;

Functions: Concept of Class and Methods, Defining and Use of User Defined Class and Methods, methods to perform calculations, Parameterized methods and method overloading;

Objects Library (Java.lang)
String Class:

Number Class Sub classes of Integer, Long, Short, Big Integer;

Date and Time related Objects: java.util.Date,
Simple GUI Objects: Dialog;

Introduction to JDBC Programming : JDBC Introduction, JDBC drivers, Programming using JDBC API.

Accessing MySQL database using JDBC to connect with database.

Introduction to Web Application Development :
HTML, DHTML, **Server Side Scripting using Servlets and JSP**,
Introduction to JavaBeans
Create a simple web based Application that accesses data residing in a database.

UNIT 3: RELATIONAL DATABASE MANAGEMENT SYSTEM

Review of RDBMS from Class XI

Database Fundamentals

Concept of Database Transaction, Committing a Transaction, Concept of “All or None” in a Transaction, Network Protocols Required (TCP/IP) for Data Communication, Stored Procedures, Triggers

(Programming Language in MySQL) -Procedures in MySQL

About ANSI SQL

ANSI SQL program structures

Declaring Variables: Use of Variables, Handling Variables in MySQL, Types of Variables, Declaration, Naming Rules, Assigning Values to Variables, Initialization, Keywords, Scalar Data types, Scalar Variable Declaration, Declaring Boolean Variables,

Writing, Saving and Executing a Simple code using ANSI SQL :

Block Syntax and Guidelines, MySQL functions in Code, Functions in MySQL, Data type Conversion, Nested Blocks and Variable Scope, Operators in MySQL, Using Bind Variables, Programming Guidelines, Determining Variable Scope, Statements in MySQL.

Assignment statement, comments, constants, operators and expressions, procedure structure.

Program Constructs : Writing Control Structures: Controlling MySQL Flow of Execution, IF statements, IF-THEN-ELSE -END IF Statement Execution Flow, IF-THEN-ELSIF-END IF Statement Execution Flow, Building Logical Conditions, Logic Tables, Boolean Conditions, Iterative Control: LOOP Statement, While Loop;

Creating Procedures: Overview of Procedures, Syntax for Creating Procedures, Developing Stored Procedures and its Advantages, Creating a Stored Procedure, Procedure Parameter Modes, Creating Procedures with Parameters, IN and OUT parameters and Usage, DEFAULT Option for Parameters, Removing Stored Procedures;

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Database Interaction: Retrieving data in MySQL, Manipulating Data using MySQL, Inserting Data, Updating Data, Deleting Data, Naming Conventions, Commit and Rollback Statements. MySQL Record Structure, Referencing MySQL variables;

Implementing Triggers : Defining Trigger, Creating Trigger, Types Triggers (insert, Delete, Update, Before, After), enabling and disabling triggers, Viewing Trigger, Dropping Trigger.

UNIT 4 :IT Applications

Development of Data Base Applications (Application Domain):

- Student database for school
- Employee database for a company
- Nursing Home automation system
- Library Database for Library
- Railway Reservation System
- Hotel Reservation;

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Class XII (Practical)

Duration: 3 Hours

Total Marks 30

1. Hands on experience

15

A problem should be given covering the following features

1. Start a Standard Web Project using a Wizard in IDE(Netbeans)
2. Table structure in the database for the application with Constraints (Primary Key, Foreign Key, Check, and Unique).
3. A New Web Application that accesses the database using JDBC , for accessing data in table and invoke Stored Procedure to perform transactions/ conditional update
4. Trigger (any)

2. Records

05

1. Create a Web Application using JSP for Students Information System Having a Student Table in Relational Database and a Student Data Form in Web Browser to enter data into the database.
2. Create an Application using JSP for Employee Information System Having a employee Table in Relational Database and a Employee Data Entry Form on Web Browser to enter data into the database.
3. Create a Web Application using JSP for Nursing Home Automation System having Linked tables (for example: Patient, Employee, Bill) in Relational Database and a required Data Entry Forms in JSP to enter data into the database.
4. Create a database handling application for Student Expert System. Following features are to be incorporated in the application:
 - a. Create following linked tables of Student in the Relational Database.
 - i. StudentMaster : containing general information about the student.
 - ii. StudentDetail: Table to store data having details such as Class, Section, Marks and other relevant information.
 - iii. StudentFeeDetail: Should contain details like Financial Year, Class, Fee, FeeStatus(such as Paid and UnPaid)
 - iv. Accounts: General Accounts table to store fee collection details such as received from, date, chequeno and other relevant information.
 - b. The database should have Procedures to update data, Insert data and to perform other database transactions.
 - c. Database triggers should also be defined wherever automatic data modification is required.
 - d. JSP forms for data entry.
 - e. NetBeans to perform Database Transactions and Commit changes made

3. Project

05

The following case study is to be adopted for the development of project

A book publishing company B R Publishing Group is in existence since 1950. They were untouched with latest technological inventions. They are still using a traditional approach of bookkeeping and accounts maintenance.

A company, Nova technology, introduced themselves as system integrator and developers who can change existing working system into the latest concept of paper less office. They wanted few details from the company about its working. The details are as under:

- Name of the company is B R Publishing Group.
- The company is having 20 employees. One Managing Director, Two Managers (Work manager and Marketing Manager) and 17 employees who work as a team for book publishing.
- The company publishes book in different Indian languages and different topics.
- Every book involves an Author and its detail.
- The book is sold in the market at a variable discount options
 - Book Seller: 30%
 - Schools: 20%
 - Customer: 15%

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- The company is maintaining information about Author and all its details such as Personal Information, Royalty etc.
- The company manages information about the book such as Book Name, Author, Quantity Sold, Quantity in Stock, etc.
- The company maintains Customer (Book Sellers) information. Books Sold, Subject, Language, and Amount Pending etc.
- Reports are required at different levels, such as
 - Customer Listing
 - Book Listing
 - Language Wise Book Listing
 - Topic Wise Book Listing
 - Pending Amount Listing (Customer Wise, Book Wise)
 - Author Royalty Detail
 - Bill Generation etc.

As a developer you are required to design the project and develop it as per customer needs (Developer can also visit a publishing company to collect customer details and live data). Suitable assumptions can be made during implementation. A proper database is to be maintained in the RDBMS and the front end is to be developed using advanced interface controls. User-friendly interface is to be generated.

4. Viva Voce

05

Five questions from topics covered in the syllabus

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Reference Books:

<http://java.sun.com/docs/books/tutorial/>