गुरु घासीदास विश्वविद्यालय
(केन्द्रीय विश्वविद्यालय अधिनियम 2009 क्र. 25 के अंतर्गत स्थापित केन्द्रीय विश्वविद्यालय)
कोनी, बिलासपुर – 495009 (छ.ग.)

Guru Ghasidas Vishwavidyalaya
(A Central University Established by the Central Universities Act 2009 No. 25 of 2009)
Koni, Bilaspur – 495009 (C.G.)

List of New Course(s) Introduced

Department	**: *Computer Science and Information Technology***
Programme Name	**: *B.Sc.(CS)***

Academic Year : 2018-19

List of New Course(s) Introduced

Sr. No.	Course Code	Name of the Course
01.	SSCICR0101(L+P)	Programming Fundamentals using C++
02.	SSCICR0102L	Data Structures
03.	SSCIGE0101(L+P)	Introduction to Programming using C
04.	SSCICR0203(L+P)	Programming in JAVA
05.	SSCICR0306L	Database Management Systems
06.	SSCICR0307L	Computer Networks
07.	SSCISC0301(L+P)	HTML and XML Programming
08.	SSCIGE0404(L+P)	Multimedia and Applications
09.	SSCISC0402(L+P)-A	PHP Programming
10.	SSCISC0402(L+P)-B	MATLAB
11	SSCIDS0502L(A)	Image Processing
12	SSCIDS0502L(B)	Soft Computing

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Department of CSIT, GGV, Bilaspur, C.G
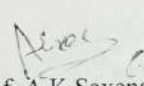
Minutes of the meeting of Board of Studies

The Board of studies meeting for B.Sc. Honours course in Computer Science was held on 06th July 2018 in the CSIT department. Following members were present.
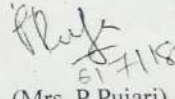
1. Prof. M. Surendra Prasad Babu,
   Department of Computer Science &System Engineering, College of Engineering, Andhra University, Visakhapatnam-530003

2. Prof. A. K. Saxena , Dept of CSIT GGV, Bilaspur.

3. Mrs. Pushpalata Pujari , Assist. Prof. Dept of CSIT, GGV, Bilaspur.
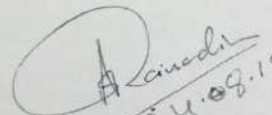
Following was resolved in the meeting

"For the academic session 2018-19 enclosed schema of curriculum / syllabus for B.Sc Honours course in Computer Science is recommended which is according to CBCS as per the latest regulation of UGC".
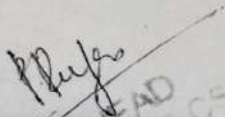
(Prof. M.Surendra Prasad Babu)   (Prof. A.K.Saxena)   (Mrs. P.Pujari)

Approved &
Forwarded.
24.08.18

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COMPUTER SCIENCE (CORE-I): Programming Fundamentals usingC/C++ (SSCICR0101L)

Theory: 60 Lectures

1. Introduction to C and C++ (3 Lectures)

History of C and C++, Overview of Procedural Programming and Object-Orientation Programming, Using main() function, Compiling and Executing Simple Programs in C++.

2. Data Types, Variables, Constants, Operators and Basic I/O (5 Lectures)

Declaring, Defining and Initializing Variables, Scope of Variables, Using Named Constants, Keywords, Data Types, Casting of Data Types, Operators (Arithmetic, Logical and Bitwise),Using Comments in programs, Character I/O (getc, getchar, putc, putcharetc), Formatted and Console I/O (printf(), scanf(), cin, cout), Using Basic Header Files (stdio.h, iostream.h, conio.hetc).

3. Expressions, Conditional Statements and Iterative Statements (5 Lectures)

Simple Expressions in C++ (including Unary Operator Expressions, Binary Operator Expressions), Understanding Operators Precedence in Expressions, Conditional Statements (if construct, switch-case construct), Understanding syntax and utility of Iterative Statements (while, do-while, and for loops), Use of break and continue in Loops, Using Nested Statements (Conditional as well as Iterative)

4. Functions and Arrays (10 Lectures)

Utility of functions, Call by Value, Call by Reference, Functions returning value, Void functions, Inline Functions, Return data type of functions, Functions parameters, Differentiating between Declaration and Definition of Functions, Command Line Arguments/Parameters in Functions, Functions with variable number of Arguments.

Creating and Using One Dimensional Arrays (Declaring and Defining an Array, Initializing an Array, Accessing individual elements in an Array, Manipulating array elements using loops), Use Various types of arrays (integer, float and character arrays / Strings) Two- dimensional Arrays (Declaring, Defining and Initializing Two Dimensional Array, Working with Rows and Columns), Introduction to Multi-dimensional arrays

5. Derived Data Types (Structures and Unions) (3 Lectures)

Understanding utility of structures and unions, Declaring, initializing and using simple structures and unions, Manipulating individual members of structures and unions, Array of Structures, Individual data members as structures, Passing and returning structures fromfunctions, Structure with union as members, Union with structures as members.

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6. Pointers and References in C++ (7 Lectures)

Understanding a Pointer Variable, Simple use of Pointers (Declaring and Dereferencing Pointers to simple variables), Pointers to Pointers, Pointers to structures, Problems withPointers, Passing pointers as function arguments, Returning a pointer from a function, using arrays as pointers, Passing arrays to functions. Pointers vs. References, Declaring and initializing references, Using references as function arguments and function return values

7. Memory Allocation in C++Differentiating between static and dynamic memory allocation, use of malloc, calloc and free functions, use of new and delete operators, storage of variables in static and dynamic memoryallocation

8. File I/O, Preprocessor Directives (4 Lectures)

Opening and closing a file (use of fstream header file, ifstream, ofstream and fstream classes), Reading and writing Text Files, Using put(), get(), read() and write() functions, Random access in files, Understanding the Preprocessor Directives (#include, #define, #error, #if, #else,#elif, #endif, #ifdef, #ifndef and #undef), Macros

9. Using Classes in C++ (7 Lectures)

Principles of Object-Oriented Programming, Defining & Using Classes, Class Constructors, Constructor Overloading, Function overloading in classes, Class Variables &Functions, Objects as parameters, Specifying the Protected and Private Access, Copy Constructors,Overview of Template classes and their use.

10. Overview of Function Overloading and Operator Overloading (5 Lectures)

Need of Overloading functions and operators, Overloading functions by number and type of arguments, Looking at an operator as a function call, Overloading Operators (including assignment operators, unary operators)

11. Inheritance, Polymorphism and Exception Handling (8 Lectures)Introduction to Inheritance (Multi-Level Inheritance, Multiple Inheritance), Polymorphism (Virtual Functions, Pure Virtual Functions), Basics Exceptional Handling (using catch and throw, multiple catch statements), Catching all exceptions, Restricting exceptions, Rethrowing exceptions.

Reference Books

1. HerbtzSchildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill.2003

2. BjarneStroustrup, "The C++ Programming Language", 4th Edition, Addison-Wesley , 2013.

3. BjarneStroustroup, "Programming -- Principles and Practice using C++", 2nd Edition,Addison-Wesley 2014.

4. E Balaguruswamy, "Object Oriented Programming with C++", Tata McGraw-Hill

Education, 2008.

5. Paul Deitel, Harvey Deitel, "C++ How to Program", 8th Edition, Prentice Hall, 2011.

5. John R. Hubbard, "Programming with C++", Schaum's Series, 2nd Edition, 2000.

6. Andrew Koeni, Barbara, E. Moo, "Accelerated C++", Published by Addison-Wesley , 2000.

7. Scott Meyers, "Effective C++", 3rd Edition, Published by Addison-Wesley, 2005.

8. Harry, H. Chaudhary, "Head First C++ Programming: The Definitive Beginner's Guide", FirstCreate space Inc, O-D Publishing, LLC USA.2014

9. Walter Savitch, "Problem Solving with C++", Pearson Education, 2007.

10. Stanley B. Lippman, JoseeLajoie, Barbara E. Moo, "C++ Primer", Published by Addison-Wesley, 5th Edition, 2012

COMPUTER SCIENCE LAB (CORE-II): Programming Fundamentals usingC/C++ Lab (SSCICR0101P)

Practical: 15 Lectures

1. WAP to print the sum and product of digits of an integer.

2. WAP to reverse a number.

3. WAP to compute the sum of the first n terms of the following seriesS = $1+1/2+1/3+1/4+……$

4. WAP to compute the sum of the first n terms of the following seriesS =$1-2+3-4+5………………$

5. Write a function that checks whether a given string is Palindrome or not. Use thisfunction to find whether the string entered by user is Palindrome or not.

6. Write a function to find whether a given no. is prime or not. Use the same to generatethe prime numbers less than 100.

7.WAP to compute the factors of a given number.

8. Write a macro that swaps two numbers. WAP to use it.

9. WAP to print a triangle of stars as follows (take number of lines from user):

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

10. WAP to perform following actions on an array entered by the user:
   i) Print the even-valued elements

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ii) Print the odd-valued elements
iii) Calculate and print the sum and average of the elements of array
iv) Print the maximum and minimum element of array
v) Remove the duplicates from the array
vi) Print the array in reverse order

The program should present a menu to the user and ask for one of the options. The menu should also include options to re-enter array and to quit the program.

11. WAP that prints a table indicating the number of occurrences of each alphabet in thetext entered as command line arguments.

12. Write a program that swaps two numbers using pointers.

13. Write a program in which a function is passed address of two variables and then alter itscontents.

14. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.

15. Write a program to find sum of n elements entered by the user. To write this program, allocate memory dynamically using malloc() / calloc() functions or new operator.

16. Write a menu driven program to perform following operations on strings:
    a) Show address of each character in string
    b) Concatenate two strings without using strcat function.
    c) Concatenate two strings using strcat function.
    d) Compare two strings
    e) Calculate length of the string (use pointers)
    f) Convert all lowercase characters to uppercase
    g) Convert all uppercase characters to lowercase
    h) Calculate number of vowels
    i) Reverse the string

17. Given two ordered arrays of integers, write a program to merge the two-arrays to getan ordered array.

18. WAP to display Fibonacci series (i)using recursion, (ii) using iteration

19. WAP to calculate Factorial of a number (i)using recursion, (ii) using iteration

20. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.

21. Create Matrix class using templates. Write a menu-driven program to perform followingMatrix
    operations (2-D array implementation):
    a) Sum   b) Difference c) Product   d) Transpose

22. Create the Person class. Create some objects of this class (by taking information from the user). Inherit the class Person to create two classes Teacher and Student class. Maintain therespective information in the classes and create, display and

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delete objects of these two classes (Use Runtime Polymorphism).

23. Create a class Triangle. Include overloaded functions for calculating area. Overloadassignment operator and equality operator.

24. Create a class Box containing length, breath and height. Include following methods in it:
    a) Calculate surface Area
    b) Calculate Volume
    c) Increment, Overload ++ operator (both prefix & postfix)
    d) Decrement, Overload -- operator (both prefix & postfix)
    e) Overload operator == (to check equality of two boxes), as a friend function
    f) Overload Assignment operator
    g) Check if it is a Cube or cuboid

    Write a program which takes input from the user for length, breath and height to test theabove class.

25. Create a structure Student containing fields for Roll No., Name, Class, Year and TotalMarks. Create 10 students and store them in a file.

26. Write a program to retrieve the student information from file created in previous question andprint it in following format:
                Roll No. Name Marks

27. Copy the contents of one text file to another file, after removing all whitespaces.

28. Write a function that reverses the elements of an array in place. The function mustaccept only one pointer value and return void.

29. Write a program that will read 10 integers from user and store them in an array. Implement array using pointers. The program will print the array elements in ascending and descendingorder.

COMPUTER SCIENCE (CORE-II): Data Structures (SSCICR0102L)

Theory: 60 Lectures

1. **Arrays**   (5 Lectures)
   Single and Multi-dimensional Arrays, Sparse Matrices (Array and Linked Representation)

2. **Stacks**   (5 Lectures)
   Implementing single / multiple stack/s in an Array; Prefix, Infix and Postfix expressions,Utility and conversion of these expressions from one to another; Applications of stack; Limitations of Array representation of stack

3. **Linked Lists**   (10 Lectures)
   Singly, Doubly and Circular Lists (Array and Linked representation); Normal and Circularrepresentation of Stack in Lists; Self Organizing Lists; Skip Lists

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4. Queues (5 Lectures)

Array and Linked representation of Queue, De-queue, Priority Queues

5. Recursion (5 lectures)

Developing Recursive Definition of Simple Problems and their implementation; Advantagesand Limitations of Recursion; Understanding what goes behind Recursion (Internal Stack Implementation)

6. Trees (20 Lectures)

Introduction to Tree as a data structure; Binary Trees (Insertion, Deletion , Recursive andIterative Traversals on Binary Search Trees); Threaded Binary Trees (Insertion, Deletion, Traversals); Height-Balanced Trees (Various operations on AVL Trees).

7. Searching and Sorting (5 Lectures)

Linear Search, Binary Search, Comparison of Linear and Binary Search, Selection Sort,Insertion Sort, Insertion Sort, Shell Sort, Comparison of Sorting Techniques

8. Hashing (5 Lectures)

Introduction to Hashing, Deleting from Hash Table, Efficiency of Rehash Methods, Hash Table Reordering, Resolving collusion by Open Addressing, Coalesced Hashing, Separate Chaining, Dynamic and Extendible Hashing, Choosing a Hash Function, PerfectHashing Function

Reference Books:
1. Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning,2012.
2. SartajSahni, Data Structures, "Algorithms and applications in C++", Second Edition,Universities Press, 2011.
3. Aaron M. Tenenbaum, Moshe J. Augenstein, YedidyahLangsam, "Data Structures Using Cand C++:, Second edition, PHI, 2009.
4. Robert L. Kruse, "Data Structures and Program Design in C++", Pearson,1999.
5. D.S Malik, Data Structure using C++,Second edition, Cengage Learning, 2010.
6. Mark Allen Weiss, "Data Structures and Algorithms Analysis in Java", Pearson Education,3rd edition, 2011
7. Aaron M. Tenenbaum, Moshe J. Augenstein, YedidyahLangsam, "Data Structures UsingJava, 2003.
8. Robert Lafore, "Data Structures and Algorithms in Java, 2/E", Pearson/ Macmillan ComputerPub,2003
9. John Hubbard, "Data Structures with JAVA", McGraw Hill Education (India)

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PrivateLimited; 2 edition, 2009

10. Goodrich, M. and Tamassia, R. "Data Structures and Algorithms Analysis in Java",4th Edition, Wiley,2013
11. Herbert Schildt, "Java The Complete Reference (English) 9th Edition Paperback",Tata McGraw Hill, 2014.

D. S. Malik, P.S. Nair, "Data Structures Using Java", Course Technology,

Generic Elective (GE-1)   Subject – Introduction to Programming using C(SSCIGE0101L)

Origin & Introduction to C : About C, Evolution of C, Structure of a C program, Compiling aC program, Simple C program, Character set in C, Keywords in C, Basic data types, Qualifiers used with basic data types, Variables in C, Type declaration, Input function, Output function and format specifiers.

Operators: Arithmetic operators, Unary operators, Relational and logical operators, address operator, conditional operator, Hierarchy of operators.

Decision Making, looping & Branching: Control statements, if statement, if else statement, for statement, while loop, do while loop, switch statement, break statement, continue statement, gotostatement.

Arrays: Introduction to arrays, advantages of arrays, single dimensional arrays, multidimensional arrays, array declaration, array initialization, accessing data from array. Two- dimensional Arrays (Declaring, Defining and Initializing Two Dimensional Array, Working withRows and Columns)

Introduction to pointers, function, structure and union.

Reference Books:

1. Y. Kanetkar, Let Us C, BPB Publication.
2. B.S. Gottfried, Schaum's outline of Theory and Problems of Programming with C, McGraw-Hill.
3. *Programming in ANSI C - Balaguruswami, TMH 2.*
4. *The 'C' programming language - B.W.Kernighan, D.M.Ritchie, PHI*
5. A.K. Saxena, Programming Language C : Anamaya Publishers, New Delhi.
6. *C The Complete Reference - H.Sohildt, TMH 3.*
7. *Computer fundamentals and programming in C – Pradip Dey & Manas Ghosh, OXFORD*

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Generic Elective -1 LAB (GE- IA) : **Introduction to Programming using C Lab**
Practical : 15 Lectures (SSCIGE0101P)

1. Write a program to find greatest of three numbers.
2. Write a program to find gross salary of a person
3. Write a program to find grade of a student given his marks.
4. Write a program to find LCM of two numbers.
5. Write a program to find divisor or factorial of a given number.
6. Write a program to find Fibonacci sequence.
7. Write a program to print first ten natural numbers.
8. Write a program to print first ten even and odd numbers.
9. Write a program to find grade of a list of students given their marks.
10. Create Matrix class. Write a menu-driven program to perform followingMatrix operations (2-D array implementation):
    a) Sum   b) Difference c) Product   d) Transpose

11.   Write a program to add first ten natural numbers using function.
12.   Write a program to display prime numbers using function.
13.   Write a program to store information of students using structure.

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COMPUTER SCIENCE (C-VI): Database Management Systems Theory:

60 Lectures

	Lectures

1.Introduction   (6)

Characteristics of database approach, data models, database system architecture and data Independence.

2.Entity Relationship(ER) Modelling   (8 Lectures)

Entity types, relationships, constraints.

3.Relation data model   (20 Lectures)

Relational model concepts, relational constraints, relational algebra, SQLqueries

4.Database design   (15 Lectures)

Mapping ER/EER model to relational database, functional dependencies,Lossless decomposition, Normalforms(upto BCNF).

5.Transaction Processing   (3 Lectures)

ACID properties, concurrency control

6.File Structure and Indexing   (8 Lectures)

Operations on files, File of Unordered and ordered records, overview of File organizations, Indexing structures for files(Primary index, secondary index, clustering index), Multilevel indexing using B and B^+ trees.

Books Recommended:

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. R. Ramakrishanan, 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.

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SKILL ENHANCEMENT COURSE (SEC-1) A HTML and XML programming

Tutorials:60

HTML Programming

- **Unit-I: Introduction** (
- **Unit-II: The Basics** (
  - The Head, the Body
  - Colors, Attributes
  - Lists, ordered and unordered
- **Unit-III: Links** (
  - Introduction
  - Relative Links, Absolute Links
  - Link Attributes
  - Using the ID Attribute to Link Within a Document
- **Unit-IV: Images** (
  - Putting an Image on a Page
  - Using Images as Links
  - Putting an Image in the Background
- **Unit V: – Tables** (
  - Creating a Table
  - Table Headers o
  - Captions
  - Spanning Multiple Columns o
  - Styling Table
- **Unit VI – Forms** (
  - Basic Input and Attributes
  - Other Kinds of Inputs o
  - Styling forms with CSS
  - Where To Go From Here

Book Recommended:

1. Virginia DeBolt , Integrated HTML and CSS A Smarter, Faster Way to Learn Wiley / Sybex , 2006
2. Cassidy Williams, Camryn Williams Introduction to **HTML** and CSS, O'Reilly, 20

Software Lab Based on HTML:

Q.1 Create an HTML document with the following formatting options:
    I.   Bold
    II. Italics

    V.   Font (Type, Size and Color)

    X.   Pre tag

Q.2   Create an HTML document which consists of:
    I.   Ordered List
    II. Unordered List III.
    Nested List
    IV.   Image

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XYZ Ltd's Update

1. Introduction
2. Company Financial Update
    o First Quarter
    o Second Quarter
    o Third Quarter
    o Fourth Quarter
3. Advertising Update
    o Result of Newspaper Campaign
    o Additions to staff
    o New Thoughts on Television
4. Human Resources Update

A. Saftey Considerations
    1. Body substance isolation
    2. Sense safly
    3. Initial size-up
B. Intitial Patient Assessment
    1. General Impression
    2. Unresponsiveness
        i. Alert to person, place and time
        ii. Verbal response to audible stimuli
        iii. Pain evokes verbal or physical response
        iv. Unresponsive to all stimuli
C. Patient Critical Needs
    1. Airway
    2. Breathing
        i. Use oxygen if indicated
        ii. Consider use of assisting with bag value mask
    3. Circulation
    4. Bleeding

Q.3 Create an HTML document which implements Internal linking as well as External linking. Q.4
Q4 Create a table using HTML which consists of columns for Roll No., Student's name and grade.

Result		
Roll No.	Name	Grade

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			Place an image here

Q.6

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

Subscribe to XYZ News Magazine and Emails

Interested in receiving daily small updates of all latest News? Well, now you can. And best of all, it is free! Just fill out this form and submit it by clicking the 'send it In' button. We will put you on our mailing list and you will receive your first email in 3-5 days.

Please fill the following boxes to help us send the emails and our news letter:

First Name

Last Name

Business:

We must have a correct e-mail address to send you the news letter:

Email

How did you hear about XYZ News Magazine and Emails?

◉ Here on the Web ○ In a magazine ○ Television ○ Other

Would you like to be on our regular mailing list?

☑ Yes, we love junk emails

[Reset]   [Send it in!]

Q.7   Create HTML documents (having multiple frames) in the following three formats:

Frame1
Frame2

Frame1	
Frame2	Frame3

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4. XML Programming

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. XML in action web technology by William J. Pardi
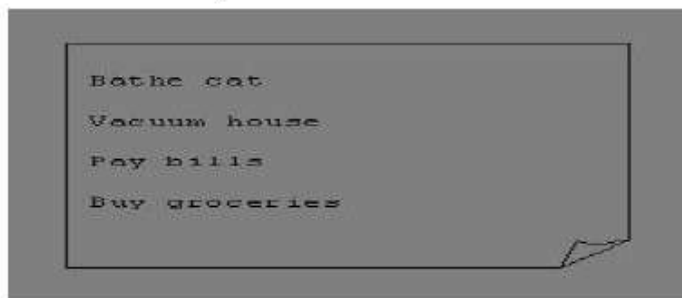2. Step by Step XML by Michael J. Young

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.

1. Draw a tree representation of the structure.

```
Bathe cat

Vacuum house

Pay bills

Buy groceries
```

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</edition>

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```
<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><TITLEHow 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> <EQUIPMENT><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.

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Generic Elective –IV   **Multimedia and Applications**
Theory: 60 lectures

Multimedia: Introduction to multimedia, components, uses of multimedia, 6L multimedia applications, virtual reality.

Text: Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools,   4L
Hypermedia & Hypertext.

Images: Still Images – bitmaps, vector drawing, 3D drawing & rendering, natural   6L
light & colors, computerized colors, color palettes, image file formats.

Sound: Digital Audio, MIDI Audio, MIDI vs Digital Audio, Audio File Formats.   6L

Video: How video works, analog video, digital video, video file formats, video   8L
shooting and editing.

Animation: Principle of animations, animation techniques, animation file formats.   10L

Internet and Multimedia: www and HTML, multimedia on the web – web servers,   6L
web browsers, web page makers and site builders.

Making Multimedia: Stages of a multimedia project, Requirements to make good   14L
multimedia, Multimedia Hardware - Macintosh and Windows production Platforms,
Hardware peripherals - Connections, Memory and storage devices, Multimedia
software and Authoring tools.

References:
1. Tay Vaughan, ―Multimedia: Making it workl, TMH, Eighth edition.2011
2. Ralf Steinmetz and KlaraNaharstedt, ―Multimedia: Computing, Communications Applicationsl, Pearson.2012
3. Keyes, ―Multimedia Handbookl, TMH,2000.
4. K. Andleigh and K. Thakkar, ―Multimedia System Designl, PHI.2013

GENERIC ELECTIVE IV LAB   **Multimedia and Applications Lab**
Practical: 60 lectures
Practical exercises based on concepts listed in theory using Flash/ GIMP/ PhotoShop/
Animation Tools/ Image Editors/ Video Editors.

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Optional

Implement the followings using Flash-

1. Create an animation using the tools panel and the properties panel to draw the following –
   Line, pe , oval, circle, rectangle , square, pencil , brush , lasso tool
2. Create an animation using text tool to set the font , size , color etc.
3. Create an animation using **Free transform tool** that should use followings-
   Move Objects
   Skew Objects
   Stretch Objects
   Rotate Objects
   Stretch Objects while maintaining proportion
   Rotate Objects after relocating the center dot
4. Create an animation using layers having following features-
   Insert layer, Delete layer, guide layer, Mask layer.
5. Modify the document (changing background color etc.)using the following tools

   Eraser tool Hand
   tool Ink bottle
   tool Zoom tool
   Paint Bucket tool
   Eyedropper tool

6. Create an animation for bus car race in which both starts from the same point and car wins
   the race.
7. Create an animation in which text Hello gets converted into GoodBye (using motion/shape
   tweening).
8. Create an animation having five images having fade-in fade-out effect.
9. Create an scene to show the sunrise (using multiple layers and motion tweening)
10. Create an animation to show the ripple effect.
11. Create an animation (using Shape tweening and shape hints) for transforming one shape
    into another.
12. Create an animation for bouncing ball (you may use motion guide layer).

SKIL ENHANCEMENT COURSE (SEC-2) A   PHP Programming
(1 +2 Lab)

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Introduction to PHP:

- 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: (3L)
- 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: (3L)
- 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

Reference Books:

1. Steven Holzner, "PHP: The Complete Reference Paperback", McGraw Hill Education (India), 2007.

2. Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify-Reuse)", Wiley India Private Limited, 2008.

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3. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5", 3rd Edition Paperback, O'reilly, 2014.

4. Luke Welling, Laura Thompson, PHP and MySQL Web Development", 4th Edition, Addition Paperback, Addison-Wesley Professsional,2008.

5. David Sklar, Adam Trachtenberg, "PHP Cookbook: Solutions & Examples for PHP Programmers", 2014.

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.

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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.

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SKILL ENHANCEMENT COURSE (SEC-2) B Programming in MATLAB (1+2Labs)

Unit I- Introduction to Programming: Components of a computer, working with numbers, Machine

    code, Software hierarchy. (2L)

Unit I- Programming Environment: MATLAB Windows, A First Program, Expressions, Constants,
    Variables and assignment statement, Arrays. (3L)

Unit III- Graph Plots: Basic plotting, Built in functions, Generating waveforms, Sound replay, load

    and save. (2L)

Unit IV- Procedures and Functions: Arguments and return values, M-files, Formatted console
    input-output, String handling. (3L)

Unit V-Control Statements: Conditional statements: If, Else, Else-if, Repetition statements: While,

    for loop. (2L)

Unit VI- Manipulating Text: Writing to a text file, Reading from a text file, Randomising and
    sorting a list, searching a list. (2L)

Unit VII- GUI Interface: Attaching buttons to actions, Getting Input, Setting Output. (2L)

Recommended Books:

1. MATLAB: An Introduction with Applications, by Amos Gilat, 2nd edition, Wiley, 2004,
2. C.B. Moler, Numerical Computing with MATLAB, SIAM, 2004.

Software Lab Based on MatLab:

1. Write a program to assign the following expressions to a variable A and then to print out the value of A.
   a. $(3+4)/(5+6)$
   b. $2\pi^3$
   c. $\sqrt{2}$
   d. $(0.0000123 + 5.67\times10^{-3}) \times 0.4567\times10^{-4}$

2. Celsius temperatures can be converted to Fahrenheit by multiplying by 9, dividing by 5, and adding 32. Assign a variable called C the value 37, and implement this formula to assign a variable F the Fahrenheit equivalent of 37 Celsius.

3. Set up a vector called N with five elements having the values: 1, 2, 3, 4, 5. Using N, create assignment statements for a vector X which will result in X having these values:
   a. 2, 4, 6, 8, 10
   b. 1/2, 1, 3/2, 2, 5/2
   c. 1, 1/2, 1/3, 1/4, 1/5
   d. 1, 1/4, 1/9, 1/16, 1/25

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4. A supermarket conveyor belt holds an array of groceries. The price of each product (in pounds) is [0.6, 1.2 ,0.5, 1.3] ; while the numbers of each product are [3, 2 ,1 ,5]. Use MATLAB to calculate the total bill.

5. The sortrows(x) function will sort a vector or matrix X into increasing row order. Use this function to sort a list of names into alphabetical order.

6. The —identityǀ matrix is a square matrix that has ones on the diagonal and zeros elsewhere. You can generate one with the eye() function in MATLAB. Use MATLAB to find a matrix B, such that when multiplied by matrix A=[1 2; -1 0] the identity matrix I=[1 0; 0 1] is generated. That is A*B=I.

7. Create an array of N numbers. Now find a single MATLAB statement that picks out from that array the 1,4,9,16,…,√Nth entries, i.e. those numbers which have indices that are square numbers.

8. Draw a graph that joins the points (0,1), (4,3), (2,0) and (5,-2).

9. The seeds on a sunflower are distributed according to the formula below. Plot a small circle at each of the first 1000 co-ordinates :

$$r_n = \sqrt{n}$$

$$\theta_n = \frac{137.51}{180}\pi n$$

10. Calculate 10 approximate points from the function y=2x by using the formulae:

  i. $x_n = n$
  ii. $y_n = 2n + rand - 0.5$

Fit a line of best fit to these points using the function polyfit() with degree=1, and generate co-ordinates from the line of best fit using polyval(). Use the on-line help to find out how to use these functions. Plot the raw data and the line of best fit.

11. Calculate and replay 1 second of a sinewave at 500Hz with a sampling rate of 11025Hz. Save the sound to a file called "ex35.wav". Plot the first 100 samples.

12. Calculate and replay a 2 second chirp. That is, a sinusoid that steadily increases in frequency with time, from say 250Hz at the start to 1000Hz at the end.

13. Build a square wave by adding together 10 odd harmonics: 1f, 3f, 5f, etc. The amplitude of the nth harmonic should be 1/n. Display a graph of one cycle of the result superimposed on the individual harmonics.

14. Write a function called FtoC (ftoc.m) to convert Fahrenheit temperatures into Celsius. Make sure the program has a title comment and a help page. Test from the command window with:

  i. FtoC(96)
  ii. lookfor Fahrenheit
  iii. help FtoC

15. Write a program to input 2 strings from the user and to print out (i) the concatenation of the two strings with a space between them, (ii) a line of asterisks the same length as the concatenated strings, and (iii) the reversed concatenation. For example:

  i. Enter string 1: Mark
  ii. Enter string 2: Huckvale
  iii. Mark Huckvale
  iv. *************
  v. elavkcuH kraM

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DSE-2(A) Digital Image Processing

Theory: 60 Lectures

1. Introduction   (6 Lectures)
Light, Brightness adaption and discrimination, Pixels, coordinate conventions, Imaging
Geometry, Perspective Projection, Spatial Domain Filtering, sampling and quantization.

2. Spatial Domain Filtering   (7 Lectures)
Intensity transformations, contrast stretching, histogram equalization, Correlation and
convolution, Smoothing filters, sharpening filters, gradient and Laplacian.

3. Filtering in the Frequency domain   (8 Lectures)
Hotelling Transform, Fourier Transforms and properties, FFT (Decimation in Frequency and
Decimation in Time Techniques), Convolution, Correlation, 2-D sampling, Discrete Cosine
Transform, Frequency domain filtering.

4. Image Restoration   (8 Lectures)
Basic Framework, Interactive Restoration, Image deformation and geometric transformations,
image morphing, Restoration techniques, Noise characterization, Noise restoration filters,
Adaptive filters, Linear, Position invariant degradations, Estimation of Degradation functions,
Restoration from projections.

5. Image Compression   (10 Lectures)
Encoder-Decoder model, Types of redundancies, Lossy and Lossless compression, Entropy of
an information source, Shannon's 1st Theorem, Huffman Coding, Arithmetic Coding, Golomb
Coding, LZW coding, Transform Coding, Sub-image size selection, blocking artifacts, DCT
implementation using FFT, Run length coding, FAX compression (CCITT Group-3 and
Group-4), Symbol-based coding, JBIG-2, Bit-plane encoding, Bit-allocation, Zonal Coding,
Threshold Coding, JPEG, Lossless predictive coding, Lossy predictive coding, Motion
Compensation

6. Wavelet based Image Compression   (5 Lectures)
Expansion of functions, Multi-resolution analysis, Scaling functions, MRA refinement
equation, Wavelet series expansion, Discrete Wavelet Transform (DWT), Continuous
Wavelet Transform, Fast Wavelet Transform, 2-D wavelet Transform, JPEG-2000 encoding,
Digital Image Watermarking.

7. Morphological Image Processing   (7 Lectures)
Basics, SE, Erosion, Dilation, Opening, Closing, Hit-or-Miss Transform, Boundary
Detection, Hole filling, Connected components, convex hull, thinning, thickening, skeletons,
pruning, Geodesic Dilation, Erosion, Reconstruction by dilation and erosion.

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8. Image Segmentation (9 Lectures)

Boundary detection based techniques, Point, line detection, Edge detection, Edge linking, local processing, regional processing, Hough transform, Thresholding, Iterative thresholding, Otsu's method, Moving averages, Multivariable thresholding, Region-based segmentation, Watershed algorithm, Use of motion in segmentation

Reference Books

1. R C Gonzalez , R E Woods, Digital Image Processing, 3rd Edition, Pearson Education.2008.
2. A K Jain, Fundamentals of Digital image Processing, Prentice Hall of India.1989.
3. K R Castleman, Digital Image Processing, Pearson Education.1996
4. Schalkoff, Digital Image Processing and Computer Vision, John Wiley and Sons.1989.
5. Rafael C. Gonzalez, Richard E. Woods, Steven Eddins,' Digital Image Processing using MATLAB', Pearson Education, Inc., 2004.

Digital Image Processing Lab
Practical: 60 Lectures

1. Write program to read and display digital image using MATLAB or SCILAB
   a. Become familiar with SCILAB/MATLAB Basic commands
   b. Read and display image in SCILAB/MATLAB
   c. Resize given image
   d. Convert given color image into gray-scale image
   e. Convert given color/gray-scale image into black & white image
   f. Draw image profile
   g. Separate color image in three R G & B planes
   h. Create color image using R, G and B three separate planes
   i. Flow control and LOOP in SCILAB
   j. Write given 2-D data in image file

2. To write and execute image processing programs using point processing method
   a. Obtain Negative image
   b. Obtain Flip image
   c. Thresholding
   d. Contrast stretching

3. To write and execute programs for image arithmetic operations
   a. Addition of two images
   b. Subtract one image from other image
   c. Calculate mean value of image
   d. Different Brightness by changing mean value

4. To write and execute programs for image logical operations
   a. AND operation between two images
   b. OR operation between two images
   c. Calculate intersection of two images

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    e. NOT operation (Negative image)

5. To write a program for histogram calculation and equalization using
    a. Standard MATLAB function
    b. Program without using standard MATLAB functions
    c. C Program

6. To write and execute program for geometric transformation of image
    a. Translation
    b. Scaling
    c. Rotation
    d. Shrinking
    e. Zooming

7. To understand various image noise models and to write programs for
    a. image restoration
    b. Remove Salt and Pepper Noise
    c. Minimize Gaussian noise
    d. Median filter and Weiner filter

8. Write and execute programs to remove noise using spatial filters
    a. Understand 1-D and 2-D convolution process
    b. Use 3x3 Mask for low pass filter and high pass filter

9. Write and execute programs for image frequency domain filtering
    a. Apply FFT on given image
    b. Perform low pass and high pass filtering in frequency domain
    c. Apply IFFT to reconstruct image

10. Write a program in C and MATLAB/SCILAB for edge detection using different edge detection mask
11. Write and execute program for image morphological operations erosion and dilation.
12. To write and execute program for wavelet transform on given image and perform inverse wavelet transform to reconstruct image.

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DSE-2(B)   Soft Computing

Tutorials on DSE-2(B) Soft Computing

Introduction: Hard computing, Soft Computing, Definition, Advantages and applications of neural networks, Artificial neural network, Biological neural network, Biological neuron vs artificial neuron, evolution of neural networks. Basic models of ANN : connections, supervised learning, unsupervised and reinforcement learning, activation functions, terminologies of ANN : weights, bias, threshold, learning rate, momentum factor. McCulloch-Pitts neuron, Linear separability, Nonlinear separability, Hebb Network, Perceptron Networks : theory, learning rule, architecture, training algorithm for single output classes, training algorithm for multiple output classes, testing algorithm, Adaline, Multiple adaptive linear neurons, Back propagation network, Functional link artificial neural network(FLANN), Radial basis function network(RBFN).

Introduction to Fuzzy logic, classical sets and Fuzzy sets, classical relation and Fuzzy relations, Membership functions, defuzzification, Fuzzy Inference systems.

Genetic algorithm : Encoding, types of selection, crossover and its types, mutation and its types, cost function, flow chart, algorithm for function optimization, real coded genetic algorithm.

Books:
1. Neural Networks and Learning Machines by Simon Haykin, Pearson Education, 3rd Edition.
2. Principles of Soft Computing by S. N. Sivanandam and S. N. Deepa, 2nd edition, Wiley.
3. Artificial Neural Networks by B. Yegnanarayana, PHI
4. Neural Networks, Fuzzy logic and Genetic algorithm by S. Rajasekaran and G. A. Vijayalakshmi Pai, PHI

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