

Appendix - XXIX

B.Voc. (Software Development) Skill Component			Credits (Th+Lab)
Semester - 1			
1	SEC1.1	Fundamentals of Mathematics and Statistics	4 + 0
2	SEC1.2	Programming Skills using C	4 + 3
3	SEC1.3	Desktop Publishing	4 + 3
Semester – 2			
1	SEC 2.1	C++ Programming Skills	4 + 3
2	SEC 2.2	Data Structures	4 + 3
3	SEC 2.3	Project I	4
Semester – 3			
1	SEC 3.1	Aptitude & Logical Reasoning	4 + 0
2	SEC 3.2	Core Java Programming	4 + 3
3	SEC 3.3	Operating System Concepts	4 + 3
Semester – 4			
1	SEC 4.2	Networking Fundamentals	4 + 3
2	SEC 4.3	Web Application and Development	4 + 3
3	SEC 4.4	Project II	4
Semester - 5			
1	SEC 5.1	Software Engineering	4 + 0
2	SEC 5.2	Python Programming	4 + 3
3	SEC 5.3	Database Management Skills	4 + 3
Semester - 6			
1	SEC 6.1	Introduction to Data Science	4 + 3
2	SEC 6.2	Mobile Application Development	4 + 3
3	SEC 6.3	Industrial Training	4

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B.Voc –Software Development**Fundamentals of Mathematics and Statistics
Paper Code: SEC 1.1****Credit - 4****Max Marks: 100 Hours:3****Part A – (Basic Mathematics)**

1. Sets, relation and mappings. Basic number systems and their algebraic properties, complex numbers.
2. Basic algebra- Solution of quadratic equations, relation between roots and co-efficients of basics of quadratic and cubic equations. Arithmetic & Geometric progressions. Binomial theorem with simple applications.
3. Matrix Algebra Math- Types of Matrices, algebra of matrices. Computation of determinants and finding inverse of matrices upto third order.
Formulation and solution of system of linear equations (upto 3 unknowns) by Cramer's Rule and Matrix- inverse method.
4. Graphs of linear functions and simple functions such as :-
 $y=x^2$, $y=x^2+1$ $y=x^3$ $Y=IxI$
5. Business Mathematics – percentage, profit and loss, simple and compound interest, present value

Part B – (Basic Statistics)

6. Presentation of statistical data by bar charts and pie charts.
7. Measures of Central Tendency – weighted mean, arithmetic mean, median and mode – simple problems.
8. Measures of Variation: Variance, Standard Deviation & Coefficient of Variation (Simple problems).
9. Simple Correlation and rank correlation. Simple Linear regression and Analysis.

Readings: -

1. Algebra-M.K. Singal and Asha Rani Singal.
2. Business Mathematics and Statistics- J.K. Thukral
3. Statistical Methods-S.P. Gupta.

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**B.Voc –Software Development
Programming Skills using C**

Paper Code: SEC 1.2

Credit - 7

Max Marks: 100 Hours:3

Objective: The objective of the paper is to make the students familiar with the basics of programming aspects, using C as the primary language. This course focuses on the programming constructs which are used in other languages as well. This is the introductory course on programming. So it does not require any perquisite.

UNIT- I

Concept of algorithms, Flow Chart, Programming using C: C character set, Tokens, identifiers, Variables, Constants, data type in C, simple I/O Function calls from library, arithmetic, relational and logical operations, **Conditional Structure:** if, else, switch, break, continue and goto.

[T1], [T2] [No. of hrs. 15]

UNIT- II

Concept of loops: for, while and do-while and nested loops.

Arrays: One and Two dimensional . Initialization and some basic operation on 1-D and 2-D array, Strings as array of character. Concept of Pointer, array and pointer relationship, pointer to array, array of pointers, pointer to functions.

[T1], [T2] [No. of hrs. 15]

UNIT-III

Functions: Concept of functions, Parameter passing techniques - call by value and call by reference, library functions.

Structure: Initialization of structure and their application, union.

[T2], [T1] [No. of hrs. 15]

UNIT- IV

Files: Concept of files, Binary files, Text files, File Handling in C Using File Pointers, fopen(), fclose(), Input and Output using file pointers, Character Input and Output with Files,

String: String manipulation Functions and their application.

[T2], [T1] [No. of hrs. 15]

Text Books:

[T1] Yashwant Kanetkar, "Test your C Skills", BPB Publications

[T2] Programming in ANSI C, E. Balagurusamy; McGraw Hill, 6th Edition.

Reference Books:

[R1] Kernighan & Ritchie, "C Programming Language", The (Ansi C version), PHI, 2nd Edition

[R2] K.R Venugopal, "Mastering C", TMH

[R3] R.S. Salaria "Application Programming in C", Khanna Publishers, 4th Edition

Programming Skills using C Lab

Credit-3 Lectures: 45

Hours:3

Max Marks: 75

List of Experiments:

1. Programs to illustrate the data types and simple arithmetic operators (i.e. area of a

circle, conversion of Temperature units)

2. Programs to illustrate the conditional structure (i.e. largest of three numbers, simple calculator by switch – case)
3. Programs to illustrate the loop structure (find sum of a geometric series, find sum of first n natural numbers etc.)
4. Programs to illustrate 1- D array (i.e. find average of marks of a class in one subject)
5. Programs on function (i.e. to find the factorial of a number, to find the HCF of two nos.).
6. Programs on function (to highlight the difference between call by value and call by reference)
7. Programs on library functions by using header files (i.e string and char functions).
8. Programs to illustrate 2-D array (i.e. program for matrices addition, Subtraction, multiplication)
9. Programs on structure (i.e. an array of record contains information of employees of a company. Display all the data of those employees having salary > 20000.)
10. Programs on union (to illustrate the difference and similarity between structure and union).
11. Programs on binary file (i.e. Store records of a student in a Binary File “Student.dat” read the file and display the content of the file.)
12. Programs on text file (i.e., to count the no of Lowercase, Uppercase and special characters presents in a text file).

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**B.Voc –Software Development
Desktop Publishing**
Paper Code: SEC 1.3

Credit - 7**Max Marks: 100 Hours:3**

Objectives and Pre-requisites: Basic knowledge of computer operation is expected. To prepare students having skills in the field of content designing or Desk top publishing where there is a great scope for them work in printing Press, News Paper houses, Publishing companies and Advertising Industries. Application software like Adobe Page maker and Corel draw are used for designing work Adobe Photoshop is a very popular image editing software and efficient working of these is absolutely essential to work in printing industry.

Learning Outcomes: Individuals who complete this program can start their own designing firm catering to project works like brochure designing, visiting cards, banners, flyers, magazines and newsletters etc.

UNIT-I

D.T.P for Publications: Introductions to Printing, Types of Printing, Offset Printing, Transparent Printout, Use of DeskTop Publishing in Publications, Importance of D.T.P in Publication, Advantage of D.T.P in Publication, Laser printers – Uses, Types and Advantage in publication.

[T1][No. of Hrs. 10]**UNIT-II**

Introductions to Page Maker: Different page format / Layouts, News paper page format, Page orientations, Columns & Gutters, Printing in reduced sizes. PageMaker Icon and help, Tool Box, Styles, Menus etc., Different screen Views, Importing text/Pictures, Auto Flow, Columns.

Master Pages and Story Editor, Menu Commands and short-cut commands, Spell check, Find & Replace, Import Export etc., Fonts, Points Sizes, Spacing etc., Installing Printers, Scaling (Percentages). Use of D.T.P. in Advertisements, Books & Magazines, News Paper.

[T2][No. of Hrs. 17]**UNIT – III Introduction to CorelDraw**

Introduction to CorelDraw Use and importance in Designing, Introduction to Screen and Work Area

.Introduction to Tools of CorelDraw, Managing Palettes ,Working with Images, Patterns and Textures ,Working with Shapes, Colours and Fills, Image Editing.

Page Setup and Designing, Using Styles and Templates, Working with Text, Formatting Text, Text Attributes. Designing Different Page Layouts, Column Layout, Working with Layers. Special Effect to Objects and Texts, Contour Tool, Layout for News Paper and Magazines.

Preparation of Visiting Cards & Invitation Cards, Logo Design and Brochure design.

[T3][No. of Hrs. 17]**UNIT- IV Introduction of PhotoShop**

Introduction to Adobe Photoshop & Documents, Various Graphic Files and Extensions, Various Colour Modes and Models. Introduction to Screen and Work Area, Photoshop Tools & Palettes , Using Brushes , Rubber Stamp Options , Using the Editing Tool ,The Smudge Tool, Selection Tools ,Use of Layers , Applying Filters ,Working with Images

[T4][No. of Hrs.**16]****Text Books:**

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[T1] Desktop Publishing and Design: A Beginner's Guide Paperback – 2003 by Roger C Parker (Author) [T2] Adobe PageMaker 7.0 Ellenn Behoriam, Erika Kendra Prentice Hall, 01-Mar-2002

[T3] Special Edition Using CorelDRAW 9 Steve Bain, D. Scott Campbell Que, 1999 [T4] Adobe Photoshop 7.0 Adobe Press

References Books:

- [R1] Straight To The Point - PageMaker 7.0 Laxmi Publications, Ltd., 01-Jan-2009
- [R2] Adobe PageMaker 7.0 Classroom in a Book by Adobe Creative Team.
- [R3] Adobe Photoshop Elements 7.0 – Illustrated By Barbara Waxer, Lisa Tannenbaum
- [R4] Adobe Photoshop Elements 7 Classroom in a Book By Adobe Creative Team
- [R5] CorelDraw 10 for Windows By Phyllis Davis, Steve Schwartz, Steven A. Schwartz Bring it Home with CorelDRAW: A Guide to In-house Graphic Design Roger
- [R6] Wambolt Course Technology, 2012

Desktop Publishing Lab

**Credit-3 Lectures: 45
Hours:3**

Max Marks: 75

List of Experiments:-

1. Design Newspaper article in Multiple Columns in ADOBE PAGEMAKER.
2. Design a classified advertisement in ADOBE PAGEMAKER.
3. Perform experiments with the use of Master Pages in ADOBE PAGEMAKER.
4. Perform experiments with the use of import and export command in ADOBE PAGEMAKER.
5. Design Invitation Card in CORELDRAW.
6. Design a Logo in CORELDRAW
7. Design Greeting Card in CORELDRAW.
8. Design a Broucher in CORELDRAW
9. Design a Magazine Front Page in CORELDRAW.
10. Scan a BLACK& WHITE PHOTO and convert it into COLOR PHOTO in PHOTOSHOP.
11. Change dress color of a scanned photo using PHOTOSHOP.
12. Scan a PASSPORT SIZE PHOTO and apply various tools for finishing the photo in PHOTOSHOP.

Suggested Tool Kits: Adobe PageMaker 7, CorelDraw 9, Adobe Photoshop 7

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**B.Voc –Software Development
C++ Programming Skills**

Paper Code: SEC 2.1

Credit-4 Lectures: 60

Max Marks: 100

Hours:3

Objectives and Pre-requisites: The Student should have basic knowledge of computer operation and logic to develop concept of C++. To understand the basics of Object Oriented Programming and their applications by using C++.

Learning Outcomes: The student will gain knowledge of objects, Class, Data Abstraction, Encapsulation, inheritance, Polymorphism and Dynamic Binding. Will able to develop and construct programs using Bottom up design approach.

UNIT-I

Introduction: Structured Programming, Object Oriented Programming, Programming Methodology, Basic Concepts of OOPs. C++ Overview, C++ Character Set, C++ Tokens, Constants & Variables, Data Types, Structure of C++ Program. Operators & Expressions, Type Conversion, Control Structure: if, switch-case, while, do-while, for. Operators & References in C++: Scope resolution operator, Reference variable, New & Delete, Pointer member operators.

[T1, T2][No. of Hrs: 15]

UNIT-II

Introduction of Function: Declaration / Prototyping, Main function, Call by Value, Call by Reference, Call by Address, Inline Function, friend function.

Classes and Objects: Abstract data types, Classes, Objects, C++ class declaration, instantiation of objects, Array of Objects, Static Member function.

Constructors and Destructors: Parameterized constructors, Copy Constructor, Multiple Constructor, Destructor.

[T1, T2][No. of Hrs. 15]

UNIT-III

Inheritance: Inheritance, Types of Inheritance- Single, Multiple, Multilevel, Hierarchical, Hybrid, derivation-public, private & protected, Virtual Base Class, Constructor and Destructor in Inheritance.

Polymorphism: –Polymorphism, Types of Polymorphism- Compile time and runtime, Operator overloading, function overloading, parametric polymorphism

Pointer: Introduction, Pointer to Object, This Pointer, Pointer to derived Classes, Overriding inheritance methods-Virtual Function, Pure Virtual Function.

[T1, T2][No. of Hrs: 17]

UNIT-IV

Input-Output & Manipulator: Stream Classes, Unformatted Input/ Output, Formatted Input/ Output, Manipulators.

File Handling: Classes for File Streams, Opening & Closing of File, File Opening Modes, Checking End Of File, Working with Binary Mode.

Exception Handling: Basics of Exception Handling, Exception Handling Mechanism, Throwing Mechanism, Catching Mechanism.

[T1, T2, T3][No of Hrs: 13]

Text Books:

[T1] R. Lafore, “Object Oriented Programming using C++”, BPB Publications, 2004.

[T2] E. Balaguruswamy, “Object Oriented Programming with C++”, TMH.

[T3] A.R. Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH, 1997.

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[T4] Hari Mohan Pandey, " Trouble Free C++", Ane Books Pvt. Ltd.

Reference Books:

- [R1] Yashwant Kanethkar, "Object Oriented Programming using C++", BPB, 2004.
- [R2] Schildt Herbert, "C++ Programming", 2nd Edition, Wiley DreamTech.
- [R3] D. Parasons, "Object Oriented Programming with C++", BPB Publication, 1999.
- [R4] Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication, 2002.
- [R5] Jibitesh Mishra, Muktikanta Sa, K. Madhu Sudhan "Object Oriented Programming using C++"- 2nd Edn, Scitech Publication.

C++ Programming Skills Lab

Credit-3 Lectures: 45

Max Marks: 75

Hours:3

List of Experiments:

1. Design an employee class for reading and displaying the employee information, the getInfo() and display Info () methods will be used respectively. Where get Info () will be private method.
2. Design the class student containing get Data() and display Data() as two of its methods which will be used for reading and displaying the student information respectively. Where get Data() will be private method.
3. Design a class Complex for adding the two complex numbers and also show the use of constructor.
4. Design a class Geometry containing the methods area() and volume() and also overload the area() function.
5. Overload the operator + for adding the timings of two clocks, And also pass objects as an argument.
6. Overload the + for concatenating the two strings. For e.g "c" + "++" = c++
7. Design a class for single level inheritance using public and private type derivation.
8. Design a class for multiple inheritance.
9. Implement the concept of method overriding.
10. Show the use of virtual function
11. String operations for string length , string concatenation
12. String operations for string reverse, string comparison.
13. Show the implementation of exception handling
14. Show the implementation for exception handling for strings
15. Design a class File Demo, open a file in read mode and play the total number of words and lines in the file.
16. Design a class to handle multiple files and file operations
17. Show the implementation of template class library for swap function.
18. Design the template class library for sorting ascending to descending and vice-versa

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**B.Voc –Software Development
Data Structures**

Paper Code: SEC 2.2

Credit - 7

Max Marks: 100 Hours:3

Single and Multidimensional arrays, Sequential Allocation, Address Calculations, Sparse matrices and their efficient representation. 6L

[2]: [chap 7: 7.1, 7.3, 7.4.1, 7.4.2 up to Pg 256, 7.4.3 (up to pg. 261)]

Recursion, Application of stacks to recursion problems. 5L

[1]: [chap 5: 5.1 to 5.9]

Singly & Double Linked Lists, Operations on all these structures and applications of these structures. 6L

[1]: [chap 3: 3.1, 3.2]

Circular Linked Lists, Self Organizing Lists 4L

[1]: [chap 3: 3.3, 3.5]

Stacks, Applications of stacks eg.: Infix to Postfix. Queues, Overview of priority queue 6L

[1]: [chap 4: 4.1 to 4.3]

Trees, Binary Trees, Complete Binary trees and almost complete Binary trees, BST, Tree traversal algorithms, Searching in Binary Search Tree. Introduction to Threaded Trees. 10L

[1]: [chap 6: 6.1 to 6.4.3 upto pg 235]

BST Insertion & Deletion 5L

[1]: [chap 6: 6.5(pg 241-242), 6.6 (pg 244-250)]

Sorting Techniques (without efficiency): Bubble Sort, Selection Sort, Insertion Sort. 9L

[3]: [chap 6: 6.2(pg 339-341), 6.3(pg 352-353), 6.4(upto pg 365)]

Searching Techniques (without efficiency): Linear search, Binary search, Hashing with Collision handling methods. 5L

[3]: [chap 7: 7.1(pg 384-390, 394-396), Ref. [1]: [ch10: 10.1 to 10.3 (pg 525-538)]

Multiway trees – B-Tree, B+ Tree. 4L

[1]: [chap 7 : (pg 301-316)]

Recommended Reading Material

Text Books

1. Adam Drozdek, Data Structures and algorithm in C++, Third Edition, Cengage Learning, 2012.
2. Sartaj Sahni, Data Structures, Algorithms and applications in C++, Second Edition, Universities Press, 2011.
3. Aaron M. Tenenbaum, Moshe J. Augenstein, Yedidyah Langsam, Data Structures Using C and C++, Second edition, PHI, 2009. Reference Books
4. D.S Malik, Data Structure using C++, Second edition, Cengage Learning, 2010.

Online Reading/Supporting Material

5. <http://nptel.iitm.ac.in/video.php?subjectId=106102064>

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Data Structures Lab

**Credit-2 Lectures: 30
Hours:3**

Max Marks: 50

1. Write a menu driven program to implement the following sparse matrices using one-dimensional array: a) Diagonal Matrix b) Lower Triangular Matrix c) Upper Triangular Matrix d) Symmetric Matrix
2. I. Write a program to compute b^r using recursion where b represents base and r represents power.
II. Write a program to reverse a user entered string using recursion.
3. Write a program to perform the following Queue operations using Circular Array implementation (Use Templates): a) Enqueue b) Dequeue
4. I. Write a program to add two large integers using stack.
II. Write a program to evaluate postfix expression using stack.
5. Write a program to implement Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list and concatenate two linked lists (include a function and also overload operator +).
6. I. Write a program to perform the following Stack operations using linked list - Push Pop Clear
II. Write a program to create and perform the following operations on Queues using linked list: a.Enqueueb.Dequeue
7. Write a program to implement Doubly Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.
8. Write a program to implement Circular Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.
9. Write a program to add two polynomials using linked list representation.
10. Write a menu driven program to implement the following operations in an ordered linked list: a) Insertion b) Deletion c) Merging
11. Write a Program to reverse elements of a Stack using an additional Stack.
12. Write a Program to reverse elements of a Stack using an additional Queue.
13. Write a menu driven program to implement the following operations in a Binary Search Tree: a) Insertion. b) Deletion by copying or by merging. c) Search a number in BST. d) Display the contents in one of preorder, postorder and inorder traversals using recursion. e) Display the contents by level-by-level traversal. f) Count the leaf and non-leaf nodes of the tree. g) Display the height of the tree. h) Create the mirror image of the tree.
14. Write a menu driven program to implement the following sorting and searching algorithms: a) Insertion Sort b) Binary Search c) Bubble Sort d) Selection Sort
15. Write a program to create a Hash Table that allows insertion, deletion and searching for an element.

B.Voc –Software Development

Aptitude and Logical Reasoning

Paper Code: SEC 3.1

Credit - 4

Max Marks: 100 Hours:3

UNIT-I

Data sufficiency, Measurement, Time and distance, Arithmetic, Relationship between numbers.

[T1][T2][No. of Hrs. 15]

UNIT-II

Basic mathematical relations and formula, Computation, Data interpretation.

[T1][T2][No. of Hrs. 15]

UNIT-III

Differences, Discrimination, Decision-making, Judgement, Problem-solving, Analogies, Analysis.

[T1][T2][No. of Hrs. 20]

UNIT-IV

Arithmetic reasoning, Relationship concept, Arithmetic number series, Similarities, Verbal and figure classification, Space visualization, Observation.

[T1][T2][No. of Hrs. 25]

Text Books:

[T1] Arun Sharma, "How to prepare for Logical Reasoning for the CAT".

[T2] A.K. Gupta, "Logical and Analytical Reasoning".

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**B.Voc –Software Development
Core Java Programming**

Paper Code: SEC 3.2

Credit - 7

Max Marks: 100 Hours:3

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, Datatypes, 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, String Buffer methods. (6L)

Abstract Class, Interface and Packages: Modifiers and Access Control, Abstract classes and methods, Interfaces, Packages Concept, Creating user defined packages (10L)

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 (7L)

Applet Programming: Introduction, Types Applet, Applet Life cycle, Creating Applet, Applet tag (2L)

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

Core Java Programming Lab

Credit-3 Lectures: 45

Max Marks: 75

Hours:3

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.

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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 NumberFormatException 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.

**B.Voc –Software Development
Operating System Concepts**

Paper Code: SEC 3.3

Credit-4

Max Marks: 100 Hours:3

Introduction: Basic OS functions, resource abstraction, types of operating systems – multiprogramming systems, batch systems, time sharing systems; operating systems for personal computers & workstations, process control & real time systems.

Operating System Organization: processor and user modes, kernels, system calls and system programs.

Process Management: System view of the process and resources, process abstraction, process hierarchy, threads, threading issues, thread libraries; Process Scheduling, non-pre-emptive and pre-emptive scheduling algorithms; concurrent and processes, critical section, semaphores, methods for inter-process communication; deadlocks.

Memory Management: Physical and virtual address space; memory allocation strategies - fixed and variable partitions, paging, segmentation, virtual memory

File and I/O Management: Directory structure, file operations, file allocation methods, device management.

Protection and Security:

Policy mechanism, authentication, internal access authorization.

Recommended Books:

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 2008 5th Edition, Prentice Hall of India.
5. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.

LIST OF PRACTICALS OF OPERATING SYSTEMS

Credit-1 Lectures: 15

Max Marks: 50

Hours:3

BASIC UNIX COMMANDS

1. File Manipulation functions

- creat,
- open,
- read,
- write,
- close,
- mv,
- cp,
- rm.

2. Directory Manipulation functions such as mkdir, rmdir, cd, pwd.

3. ls with options such as -l, -s, etc

4. wc

5. diff

6. cmp
7. chmod
8. who
9. who am i
10. passwd
11. du
12. date
13. cal
14. grep
15. cat
16. sort and tail

C/ C++ programs

1. WRITE A PROGRAM (using fork() and/or exec() commands) where parent and child execute:
 - a) same program, same code.
 - b) same program, different code.
 - c) before terminating, the parent waits for the child to finish its task.
2. WRITE A PROGRAM to report behaviour of Linux kernel including kernel version, CPU type and model. (CPU information)
3. WRITE A PROGRAM to report behaviour of Linux kernel including information on configured memory, amount of free and used memory. (memory information)
4. WRITE A PROGRAM to print file details including owner access permissions, file access time, where file name is given as argument.
5. WRITE A PROGRAM to copy files using system calls.
6. Write program to implement FCFS scheduling algorithm.
7. Write program to implement Round Robin scheduling algorithm.
8. Write program to implement SJF scheduling algorithm.
9. Write program to calculate sum of n numbers using thread library.
10. Write program to calculate factorial of number n using thread library.
11. Write program to calculate sum of n even numbers using thread library.

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**B.Voc –Software Development
Networking Fundamentals**

Paper Code: SEC 4.2

Credit-4

Max Marks: 100 Hours:3

Introduction to Computer Networks: Network definition; network topologies; network classifications; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite.

Data Communication Fundamentals and Techniques: Analog and digital signal; data-rate limits; digital to digital line encoding schemes; pulse code modulation; parallel and serial transmission; digital to analog modulation-; multiplexing techniques- FDM, TDM; transmission media.

Networks Switching Techniques and Access mechanisms: Circuit switching; packet switching- connectionless datagram switching, connection-oriented virtual circuit switching; dial-up modems; digital subscriber line; cable TV for data transfer.

Data Link Layer Functions and Protocol: Error detection and error correction techniques; data-link control- framing and flow control; error recovery protocols- stop and wait ARQ, go-back-n ARQ; Point to Point Protocol on Internet.

Multiple Access Protocol and Networks: CSMA/CD protocols; Ethernet LANs; connecting LAN and back-bone networks- repeaters, hubs, switches, bridges, router and gateways;

Networks Layer Functions and Protocols: routing; routing algorithms; network layer protocol of Internet- IP protocol, Internet control protocols.

Transport Layer Functions and Protocols: Transport services- error and flow control, Connection establishment and release- three way handshake;

Overview of Application layer protocol: Overview of DNS protocol; overview of WWW & HTTP protocol.

Recommended Books

1.B. A. Forouzan: Data Communications and Networking, Fourth edition, THM Publishing Company Ltd 2007.

2.A. S. Tanenbaum: Computer Networks, Fourth edition, PHI Pvt. Ltd 2002.

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**B.Voc –Software Development
Web Application and Development**

Paper Code: SEC 4.3

Credit - 4

Max Marks: 100 Hours:3

Introduction: 15L

Basics of World Wide Web (WWW), Web Browser and its architecture, Hyper Text Markup Language (HTML), Common Gateway Interface (CGI), Content Management System (CMS), Remote Login (TELNET).

[1]:[chap.6 Complete].

JavaScript: 14L

Basic concepts, structure, variables, operators, functions, control structures, standard objects, event handling, Introduction to AJAX.

[1]: [chap. 7 Complete]

Java Server Pages:16L

Introduction to Java Server Pages (JSP), elements of a JSP (directives, comments, scripting), developing a simple JavaBean, Java Database Connectivity (JDBC).

[1]: [9.1.5 – 9.1.8, 9.1.11, 9.1.12]

Recommended Reading Material

Text Books

1.A. S. Godbole and A. Kahate, Web Technologies: TCP/IP, Architecture and Java Programming, McGraw-Hill, 2nd Edition, 2012.

Reference Books

2.H.M. Deitel, P.J. Deitel and A.B. Goldberg, Internet and World Wide Web: How to Program, 4th Edition, Pearson Prentice Hall, 2008

3.N. P. Gopalan and J. Akilandeswari, Web Technology: A Developer's Perspective, PHI, 2013.

4.J. C. Jackson, Web Technologies: A Computer Science Perspective, PHI, 2009.

Online Reading / Supporting Material

1.<http://www.w3schools.com/>

2.<http://netbeans.org/>

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Web Application and Development Lab

**Credit-3 Lectures: 45
Hours:3**

Max Marks: 75

LIST OF PRACTICALS

1. Create an admission form of your college which includes:
 - College name and its website address that links to the website
 - numbered list of various fields
 - Check boxes
 - image for photograph
 - combo box
 - submit button
2. Design a set of web pages to organize the content on the topic ‘WebTechnology’ or any other topic of your choice using frames.
3. Design a web page using CSS to demonstrate a web portal of tutorials.
4. Put validation checks on all possible fields on admission form (Pract. 1) using JavaScript.
5. Create an interactive multiple-choice quiz using JavaScript and AJAX.
6. Create an Ajax-enabled HTML page for accepting a user ID and password from the user, and check if the user ID and password are correct.
7. Create a JDBC connection to the admission form (Pract 1) for generating a database of students. Send an appropriate acknowledgement to the student after accepting the form. (Make use of JSP, JDBC and MySql)

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**B.Voc –Software Development
Software Engineering
Paper Code: SEC 5.1**

Credit - 4

Max Marks: 100 Hours:3

Introduction:05L

The Evolving Role of Software, Software Characteristics, Changing Nature of Software, Software Engineering as a Layered Technology, Software Process Framework, Framework and Umbrella Activities, Process Models, Capability Maturity Model Integration (CMMI) [1]:[1.1, 1.3, 1.4, up to 2.1.2, 2.3 –up to 2.3.3, 3.1 –3.3 (before 3.3.1), 30.3]

Requirement Analysis: 4L

Software Requirement Analysis, Initiating Requirement Engineering Process, Requirement Analysis and Modeling Techniques.

[2]: [3.1.2 (pg: 72-75), 3.2 up to 3.2.2 (pg: 75-87), 3.3 up to 3.3.2]

Design Engineering:8L

Design Concepts, Architectural Design Elements, Software Architecture, Data Design at the Architectural Level and Component Level, Mapping of Data Flow into Software Architecture.

[2]: [upto 6.2],[1]: [9.1.1, 9.6 up to 9.6.1].

Quality Management:7 L

Quality Concepts, Software Quality Assurance, Software Reviews, Metrics for Process and Projects.

[1]: [14.4, up to 15.2, up to 16.2]

Software Metrics:4 L

ProductMetrics, Measures, Metrics and Indicators, Function Based Metrics, Process and Project Metrics, Software Measurements, and Metrics for software quality

[1]: [up to 23.1.1, 23.2-up to 23.2.1, up to 25.2.3, 25.3]

Estimations and Scheduling:05L

Estimations for Software Projects, Empirical Estimation Models, Project Scheduling.

[1]: [26.5, 26.6-up to 26.6.6, 26.7.2, 26.7.3, 27.5-up to 27.5.1]

Testing Strategies & Tactics:05L

Software Testing Fundamentals, Strategic Approach to Software Testing, Test Strategies for ConventionalSoftware, Black-Box Testing, White-Box Testing, Basis Path Testing.

[1]: [up to 17.1.3, 17.3, 17.6, 17.7, 18.2-18.4, 18.6 up to 18.6.3
(exclude 18.6.1)]

Risk Management:7L

Software Risks, Risk Identification, Risk Projection and Risk Refinement, Risk Mitigation, Monitoring and Management.

[1]: [up to 28.6]

Recommended Reading Material

Text Books

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1.R.S. Pressman, Software Engineering: A Practitioner's Approach, McGraw-Hill, Ed 7, 2010.

2.P. Jalote, An Integrated Approach to Software Engineering , Narosa Publishing House, Edition 3, 2011.

Reference Books

3.R. Mall, Fundamentals of Software Engineering, Prentice-Hall of India, 3rd Edition, 2009.

4.I. Sommerville, Software Engineering (9th edition), Addison Wesley, 2010

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B.Voc –Software Development

Python Programming

Paper Code: SEC 5.2

Credit - 4

Max Marks: 100 Hours:3

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

(10L)

Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming.

(10L)

Overview of Programming : Structure of a Python Program, Elements of Python

(8L)

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).

(16L)

Creating Python Programs : Input and Output Statements, Control statements(Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.),

Defining Functions, default arguments.

(16L)

Reference Books

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Python Tutorial/Documentation www.python.org 2015
3. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012
4. <http://docs.python.org/3/tutorial/index.html>
5. <http://interactivepython.org/courselib/static/pythonds>
6. <http://www.ibiblio.org/g2swap/byteofpython/read/>

Software Lab Based on Python

Credit-3

Max Marks: 75 Hours:3

Section: A (Simple programs)

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon users 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.

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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.

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Section: B (Visual Python):

All the programs should be written using user defined functions, wherever possible.

1. Write a menu-driven program to create mathematical 3D objects I. curve
- II. sphere III. cone
- IV. arrow
- V. ring
- VI. cylinder.
2. WAP to read n integers and display them as a histogram.
3. WAP to display sine, cosine, polynomial and exponential curves.
4. WAP to plot a graph of people with pulse rate p vs. height h. The values of p and h are to be entered by the user.
5. WAP to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula $m=60/(t+2)$, where t is the time in hours. Sketch a graph for t vs. m, where $t \geq 0$.
6. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows:

$$P(t) = (15000(1+t))/(15 + e^t)$$
 where the time t is measured in hours. WAP to determine the size of the population at given time t and plot a graph for P vs t for the specified time interval.
7. Input initial velocity and acceleration, and plot the following graphs depicting equations of motion:
 - I. velocity wrt time ($v=u+at$)
 - II. distance wrt time ($s=u*t+0.5*a*t*t$)
 - III. distance wrt velocity ($s=(v*v-u*u)/2*a$)
 8. WAP to show a ball bouncing between 2 walls. (Optional)

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**B.Voc –Software Development
Database Management Skills**

Paper Code: SEC 5.3

Credit-4

Max Marks: 100 Hours:3

Introduction: Database concepts, characteristics of database approach, data models, data independence, database users, and database system architecture. 5L

[1]:[1.1 to 1.8, 2.1 to 2.6]

Relational Data Model: Relational model concepts, relational database constraints. 6L

[1]: [3.1 to 3.4]

The Relational Algebra and Relational Calculus 6L

[1]: [6.1 to 6.5]

SQL Programming: 8L

Data Definition Language, Data Manipulation Language, basics of SQL, query designing in SQL using aggregate functions and nested queries.

[1]: [4.1 to 4.5]

Entity Relationship (ER) Modeling: Entity types, entity set, attribute and key, relationships, relation types, entity relationship, ER modeling, ER diagrams, database design using ER diagrams.10L

[1]: [7.1 to 7.7]

Enhanced Entity-Relationship (EER) model.5L

[1]: [8.1 to 8.5]

Database Design: Relational database design by ER and EER-to-Relational Mapping.4L

[1]: [9.1 to 9.2]

Functional dependencies, Normal forms.8L

[1]: [15.1 to 15.7]

Transaction Processing:8L

Introduction to Transaction Processing Concepts and Theory.

[1]: [21.1 to 21.3]

Recommended Reading Material

Text Books

1.R. Elmasri, S.B. Navathe, Fundamentals of Database Systems, 6thedition, Pearson Education, 2010.

Reference Books

2.A. Silberschatz, H. Korth and S. Sudarshan, Database System Concepts, 5th Edition, McGraw Hill, 2010.

3.R. Ramakrishnan, J. Gehrke, Database Management Systems, 3rdedition, McGrawHill International Edition, 2007

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Database Management Skills Lab**Credit - 3****Max Marks: 75 Hours:3****Query List**

- 1.Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.
- 2.Query to display unique Jobs from the Employee Table.
- 3.Query to display the Employee Name concatenated by a Job separated by a comma.
- 4.Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.
- 5.Query to display the Employee Name and Salary of all the employees earning more than \$2850.
- 6.Query to display Employee Name and Department Number for the Employee No= 7900.
- 7.Query to display Employee Name and Salary for all employees whose salary is not in the range of \$1500 and \$2850.
- 8.Query to display Employee Name and Department No. Of all the employees in Dept 10 and Dept 30 in the alphabetical order by name.
- 9.Query to display Name and Hire Date of every Employee who was hired in 1981.
- 10.Query to display Name and Job of all employees who don't have a current Manager.
- 11.Query to display the Name, Salary and Commission for all the employees who earn commission. Sort the data in descending order of Salary and Commission.
- 12.Query to display Name of all the employees where the third letter of their name is 'A'.
- 13.Query to display Name of all employees either have two 'R's or have two 'A's in their name and are either in Dept No = 30 or their Manager's Employee No = 7788.
- 14.Query to display Name, Salary and Commission for all employees whose Commission Amount is greater than their Salary increased by 5%.
- 15.Query to display the Current Date.
- 16.Query to display Name, Hire Date and Salary Review Date which is the 1st Monday after six months of employment.
- 17.Query to display Name and calculate the number of months between today and the date each employee was hired.
- 18.Query to display the following for each employee:
-<E-Name> earns <Salary> monthly but wants <3 * Current Salary>. Label the Column as Dream Salary.
- 19.Query to display Name with the 1st letter capitalized and all other letter lower case and length of their name of all the employees whose name starts with 'J', 'A' and 'M'.
- 20.Query to display Name, Hire Date and Day of the week on which the employee started.
- 21.Query to display Name, Department Name and Department No for all the employees.
- 22.Query to display Unique Listing of all Jobs that are in Department # 30.
- 23.Query to display Name, Dept Name of all employees who have an 'A' in their name.
- 24.Query to display Name, Job, Department No. And Department Name for all the employees working at the Dallas location.
- 25.Query to display Name and Employee no. Along with their Manager's Name and the Manager's employee no; along with the Employees' Name who do not have a Manager.
- 26.Query to display Name, Dept No. And Salary of any employee whose department No. And salary matches both the department no. And the salary of any employee who earns a commission.
- 27.Query to display Name and Salaries represented by asterisks, where each asterisk (*) signifies \$100.
- 28.Query to display the Highest, Lowest, Sum and Average Salaries of all the employees

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- 29.Query to display the number of employees performing the same Job type functions.
- 30.Query to display the no. of managers without listing their names.
- 31.Query to display the Department Name, Location Name, No. Of Employees and the average salary for all employees in that department.
- 32.Query to display Name and Hire Date for all employees in the same dept. As Blake.
- 33.Query to display the Employee No. And Name for all employees who earn more than the average salary.
- 34.Query to display Employee Number and Name for all employees who work in a department with any employee whose name contains a 'T'.
- 35.Query to display the names and salaries of all employees who report to King.
- 36.Query to display the department no, name and job for all employees in the Sales department.

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B.Voc –Software Development

Introduction to Data Sciences

Paper Code: GEC 6.1

Credit - 4

Max Marks: 100 Hours:3

Data Scientist's Tool Box:

Turning data into actionable knowledge, introduction to the tools that will be used in building data analysis software: version control, markdown, git, GitHub, R, and RStudio.7L

R Programming Basics:

Overview of R, R data types and objects, reading and writing data, Control structures, functions, scoping rules, dates and times, Loop functions, debugging tools, Simulation, code profiling7L

Getting and Cleaning Data:

Obtaining data from the web, from APIs, from databases and from colleagues in various formats. basics of data cleaning and making data "tidy".7L

Exploratory Data Analysis:

Essential exploratory techniques for summarizing data, applied before formal modeling commences, eliminating or sharpening potential hypotheses about the world that can be addressed by the data, common multivariate statistical techniques used to visualize high-dimensional data. 12L

Reproducible Research:

Concepts and tools behind reporting modern data analyses in a reproducible manner, To write a document using R markdown, integrate live R code into a literate statistical program, compile R markdown documents using knitr and related tools, and organize a data analysis so that it is reproducible and accessible to others.12L

Reference Books

1. Rachel Schutt, Cathy O'Neil, "Doing Data Science: Straight Talk from the Frontline" by Schroff/O'Reilly, 2013.
2. Foster Provost, Tom Fawcett, "Data Science for Business" What You Need to Know About Data Mining and Data-Analytic Thinking" by O'Reilly, 2013.
3. John W. Foreman, "Data Smart: Using data Science to Transform Information into Insight" by John Wiley & Sons, 2013.
4. Ian Ayres, "Super Crunchers: Why Thinking-by-Numbers Is the New Way to Be Smart" 1st Edition by Bantam, 2007.
5. Eric Seigel, "Predictive Analytics: The Power to Predict who Will Click, Buy, Lie, or Die", 1st Edition, by Wiley, 2013.
6. Matthew A. Russel, "Mining the Social Web: Data mining Facebook, Twitter, LinkedIn, Goole+, GitHub, and More", Second Edition, by O'Reilly Media, 2013.

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**B.Voc –Software Development
Mobile Application Development**

Paper Code: SEC 6.2

Credit-4

Max Marks: 75 Hours:3

Introduction:12 L

History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture.

[2],[3]: pages1 to 10

Overview of object oriented programming using Java:11 L

OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine.

[5]: pages1 to 50

Development Tools:12 L

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.

[1]: Chap1, Chap2, Chap3 (page 55-59) , [4]:pages1 to 20.

User Interface Architecture:3 L

Application context, intents, Activity life cycle, multiple screen sizes

[6]: pages1 to 11,[7]: pages 1 to 8, [8]: page 1to 6.

User Interface Design:13 L

Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners(Combo boxes),Images, Menu, Dialog.

[1]: chap4(page 65-89), chap7(page 163-167), chap8(179-189): [10]: 16 pages, [11]: 9 pages

Database:9 L

Understanding of SQLite database, Connecting with the database.

[1]: chap9 (page 197-207), [12]:1 to 6 pages

Recommended Reading Material

Text Books

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

OnlineReading/ Supporting Material

2.<http://www.developer.android.com>

3.<http://developer.android.com/about/versions/index.html>

4.<http://developer.android.com/training/basics/firstapp/index.html>

5.<http://docs.oracle.com/javase/tutorial/index.htm>

(Available in the form of free downloadable ebooks also).

6.<http://developer.android.com/guide/components/activities.html>

7.<http://developer.android.com/guide/components/fundamentals.html>

8.<http://developer.android.com/guide/components/intents-filters.html>

9.<http://developer.android.com/training/multiscreen/screensizes.html>

10.<http://developer.android.com/guide/topics/ui/controls.html>

11.<http://developer.android.com/guide/topics/ui/declaring-layout.html>

12.<http://developer.android.com/training/basics/data-storage/databases.html>

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Mobile Application Development Lab

Credit-3

- 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.



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