

CBCS SYLLABUS
FOR
THREE YEARS UNDER-GRADUATE COURSE
IN
Computer Science (PROGRAMME)
(w.e.f. 2017)



BANKURA UNIVERSITY
BANKURA
WEST BENGAL

STRUCTURE IN Computer Science (PROGRAMME)
SEMESTER – I

Course Code	Course Title	Credit	Marks			No. of Hours			
			I.A.	ESE	Total	Lec.	Tu.	Pr.	
SP/CSC/101 /C-1A	Problem Solving using Computers	6	10	40		50	4	-	4
				T: 25	L:15				
102/ C-2A	Discipline-2	6	10	40		50			
103/ C-3A	Discipline-3	6	10	40		50			
ACSHP/ 104/ AECC- 1	Environmental Studies	4	10	40		50			
Total in Semester - I		22	40	160		200			

SEMESTER -II

Course Code	Course Title	Credit	Marks			No. of Hours			
			I.A.	ESE	Total	Lec.	Tu.	Pr.	
SP /CSC./201/ C-1B	Database Management Systems	6	10	40		50	4	-	4
				T:25	L:15				
202/ C-2B	Discipline - 2	6	10	40		50			
203/C- 3B	Discipline - 3	6	10	40		50			
ACSHP/204 / AECC-2	English/MIL	2	10	40		50			
Total in Semester - II		20	40	160		200			

SEMESTER – III

Course Code	Course Title	Credit	Marks			No. of Hours			
			I.A.	ESE	Total	Lec	Tu.	Pr.	
SP /CSC/ 301/C-1C	Operating Systems	6	10	40		50	4	-	4
				T: 25	L: 15				
302/C-2C	Discipline - 2	6	10	40		50			
303/ C-3C	Discipline - 3	6	10	40		50			
SP /CSC/304/ SEC-1	Anyone of the following: ● Office Automation Tools ● Multimedia and Applications	2	10	40		50	1	-	2
				T: 25	L: 15				
Total in Semester - III		20	40	160		200			

SEMESTER – IV

Course Code	Course Title	Credit	Marks			No. of Hours			
			I.A	ESE	Total	Lec.	Tu	Pr.	
SP /CSC/401/C -1D	Computer System Architecture	6	10	40		50	4	-	4
				T: 25	L: 15				
402/ C-2D	Discipline-2	6	10	40		50			
403/ C-3D	Discipline-3	6	10	40		50			
SP /CSC/404/ SEC-2	Anyone of the Following: ● HTML Programming ● XML Programming	2	10	40		50	1	-	2
				T: 25	L: 15				
Total in Semester - IV		20	40	160		200			

SEMESTER – V

Course Code	Course Title	Credit	Marks			No. of Hours			
			I.A.	ESE		Total	Lec	Tu.	Pr.
SP /CSC/501/D SE-1A	Any one of the following:	6	10	40		50	4	-	4
	<ul style="list-style-type: none"> ● Internet Technologies ● Programming in JAVA 			T: 25	L: 15				
502/DSE-2A	Discipline - 2	6	10	40		50			
503/DSE-3A	Discipline - 3	6	10	40		50			
SP /CSC/504/S EC-3	Anyone of the following:	2	10	40		50	1	-	2
	<ul style="list-style-type: none"> ● MYSQL Programming (using SQL/ PL-SQL) ● PHP Programming 			T: 25	L: 15				
Total in Semester – V		20	40	160		200			

SEMESTER – VI

Course Code	Course Title	Credit	Marks			No. of Hours			
			I.A.	ESE	Total	Lec.	Tu	Pr.	
SP /CSC/ 601/DSE-1B	Any one of the following: ● Project Work ● Discrete Structures	6	10	40	50	2	-	8	
						5	1	-	
602/DSE-2B	Discipline - 2	6	10	40	50				
603/DSE-3B	Discipline - 3	6	10	40	50				
SP /CSC/ 604/SEC-4	Anyone of the following: ● Programming in Visual Basic ● Android Programming	2	10	40		50	1	-	2
				T: 25	L: 15				
Total in Semester – VI		20	40	160	200				

SP= Science Programme, CSC.= Computer Science, ACSHP= Arts Commerce Science Honours Programme, SC=Subject Code, C= Core Course, E/H/MIL= English/ Hindi/ Modern Indian Language, H/MIL/E= Hindi/ Modern Indian Language/ English, AECC-E= Ability Enhancement Compulsory Course-English, AECC-ENV= Ability Enhancement Compulsory Course-Environmental Science, SEC= Skill Enhancement Course, GE= Generic Elective, DSE= Discipline Specific Elective IA= Internal Assessment, ESE= End-Semester Examination, Lec.= Lecture, Tu.= Tutorial, and Pr.=Practical

CORE PAPERS:**Core Paper I :Semester I:****C-1A: THEORY: 60L****Problem Solving using Computers**

Computer Fundamentals: Introduction to Computers: Characteristics of Computers, Uses of computers, Types and generations of Computers. (4L)

Basic Computer Organization - Units of a computer, CPU, ALU, memory hierarchy, registers, I/O devices. (6L)

Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation. (4L)

Techniques of Problem Solving: Flowchart, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming. (4L)

Overview of Programming: Structure of a Python Program, Elements of Python (6L)

Introduction to Python: Python Interpreter, Using Python as calculator, Python shell, Indentation. Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator). (8L)

Creating Python Programs: Input and Output Statements, Control statements (Looping-while Loop, for Loop , Loop Control, Conditional Statement- if...else, Difference between break, continue and pass). (14L)

Structures: Numbers, Strings, Lists, Tuples, Dictionary, Date & Time, Modules, Defining Functions, Exit function, default arguments. (14L)

Reference Books:

1. P. K. Sinha & Priti Sinha , “Computer Fundamentals”, BPB Publications, 2007.
2. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
3. T. Budd, Exploring Python, TMH, 1st Ed, 2011
4. Python Tutorial/Documentation www.python.org2010
5. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012
6. <http://docs.python.org/3/tutorial/index.html>
7. <http://interactivepython.org/courselib/static/pythonds>
8. <http://www.ibiblio.org/g2swap/byteofpython/read/>

C-1A: LAB**Software Lab using Python:**

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria :
 - Grade A: Percentage ≥ 80
 - Grade B: Percentage ≥ 70 and < 80
 - Grade C: Percentage ≥ 60 and < 70
 - Grade D: Percentage ≥ 40 and < 60
 - Grade E: Percentage < 40
3. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. WAP to display the first n terms of Fibonacci series.
5. WAP to find factorial of the given number.
6. WAP to find sum of the following series for n terms: $1 - 2/2! + 3/3! - \dots - n/n!$
7. WAP to calculate the sum and product of two compatible matrices.

Core Paper II: Semester-II: **C-1B: THEORY: 60L**

Database Management Systems

Introduction to Database Management Systems: Characteristics of database approach, data models, DBMS architecture and data independence.

(10L)

Entity Relationship and Enhanced ER Modeling: Entity types, relationships, SQL-Schema Definition, constraints, and object modeling.

(15L)

Relational Data Model : Basic concepts, relational constraints, relational algebra, SQL queries.

(15L)

Database design: ER and EER to relational mapping, functional dependencies, normal forms up To 3rd Normal Form

(20 L)

Books Recommended:

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. R. Ramakrishnan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
3. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.
4. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education, 2013.

C-1B: LAB

Software Lab based on Database Management Systems

Note: My Access / My SQL may be used.

The following concepts must be introduced to the students:

DDL Commands

- Create table, alter table, drop table

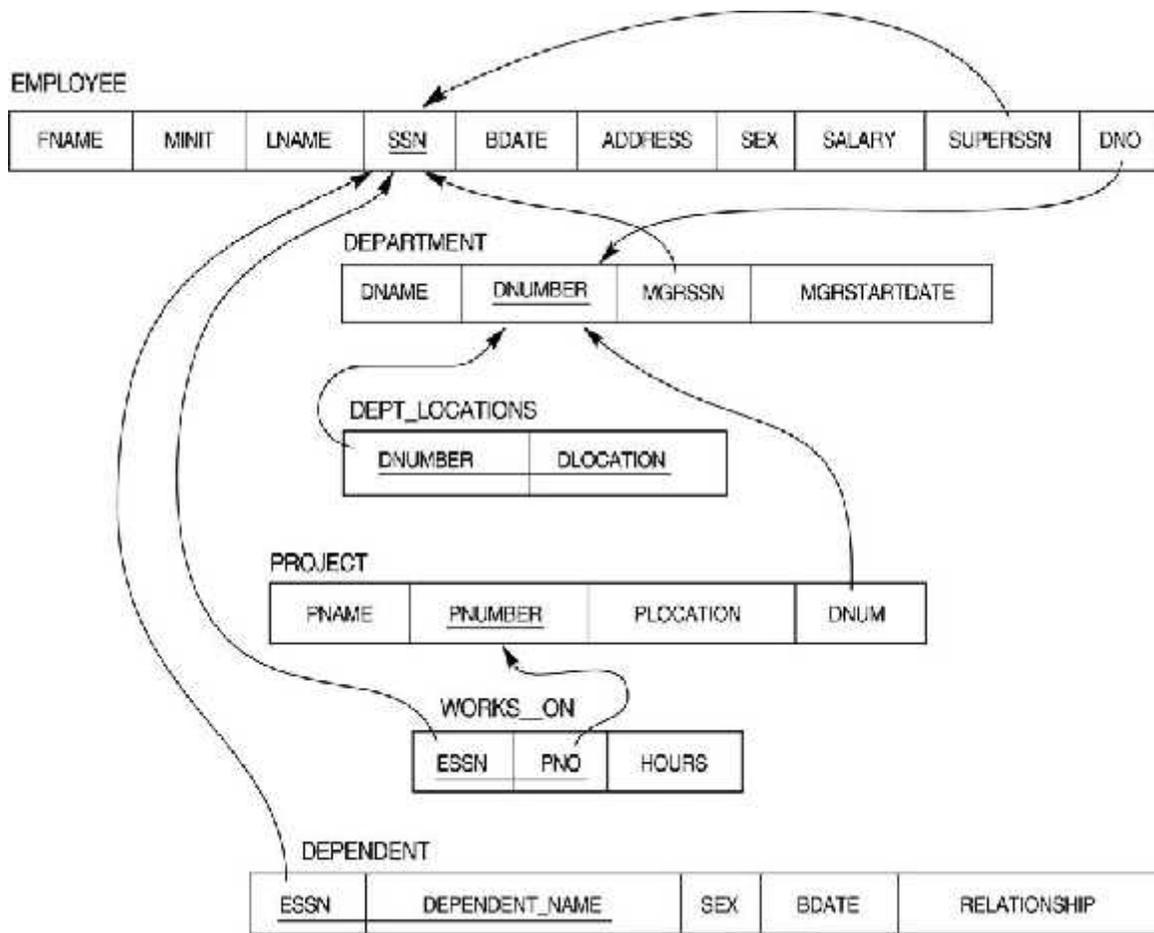
DML Commands

- Select , update, delete, insert statements
- Condition specification using Boolean and comparison operators (and, or,

not,=,<>,>,<,>=,<=)

- Arithmetic operators and aggregate functions(Count, sum, avg, Min, Max)
- Multiple table queries (join on different and same tables)
- Nested select statements
- Set manipulation using (any, in, contains, all, not in, not contains, exists, not exists, union, intersect, minus, etc.)
- Categorization using group by.....having
- Arranging using order by

Relational Database Schema - COMPANY



Questions to be performed on above schema

1. Create tables with relevant foreign key constraints
2. Populate the tables with data
3. Perform the following queries on the database :
 - i. Display all the details of all employees working in the company.
 - ii. Display ssn, lname, fname, address of employees who work in department no 7.
 - iii. Retrieve the birthdate and address of the employee whose name is 'Franklin T. Wong'
 - iv. Retrieve the name and salary of every employee
 - v. Retrieve all distinct salary values
 - vi. Retrieve all employee names whose address is in 'Bellaire'

- vii. Retrieve all employees who were born during the 1950s
- viii. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)
- ix. Retrieve the names of all employees who do not have supervisors
- x. Retrieve SSN and department name for all employees
- xi. Retrieve the name and address of all employees who work for the 'Research' department
- xii. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birthdate.
- xiii. For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.
- xiv. Retrieve all combinations of Employee Name and Department Name
- xv. Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan' either as a worker or as a manager of the department that controls the project.
- xvi. Increase the salary of all employees working on the 'ProductX' project by 15%. Retrieve employee name and increased salary of these employees.
- xvii. Retrieve a list of employees and the project name each works in, ordered by the employee's department, and within each department ordered alphabetically by employee first name.
- xviii. Select the names of employees whose salary does not match with salary of any employee in department 10.
- xix. Retrieve the name of each employee who has a dependent with the same first name and same sex as the employee.
- xx. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.
- xxi. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper headings.
- xxii. Find the sum of the salaries and number of employees of all employees of the 'Marketing' department, as well as the maximum salary, the minimum salary, and the average salary in this department.
- xxiii. Select the names of employees whose salary is greater than the average salary of all employees in department 10.
- xxiv. For each department, retrieve the department number, the number of employees in the department, and their average salary.
- xxv. For each project, retrieve the project number, the project name, and the number of employees who work on that project.
- xxvi. Change the location and controlling department number for all projects having more

- than 5 employees to 'Bellaire' and 6 respectively.
- xxvii. For each department having more than 10 employees, retrieve the department no, no of employees drawing more than 40,000 as salary.
- xxviii. Insert a record in Project table which violates referential integrity constraint with respect to Department number. Now remove the violation by making necessary insertion in the Department table.
- xxix. Delete all dependents of employee whose ssn is '123456789'.
- xxxi. Delete an employee from Employee table with ssn = '12345' (make sure that this employee has some dependents, is working on some project, is a manager of some department and is supervising some employees). Check and display the cascading effect on Dependent and Works on table. In Department table MGRSSN should be set to default value and in Employee table SUPERSSN should be set to NULL
- xxxii. Perform a query using alter command to drop/add field and a constraint in Employee table.

Core Paper III: Semester-III: **C-1C: THEORY: 60L**

Operating Systems

Introduction: System Software, Resource Abstraction, OS strategies. (2L)

Types of operating systems - Multiprogramming, Batch, Time Sharing, Single user and Multiuser, Process Control & Real Time Systems. (2L)

Operating System Organization: Factors in operating system design, basic OS functions, implementation consideration; process modes, methods of requesting system services – system calls and system programs. (10L)

Process Management: System view of the process and resources, initiating the OS, process address space, process abstraction, resource abstraction, process hierarchy, Thread model (15L)

Scheduling: Scheduling Mechanisms, Strategy selection, non-pre-emptive and pre-emptive strategies. (12L)

Memory Management: Mapping address space to memory space, memory allocation strategies, fixed partition, variable partition, paging, virtual memory (12L)

Shell introduction and Shell Scripting (7L)

- What is shell and various type of shell, Various editors present in Linux
- Different modes of operation in vi editor
- What is shell script, Writing and executing the shell script
- Shell variable (user defined and system variables)
- System calls, Using system calls
- Pipes and Filters
- Decision making in Shell Scripts (If else, switch), Loops in shell
- Functions
- Utility programs (cut, paste, join, tr , uniq utilities)
- Pattern matching utility (grep)

Books Recommended:

1. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications 2008.
2. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education 2007.
3. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education 1997.
4. W. Stallings, Operating Systems, Internals & Design Principles , 5th Edition, Prentice Hall of India. 2008.
5. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.

C-1C: LAB**Software Lab based on Operating Systems**

Note: Following exercises can be performed using Linux or Unix

1. Usage of following commands:
ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.
2. Usage of following commands:
cal, cat(append), cat(concatenate), mv, cp, man, date.
3. Usage of following commands: chmod, grep,
tput (clear, highlight), bc.
4. Write a shell script to check if the number entered at the command line is prime or not.
5. Write a shell script to modify “cal” command to display calendars of the specified months.
6. Write a shell script to modify “cal” command to display calendars of the specified range of months.
7. Write a shell script to accept a login name. If not a valid login name display message – “Entered login name is invalid”.
8. Write a shell script to display date in the mm/dd/yy format.
9. Write a shell script to display on the screen sorted output of “who” command along with the total number of users .
10. Write a shell script to display the multiplication table any number,
11. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.
12. Write a shell script to find the sum of digits of a given number.
13. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
14. Write a shell script to find the LCD(least common divisor) of two numbers.
15. Write a shell script to perform the tasks of basic calculator.
16. Write a shell script to find the power of a given number.
17. Write a shell script to find the factorial of a given number.
18. Write a shell script to check whether the number is Armstrong or not.
19. Write a shell script to check whether the file have all the permissions or not.
20. Program to show the pyramid of special character “*”.

Core Paper IV: Semester-IV:
C-1D: THEORY: 60L

Computer System Architecture

Introduction: Logic gates, Boolean algebra, Combinational circuits, circuits implementation, flip-flops and sequential circuits, decoders, multiplexers, registers, counters and memory units. (12L)

Data Representation and basic Computer Arithmetic: Number systems, complements, fixed and floating point representation, character representation, addition, subtraction, magnitude comparison. [8L]

Basic Computer Organization and Design: Computer registers, bus system, instruction set, timing and control, instruction cycle, memory reference, input-output and interrupt. (18L)

Central Processing Unit: Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control. (10L)

Programming the Basic Computer: Instruction formats, addressing modes, instruction codes, machine language, assembly language, input output programming. (8L)

Input-output Organization: Peripheral devices, I/O interface, Modes of data transfer, direct memory access. (4L)

Books Recommended:

1. M. Mano, Computer System Architecture, Pearson Education 1992.
2. A. J. Dos Reis, Assembly Language and Computer Architecture using C++ and JAVA, Course Technology, 2004
3. W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India ,2009
4. Digital Design, M.M. Mano, Pearson Education Asia, 1979

C-1D: LAB

Digital Logic Lab based on Computer System Architecture

1. Implement X-OR Gate using NAND Gates.
2. Implement X-OR Gate using NOR Gates.
3. Implement Half-Adder using Basic Gates.
4. Implement Half-Adder using NAND Gates.
5. Implement Full-Adder using NAND Gates.
6. Implement Full-Subtractor using NAND Gates.

7. Implement the Function: using Basic Gates.
8. Implement the Function: using Basic Gates.
9. Implement the Function: $F = ABC + DEF$ using IC 7411.
10. Implement a 4-bit Binary Adder using IC 7483.
11. Implement 2×1 Multiplexer using Basic Gates.
12. Implement 4×1 Multiplexer using NAND Gates.
13. Implement 8×1 MUX using IC 74153.
14. Implement a 3-bit Even Parity Checker using Basic Gates.
15. Implement a 2-bit Comparator using Basic Gates.
16. Implement S-R Flip-Flop using NAND Gates.
17. Implement J-K Flip-Flop using NAND Gates.

Discipline Specific Elective Papers: (Credit: 06 each) (DSE-1A, DSE -1B):

1. Internet Technologies: THEORY: 60L

Introduction to Web Design: Introduction to hyper text mark up language(html) document type definition, creating web pages, graphical elements, lists, hyperlinks, tables, web forms, inserting images frames. (6L)

Customized Features: Cascading style sheets, (css) for text formatting and other manipulations. (4L)

JavaScript: Data types, operators, functions, control structures, events and event handling. (8L)

Java: Use of Objects, Array and Array List class, Designing classes, Inheritance, Input/ Output, Exception Handling. (10L)

JDBC: JDBC Fundamentals, Establishing Connectivity and working with connection interface, Working with statements, Creating and Executing SQL Statements, Working with Result Set Objects. (8L)

JSP: Introduction to Java Server Pages, HTTP and Servlet Basics, The Problem with Servlets, The Anatomy of JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment, Implicit JSP Objects, Conditional Processing, Displaying Values (16L)

Using an expression to Set an Attribute Declaring Variables and Methods, Error Handling and Debugging, Sharing Data Between JSP Pages, Requests, and Users, Database Access. (8L)

Books Recommended:

1. Web Enabled Commercial Application Development Using Html, Dhtml, javascript, Perl Cgi By Ivan Bayross, BPB Publications, 2009.
2. BIG Java Cay Horstmann, Wiley Publication, 3rd Edition., 2009
3. Java 7, The Complete Reference, Herbert Schildt, 8th Edition, 2009.
4. The Complete Reference J2EE, TMH, Jim Keogh, 2002.
5. Java Server Pages, Hans Bergsten, Third Edition, O'Reilly Media December 2003.

Internet Technologies: LAB**Software Lab based on Internet Technologies****JAVA Script**

1. Create a student registration form. Create functions to perform the following checks:
 - a. Roll number is a 7-digit numeric value
 - b. Name should be an alphabetical value (String)
 - c. Non-empty fields like DOB
2. Implement a static password protection.
3. Write a javascript
 - a. To change the colour of text using `SetTimeout()`
 - b. To move an image across screen using `SetInterval()`

JAVA Programs

1. WAP to find the largest of n natural numbers.
2. WAP to find whether a given number is prime or not.
3. WAP to print the sum and product of digits of an Integer and reverse the Integer.
4. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
5. Write a java program for the following matrix operations:
 - a. Addition of two matrices
 - b. Summation of two matrices
 - c. Transpose of a matrixInput the elements of matrices from user
6. Write a java program that computes the area of a circle, rectangle and a cylinder using function overloading.

JDBC

1. Create a table 'Student' and 'Teacher' in 'College' database and insert two rows in this newly created table using JDBC API and do the following:

- a. Update an already created table 'Teacher' in 'College' database by updating a teacher's name, with "Dr." appended before the name, whose name is "Rita".
 - b. Repeat the same thing for all the teachers using Prepared Statement.
 - c. Delete the student with ID=3 from 'Student' database.
 - d. Insert two students to the ResultSet returned by the query which selects all students with FirstName="Ayush". The database must also get updated along with ResultSet.
2. Create a procedure in MySQL to count the number of rows in table 'Student'. Use Callable Statement to call this method from Java code.

JSP Practicallist

1. Display the pattern:

```
1
1 2
1 2 3
```

Take 'n' in a textbox from user. Display this pattern using

```
Scriptlets
<c:forEach>loop
```

2. Make two files as follows:
- a. main.html: shows 2 textboxes and 3 radio buttons with values "addition", "subtraction" and "multiplication"
 - b. operate.jsp: depending on what the user selects perform the corresponding function (Give two implementations: using request.getParameter() and using expression language)
3. Validate User input entered in a form. The input must include Name, DOB, EmailID, Lucky Number, Favorite food etc. (Refer Chapter 8)
4. Display Good Morning <uname>, Good Afternoon <uname> or Good Evening <uname> based on the current time of the day.
5. Create your custom library which contains two tags: <hello>, <choco>.

Usage of the tags:

<hello name="Ajay">: Output should be Hello Ajay. It contains a mandatory attribute 'name' which can accept Dynamic value.

<choco texture="Chewy">: Output should be FiveStar, BarOne.

<choco texture="Crunchy">: Output should be Munch. KitKat.

That means the mandatory attribute must accept a value, and based on the attribute's value, it should give output. You must use a bean ChocoBean for this purpose.

2. Programming in Java: THEORY: 60L

Introduction to Java: Features of Java, JDK Environment (1L)

Object Oriented Programming Concept Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++ and JAVA (10L)

Java Programming Fundamental: Structure of java program, Data types, Variables, Operators, Keywords, Naming Convention, Decision Making (if, switch), Looping (for, while), Type Casting (10L)

Classes and Objects: Creating Classes and objects, Memory allocation for objects, Constructor, Implementation of Inheritance, Implementation of Polymorphism, Method Overloading, Method Overriding, Nested and Inner classes (10L)

Arrays and Strings: Arrays, Creating an array, Types of Arrays, String class Methods, StringBuffer methods. (6L)

Abstract Class, Interface and Packages: Modifiers and Access Control, Abstract classes and methods, Interfaces, Packages Concept, Creating user defined packages (8L)

Exception Handling: Exception types, Using try catch and multiple catch, Nested try, throw, throws and finally, Creating User defined Exceptions. (4L)

File Handling: Byte Stream, Character Stream, File IO Basics, File Operations, Creating file, Reading file, Writing File (5L)

Applet Programming: Introduction, Types Applet, Applet Life cycle, Creating Applet, Applet tag (6L)

Books Recommended:

1. Ivan Bayross, Web Enabled Commercial Application Development Using Html, Dhtml, javascript, Perl Cgi , BPB Publications, 2009.
2. Cay Horstmann, BIG Java, Wiley Publication , 3rd Edition., 2009
3. Herbert Schildt , Java 7, The Complete Reference, , 8th Edition, 2009.
4. E Balagurusamy , Programming with JAVA, TMH, 2007

Programming in Java: LAB

Software Lab based on Java

1. WAP to find the largest of n natural numbers.
2. WAP to find whether a given number is prime or not.
3. Write a menu driven program for following:
 - a. Display a Fibonacci series
 - b. Compute Factorial of a number
 - c. WAP to check whether a given number is odd or even.
 - d. WAP to check whether a given string is palindrome or not.
4. WAP to print the sum and product of digits of an Integer and reverse the Integer.
5. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
6. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
7. Write a program in java to input N numbers in an array and print out the Armstrong numbers from the set.
8. Write java program for the following matrix operations:
 - a. Addition of two matrices
 - b. Summation of two matrices
 - c. Transpose of a matrix
 - d. Input the elements of matrices from user.
9. Write a java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
10. Write a Java for the implementation of Multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
11. Write a java program to create a frame window in an Applet. Display your name, address and qualification in the frame window.
12. Write a java program to draw a line between two coordinates in a window.
13. Write a java program to display the following graphics in an applet window.
 - a. Rectangles
 - b. Circles
 - c. Ellipses
 - d. Arcs
 - e. Polygons
14. Write a program that reads two integer numbers for the variables a and b. If any other character except number (0-9) is entered then the error is caught by Number Format Exception object. After that ex. getMessage() prints the information about the error occurring causes.
15. Write a program for the following string operations:
 - a. Compare two strings
 - b. Concatenate two strings
 - c. Compute length of a string
16. Create a class called Fraction that can be used to represent the ratio of two integers. Include appropriate constructors and methods. If the denominator becomes zero, throw and handle an exception.

3. Project Work/Dissertation

- This option is to be offered only in 6th Semester.
- The students will be allowed to work on any project based on the concepts studied in core/elective or skill based elective courses.
- The group size should be maximum of three (03) students.
- Each group will be assigned a teacher as a supervisor who will handle both their theory as well lab classes.
- A maximum of Four (04) projects would be assigned to one teacher.
- Theory classes will cover project management techniques.

4. Discrete Structures: THEORY : 60L

Introduction: Introduction to Sets, Finite and Infinite Sets, Unaccountably Infinite Sets. Introduction to Functions and relations, Properties of Binary relations, Closure, Partial Ordering Relations. (12L)

Pigeonhole Principle, Permutation and Combinations, Mathematical Induction, Principle of Inclusion and Exclusion. (12L)

Asymptotic Notations (4L)

Recurrence Relations: Introduction, Generating Functions, Linear Recurrence Relations with constant coefficients and their solution. (12L)

Graphs Theory: Basic Terminology of Graphs, Models and Types, Multigraphs, Weighted Graphs, Graph Representation. Graph Isomorphism Graph Connectivity, Euler and Hamiltonian Paths and Circuits, Planar Graphs, Graph Coloring, Basic Terminology of Trees, Properties of Trees, Spanning Trees. (12L)

Inference Theory: Introduction, Logical Connectives, Well Formed Formulas, Tautologies, Equivalence (8L)

Books Recommended:

1. C. L. Liu and D.P. Mohapatra, Elements of Discrete Mathematics, Third Edition, Tata McGraw Hill , 2008.
2. K. Rosen, Discrete Mathematics and Its Applications, Sixth Edition, Tata McGraw Hill,2007.
3. T.H. Cormen, C.E. Leiserson, R.L. Rivest, Introduction to Algorithms, 3E Edition,Prentice Hall of India,2010.
4. J.P. Trembley, R. Manohar, Discrete Mathematical Structures with Application to Computer Science, First Edition, Tata McGraw Hill, 2001.
5. David Gries, Fred B. Schneider, A Logical Approach to Discrete Math, Springer; 2010.

Online Reading/Supporting Material:

1. <http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-042j-mathematics-for-computer-science-fall-2005/>

Discrete Structures: TUTORIAL

kill Enhancement Courses

(SEC 1, SEC 2, SEC 3, SEC 4)

1. Office Automation Tools: THEORY: 15L

Introduction to open office/MS office/Libre office (2L)

Word Processing: Formatting Text, Pages, Lists, Tables

(4L)

Spreadsheets: Worksheets, Formatting data, creating charts and graphs, using formulas and functions, macros, Pivot Table (5L)

Presentation Tools: Adding and formatting text, pictures, graphic objects, including charts, objects, formatting slides, notes, hand-outs, slide shows, using transitions, animations (4L)

Books Recommended:

1. Sushila Madan , Introduction to Essential tools,JBA,2009.
2. Anita Goel, Computer Fundamentals, Pearson, 2012

Office Automation Tools: LAB

Computer Lab Based on Office Automation

Practical List for WORD:

1. Create a **telephone directory**.

- The heading should be 16-point Arial Font in bold
- The rest of the document should use 10-point font size
- Other headings should use 10-point Courier New Font.
- The footer should show the page number as well as the date last updated.

2. Design a time-table form for your college.

- The first line should mention the name of the college in 16-point Arial Font and should be bold.
- The second line should give the course name/teacher's name and the department in 14-point Arial.
- Leave a gap of 12-points.
- The rest of the document should use 10-point Times New Roman font.
- The footer should contain your specifications as the designer and date of creation.

3. Create the following one page documents.

- (a) Compose a note inviting friends to a get-together at your house, including a list of things to bring with them.

- (b) Design a certificate in landscape orientation with a border around the document.
4. Create the following document: A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.
 5. Convert following text to a table, using comma as delimiter

Type the following as shown (do not bold).

Color, Style, Item

Blue, A980, Van

Red, X023, Car

Green, YL724, Truck

Name, Age, Sex

Bob, 23, M

Linda, 46, F

Tom, 29, M

6. Prepare a grocery list having four columns (Serial number, the name of the product, quantity and price) for the month of April, 06.
 - Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
 - The headings of the columns should be in 12-point and bold.
 - The rest of the document should be in 10-point Times New Roman.
 - Leave a gap of 12-points after the title.
7. XYZ Publications plans to release a new book designed as per your syllabus. Design the first page of the book as per the given specifications.
 - (a) The title of the book should appear in bold using 20-point Arial font.
 - (b) The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
 - (c) At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
 - (d) The details of the offices of the publisher (only location) should appear in the footer.
8. Create the following one page documents.
 - a) Design a Garage Sale sign.
 - b) Make a sign outlining your rules for your bedroom at home, using a numbered list.

9. Enter the following data into a table given next

Salesperson	Dolls	Trucks	Puzzles
Amit	1327	1423	1193
Shivi	1421	3863	2934
Om	5214	3247	5467
Ananya	2190	1278	1928
Anupama	1201	2528	1203
Maharshi	4098	3079	2067

Add a column Region (values: S, N, N, S, S, S) between the Salesperson and Dolls columns to the given table Sort your table data by Region and within Region by Salesperson in ascending order:

Practical List for EXCEL

- Q1. Create a student worksheet containing roll numbers, names and total marks. Open a document in Word and insert the excel worksheet using:-
- Copy/Paste
 - Embedding
 - Linking
- Q2. The term wise marks for APS class of 20 students are stored in 3 separate sheets named term1, term2 and term3. Create 4th worksheet that contains student names and their total and average marks for the entire year. Give proper headings using headers. Make the column headings bold and italic. The 4th worksheet should contain college name as the first line. Make it bold, italic and center it.
- Q3. Using a simple pendulum, plot 1-T and 1-T² graph.

l	t1	t2	t3	Mean (t)	T= t/20	T ²
70						
80						
90						
100						

- Q4. Consider the following employee worksheet:-

Full Name (First Last)	Grade 1/2/3	Basic Salary	HRA	PF	GROSS	NET	VA (Vehicle Allowence)

Grade	HRA %(of Basic)
1	40%
2	35%
3	30%

Gross = Basic + HRA + VA

Net = Gross -PF

PF is 8% for all Grades

VA is 15000, 10000 and 7000 for Grades 1, 2 and 3.

- Find max, min and average salary of employees in respective Grade
- Count no. of people where VA>HRA
- Find out most frequently occurring grade.
- Extract records where employee name starts with "A" has HRA>10000
- Print Grade wise report of all employees with subtotals of net salary and also grand totals. Use subtotal command.
- Extract records where Grade is 1 or 2 and salary is between 10000 and 20000 both inclusive.

Q5. In a meeting of a marketing department of an organization it has been decided that price of selling an item is fixed at Rs40. It was resolved to increase the sell of more of more items and getting the profit of Rs40,000/. Use Goal Seek of find out how many items you will have to sell to meet your profit figure.

Q6. To study the variation in volume with pressure for a sample of an air at constant temperature by plotting a graph for P – V and P-I/V. Sample observations are:-

Pressure(P)	Volume (V)	I/V	PV	P/V
75	20			
78.9	19			
83.3	18			
88.2	17			

Q7. Plot the chart for marks obtained by the students (out of 5) vs. frequency (total number of students in class is 50).

Q8. Create the following worksheet(s) containing an year wise sale figure of five salesmen in Rs.

Salesman	2002	2003	2004	2005
MOHAN	10000	12000	20000	50000
MITRA	15000	18000	50000	60000
SHIKHA	20000	22000	70000	70000
ROHIT	30000	30000	100000	80000
MANGLA	40000	45000	125000	90000

Apply the following Mathematical & Statistical functions:

- i) Calculate the commission for each salesman under the condition :-
 - a) If total sales is greater than Rs. 3, 00,000/-, then commission is 10% of total sale made by the salesman.
 - b) Otherwise, 4% of total sale.
- ii) Calculate the maximum sale made by each salesman.
- iii) Calculate the maximum sale made in each year.
- iv) Calculate the minimum sale made by each salesman.
- v) Calculate the minimum sale made in each year.
- vi) Count the no. of sales persons.
- vii) Calculate the cube of sales made by Mohan in the year 2002.
- viii) Find the difference in sales by salesman Mitra between the year 2002 and 2003.
Find the absolute value of difference.
- ix) Also calculate the Mode, Stddev, Variance, Median for the sale made by each salesman.
- ix) Calculate the year wise Correlation coefficient between the sales man Mohan and Mitra year wise

Q9. The following table gives an year wise sale figure of five salesmen in Rs.

Salesman	2000	2001	2002	2003
S1	10000	12000	20000	50000
S2	15000	18000	50000	60000
S3	20000	22000	70000	70000
S4	30000	30000	100000	80000
S5	40000	45000	125000	90000

- v) Calculate total sale year wise.
- vi) Calculate the net sales made by each salesman
- vii) Calculate the commission for each salesman under the condition: -
 - c) If total sales is greater than Rs. 4, 00,000/-, then commission is 5% of total sale made by the salesman.
 - d) Otherwise, 2% of total sale.
- viii) Calculate the maximum sale made by each salesman.
- ix) Calculate the maximum sale made in each year.
- x) Draw a bar graph representing the sale made by each salesman.
- xi) Draw a pie graph representing the sale made by salesmen in year 2001.

Q10. Consider the following worksheet for APS 1st year students:-

S.No.	Name	PH	CH	BY	MT	CS	Total Marks	%	Grade
1									
2									

Grade is calculated as follows:-

If % \geq 90 Grade A

If % \geq 80 & $<$ 90 Grade B

If % \geq 70 & $<$ 80 Grade C

If % \geq 60 & $<$ 70 Grade D

Otherwise students will be declared fail.

- i) Calculate Grade using if function
- ii) Sort the data according to total marks
- iii) Apply filter to display the marks of the students having more than 65% marks.
- iv) Draw a pie chart showing % marks scored in each subject by the topper of the class.
- v) Draw the doughnut chart of the data as in (iv)
- vi) Enter the S.No. of a student and find out the Grade of the student using VLOOKUP.
- vii) Extract all records where name
 - a) Begins with "A"
 - b) Contains "A"
 - c) Ends with "A"

Practical List for Power Point:

1. Create five Power point slides. Each slide should support different format. In these slides explain areas of applications of IT. Make slide transition time as 10 seconds.
2. Create five Power Point slides to give advantages/disadvantages of computer, application of computers and logical structure of computer.
3. Create five Power Point slides detailing the process of internal assessment. It should be a self-running demo.

2 Multimedia and Applications: THEORY: 15L

Multimedia: Introduction to multimedia, Components, Uses of multimedia. (2L)

Making Multimedia: Stages of a multimedia project, Requirements to make good multimedia, Multimedia Hardware - Macintosh and Windows production Platforms, Hardware peripherals -

Connections, Memory and storage devices, Multimedia software and Authoring tools. (3L)

Text: Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools, Hypermedia & Hypertext. (2L)

Images: Still Images – Bitmaps, Vector Drawing, 3D Drawing & rendering, Natural Light & Colors, Computerized Colors, Color Palletes, Image File Formats. (2L)

Sound: Digital Audio, MIDI Audio, MIDI vs Digital Audio, Audio File Formats. (2L)

Video: How Video Works, Analog Video, Digital Video, Video File Formats, Video Shooting and Editing. (2L)

Animation: Principle of Animations. Animation Techniques, Animation File Formats. (2L)

Books Recommended:

1. Tay Vaughan, “Multimedia: Making it work”, TMH, Eighth edition. 2006
2. Ralf Steinmetz and Klara Naharstedt, “Multimedia: Computing, Communications Applications”, Pearson, 1995.
3. Keyes, “Multimedia Handbook”, TMH. 2000.
4. K. Andleigh and K. Thakkar, “Multimedia System Design”, PHI, 2000

Multimedia and Applications: LAB

Software Lab Based on Multimedia (FLASH as a multimedia S/W):

Practical exercises based on concepts listed in theory using Flash.

FLASH: Concept of Frame, Key frames, Frame rate, Timeline, Tween, Layers, Symbols, Embedding audio/video and embedding on the web page

1. Draw an animation to show a bouncing ball.
2. Draw an animation to show a moving stick man.
3. Draw an animation to show a fainting banana.
4. Draw an animation to show sunrise and sunset.
5. Draw an animation to show a disappearing house.
6. Draw an animation to show two boats sailing in river
7. Draw an animation to show a scene of cricket match.
8. Draw an animation to help teach a poem or a song
9. Draw an animation to show cartoon with a message
10. Make a movie showing Shape Tweening.
11. Make a movie showing Motion Tweening.
12. Add sound and button to the movie

3 HTML Programming: THEORY: 15L

UNIT I: Introduction

(1L)

UNIT II: Basics

(2L)

Head, Body,

Colors, Attributes

Lists, Ordered, Unordered

UNIT III: Links

(3L)

Introduction

Relative and Absolute Links

Link Attributes

Using the ID Attribute to Link within a Document

UNIT IV: Images

(2L)

Putting an Image on a Page

Using Images as Links

Putting an Image in the Background

UNIT V: Tables

(4L)

Creating a Table

Table Headers

Captions

Spanning Multiple Columns

Styling Table

UNIT VI: Forms

(3L)

Basic Input and Attributes

Other Kind of Inputs

Styling Forms with CSS

Where to Go from Here

Book Recommended:

1. Introduction to **HTML** and CSS -- O'Reilly , 2010
2. Jon Duckett, HTML and CSS, John Wiley, 2012

HTML Programming: LAB**Software Lab Based on HTML:**

Q.1 Create an HTML document with the following formatting options:

- I. Bold
- II. Italics
- III. Underline
- IV. Headings (Using H1 to H6 heading styles)
- V. Font (Type, Size and Color)
- VII. Paragraph
- VIII. Line Break
- IX. Horizontal Rule
- X. Pre tag

Q.2 Create an HTML document which consists of:

- I. Ordered List
- II. Unordered List
- III. Nested List
- IV Image

Q.3. Create a table having students' Roll, Name and Grade

Q.4 Create a Table with an inserted image

Q.5 Create a form using HTML which has the following types of controls:

- I. Text Box
- II. Option/radio buttons
- III. Check boxes
- IV. Reset and Submit buttons

Q6. Create HTML documents (having multiple frames) in the following three formats

Frame 1
Frame 2

Frame 1	
Frame 2	Frame 3

4 XML Programming: THEORY: 15L

Introduction: Understanding Mark-up Languages, Introduction to XML and its Goals. (3L)

XML Basics: XML Structure and Syntax, Document classes and Rules. (5L)

Other XML Concepts: Scripting XML, XML as Data, Linking with XML. (4L)

XML with Style: XSL –Style Sheet Basics, XSL basics, XSL style sheets. (3L)

Books Recommended

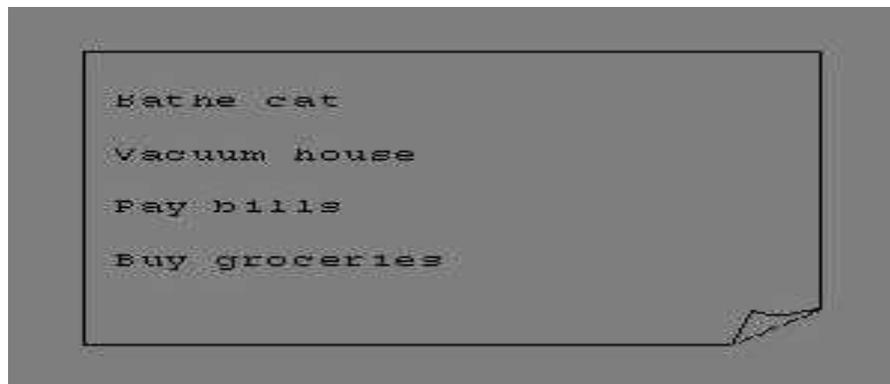
1. William J. Pardi , XML in action web technology, Microsoft Press, 1999
2. Michael J. Young ,Step by Step XML , Microsoft Press, 2002

XML Programming: LAB Software Lab Based on XML:

Exercise #1 – Information Structure

In this exercise, student will practice identifying the structure of an information object. For the sample document provided below:

Label the information structures you see, including containing structures. Draw a tree representation of the structure.



Exercise 2# Deconstructing an XML Document

In this exercise, student will practice identifying the explicit structure within an XML document. In a sense, this is the reverse of what you did in Exercise #1. For the sample XML markup below, create a document-like representation (or a simple drawing) for the content contained within the XML tags:

```
<book>
<coverInfo>
  <title>The XML
  Handbook</title><author>Charles F.
  Goldfarb</author><author>Paul
  Prescod</author><edition>Second</edi
  tion>
<description>The definitive XML resource: applications, products, and technologies. Revised
and expanded—over 600 new pages.
</description>
</coverInfo>
</book>
```

Exercise #3 – Creating XML Markup

In this exercise, create some XML markup based on the tree representation from Exercise #1 above, and the content from the original sample document.

Exercise #4 – Well-Formedness

This exercise checks your understanding of the constraints for well-formedness. Are the following document instances well-formed? Explain any NO answers.

```
<list><title>The first list</title><item>An
item</list><item>An item</item><item>Another
item</item>
<para>Bathing a cat is a <emph>relatively</emph> easy task as long as the cat is
willing.</para>
<bibl><title>How to Bathe a Cat<author></title>Merlin Bauer<author></bibl>
```

Exercise #5-Well Formedness

This exercise is a bit more challenging than the previous example. Here is a fragment of an XML document instance. Identify all the places where it fails to match the constraints for well-formedness.

```
<PROCEDURE><TITLE>How to Bathe a  
Cat</TITLE><OVERVIEW>
```

```
This procedure tells you how to bathe a cat. <WARNING></OVERVIEW>Cats don't like to take  
baths. You could get hurt doing this. Be sure to obtain all the required protective gear before you  
start. </WARNING><EQUIPEMENT><ITEM>Hockey Mask <ITEM>Padded Full-body Kevlar  
Armor</ITEM><ITEM>Tub full of warm water</ITEM><ITEM>Towels </ITEM><ITEM>First  
Aid kit</ITEM><ITEM>Cat Shampoo</ITEM><EQUIPEMENT><INSTRUCTIONS><STEP>  
Locate the cat, who by now is hiding under the bed.</STEP><STEP>Place the cat in the tub of  
water.</STEP><ITEM>Using the First Aid kit, repair the damage to your head and  
arms.</STEP><STEP>Place the cat back in the tub and hold it down.</STEP><STEP>Wash it  
really fast, then make an effort to dry it with the towels.</STEP><STEP>Decide not to do this  
again. </STEP></INSTRUCTIONS>
```

Note: Cover more exercises based on XML Programming theory concepts.

5 MySQL Programming (using SQL/PL-SQL): THEORY: 15L

SQL Vs. SQL * Plus:

SQL Commands and Data types, Operators and Expressions, Introduction to SQL * Plus. (2L)

Managing Tables and Data:

- Creating and Altering Tables (Including constraints)
- Data Manipulation Command like Insert, update, delete
- SELECT statement with WHERE, GROUP BY and HAVING, ORDER BY, DISTINCT, Special operator like IN, ANY, ALL BETWEEN, EXISTS, LIKE
- Join, Built in functions (4L)

Other Database Objects

- View
- Synonyms, Index (2L)

Transaction Control Statements

- Commit, Rollback, Savepoint (2L)

Introduction to PL/SQL

- SQL v/s PL/SQL
- PL/SQL Block Structure
- Language construct of PL/SQL (Variables, Basic and Composite Data type, Conditions looping etc.)
- % TYPE and % ROWTYPE
- Using Cursor (Implicit, Explicit) (5L)

Books Recommended:

1. Baron Schwartz , High Performance MySQL, O'Reilly, 2012.
2. Vikram Vaswani , The Complete Reference MySQL , McGraw Hill Educations, 2004.

**MySQL Programming (using SQL/PL-SQL): LAB
Software Lab Based on MySQL (SQL/PL-SQL):****[SQL COMMANDS]**

- 1) SQL* formatting commands
- 2) To create a table, alter and drop table.
- 3) To perform select, update, insert and delete operation in a table.
- 4) To make use of different clauses viz where, group by, having, order by, union and intersection,
- 5) To study different constraints.

[SQL FUNCTION]

- 6) To use oracle function viz aggregate, numeric, conversion, string function.
- 7) To understand use and working with joins.
- 8) To make use of transaction control statement viz rollback, commit and save point.
- 9) To make views of a table.
- 10) To make indexes of a table.

[PL/SQL]

- 11) To understand working with PL/SQL
- 12) To implement Cursor on a table.
- 13) To implement trigger on a table

6 PHP Programming: THEORY: 15L

Introduction to PHP: (3L)

- PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.)
- PHP with other technologies, scope of PHP
- Basic Syntax, PHP variables and constants
- Types of data in PHP, Expressions, scopes of a variable (local, global)
- PHP Operators: Arithmetic, Assignment, Relational, Logical operators, Bitwise , ternary and MOD operator.
- PHP operator Precedence and associativity

Handling HTML form with PHP:

(2L)

- Capturing Form Data
- GET and POST form methods
- Dealing with multi value fields
- Redirecting a form after submission

PHP conditional events and Loops:

(3L)

- PHP IF Else conditional statements (Nested IF and Else)
- Switch case, while ,For and Do While Loop
- Goto , Break ,Continue and exit

PHP Functions:

(3L)

- Function, Need of Function , declaration and calling of a function
- PHP Function with arguments, Default Arguments in Function
- Function argument with call by value, call by reference
- Scope of Function Global and Local

String Manipulation and Regular Expression:

(2L)

- Creating and accessing String , Searching & Replacing String
- Formatting, joining and splitting String , String Related Library functions
- Use and advantage of regular expression over inbuilt function
- Use of preg_match(), preg_replace(), preg_split() functions in regular expression

Array:

(2L)

- Anatomy of an Array ,Creating index based and Associative array ,Accessing array
- Looping with Index based array, with associative array using each() and foreach()
- Some useful Library function

PHP Programming: LAB

Software Lab Based on PHP:

1. Create a PHP page using functions for comparing three integers and print the largest number.
2. Write a function to calculate the factorial of a number (non-negative integer). The function accept the number as an argument.
3. WAP to check whether the given number is prime or not.
4. Create a PHP page which accepts string from user. After submission that page displays the reverse of provided string.
5. Write a PHP function that checks if a string is all lower case.
6. Write a PHP script that checks whether a passed string is palindrome or not? (A palindrome is word, phrase, or sequence that reads the same backward as forward, e.g., madam or nurses run)
7. WAP to sort an array.
8. Write a PHP script that removes the whitespaces from a string.
Sample string : 'The quick "" brown fox'

Expected Output : Thequick""brownfox

9. Write a PHP script that finds out the sum of first n odd numbers.
10. Create a login page having user name and password. On clicking submit, a welcome message should be displayed if the user is already registered (i.e.name is present in the database) otherwise error message should be displayed.
11. Write a PHP script that checks if a string contains another string.
12. Create a simple 'birthday countdown' script, the script will count the number of days between current day and birth day.
13. Create a script to construct the following pattern, using nested for loop.

```
*
* *
* * *
* * * *
* * * * *
```

14. Write a simple PHP program to check that emails are valid.
15. WAP to print first n even numbers.
16. \$color = array('white', 'green', 'red')
Write a PHP script which will display the colors in the following way :

Output :
white, green, red,
• green
• red
• white

17. Using switch case and dropdown list display a “Hello” message depending on the language selected in drop down list.
18. Write a PHP program to print Fibonacci series using recursion.
19. Write a PHP script to replace the first 'the' of the following string with 'That'.

Sample : 'the quick brown fox jumps over the lazy dog.'

Expected Result : That quick brown fox jumps over the lazy dog.

7 Programming with VB: THEORY: 15L

GUI Environment: Introduction to graphical user interface (GUI), programming language (procedural, object oriented, event driven), the GUI environment, compiling, debugging, and running the programs.

(2L)

Controls : Introduction to controls textboxes, frames, check boxes, option buttons, images, setting borders and styles, the shape control, the line control, working with multiple controls and their properties, designing the user interface, keyboard access, tab controls, default & cancel property, coding for controls.

(4L)

Operations: Data types, constants, named & intrinsic, declaring variables, scope of variables, valfunction, arithmetic operations, formatting data.

(2L)

Decision Making : If statement, comparing strings, compound conditions (and, or, not), nested if statements, case structure, using if statements with option buttons & check boxes, displaying message in message box, testing whether input is valid or not.

(3L)

Forms Handling : Multiple forms creating, adding, removing forms in project, hide, show method, load, unload statement, me keyword, referring to objects on a different forms.

(2L)

Iteration Handling: Do/loops, for/next loops, using msgbox function, using string function.

(2L)

Book Recommended:

Programming in Visual Basic 6.0 by Julia Case Bradley, Anita C. Millispangh (Tata Mcgraw Hill Edition 2000 (Fourteenth Reprint 2004))

Software Lab Based on Visual Basic: LAB

Practical exercises based on concepts listed in theory using VB.

1. Write a VB application to compute the sum of two variables.
2. Write a VB application to compute the factorial of a number n.
3. Write a VB application to compute the Fibonacci series of a number n.
4. Write a VB application to compute the series of prime numbers till number n.
5. Write a VB application to compute the maximum of three numbers.
6. Write a VB application to compute the sum of odd numbers and even numbers in an array of n integers.
7. Write a VB application to compare the strings.
8. Write a VB application to make a calculator.
9. Write a VB application to choose your hobbies from a list.
10. Write a VB application to illustrate the use of color radio button.
11. Write a VB application to illustrate the use of color scroll bar form.
12. Write a VB application to illustrate the use of color scroll bar label text.
13. Write a VB application to illustrate the use of color text box.
14. Write a VB application to show a timer.

8 Android Programming: THEORY: 15L

Introduction: History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture. (2L)

Overview of object oriented programming using Java: OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine. (3L)

Development Tools: Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project – Hello Word, run on emulator, Deploy it on USB-connected Android device. (4L)

User Interface Architecture: Application context, intents, Activity life cycle, multiple screen sizes.(2L)

User Interface Design: Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners (Combo boxes), Images, Menu, and Dialog. (2L)

Database: Understanding of SQLite database, connecting with the database. (2L)

Book Recommended:

1. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.

ONLINE READING / SUPPORTING MATERIAL:

1. <http://www.developer.android.com>
2. <http://developer.android.com/about/versions/index.html>
3. <http://developer.android.com/training/basics/firstapp/index.html>
4. <http://docs.oracle.com/javase/tutorial/index.htm> (Available in the form of free downloadable ebooks also).
5. <http://developer.android.com/guide/components/activities.html>
6. <http://developer.android.com/guide/components/fundamentals.html>
7. <http://developer.android.com/guide/components/intents-filters.html>
8. <http://developer.android.com/training/multiscreen/screensizes.html>
9. <http://developer.android.com/guide/topics/ui/controls.html>
10. <http://developer.android.com/guide/topics/ui/declaring-layout.html>
11. <http://developer.android.com/training/basics/data-storage/databases.html>

Android Programming: LAB

Software Lab Based on Android Programming:

1. Create “Hello World” application. That will display “Hello World” in the middle of the screen in the emulator. Also display “Hello World” in the middle of the screen in the Android Phone.
2. Create an application with login module. (Check username and password).
3. Create spinner with strings taken from resource folder (res >> value folder) and on changing the spinner value, Image will change.
4. Create a menu with 5 options and selected option should appear in text box.
5. Create a list of all courses in your college and on selecting a particular course teacher-in-charge of that course should appear at the bottom of the screen.
6. Create an application with three option buttons, on selecting a button colour of the screen will change.
7. Create and Login application as above. On successful login, pop up the message.
8. Create an application to Create, Insert, update, Delete and retrieve operation on the database.