

## Chapter 1 Structures and Pointers

A structure is a new or user defined data type in C++. It allows you to combine several related data items under a common name. The following is the syntax of defining a structure.

```
struct structure-tag
{
    Datatype member1;
    Datatype member2;
    -----
};
```

Structure does not allocate any memory and hence you cannot store anything directly in a structure. In order to store data, you have to define variables using structures.

```
struct structure_tag variable1, variable2, -----;
structrue_tag variable1, variable2, -----;
eg: date dob; student s1, s2; complex c[10];
```

We can also define structure and structure variables as below.

```
struct date                struct
{                          {
    int d;                  int d;
    int m;                  int m;
    int y;                  int y;
} dt1, dt2;                } dt1, dt2;
```

Structure variables can be initialized. In order to initialize, give values for each members in a pair of braces.

Eg: date dt = {21, 1, 2017};

**Nested structure:-** A structure containing another structure variable inside it is called a nested structure.

```
struct student
{
    int admno;
    char name[25];
    date doa;
};
```

The members of a structure are accessed using **dot operator(.)**

Eg: s1.admno, s1.name, s1.doa.d, s1.doa.m, s1.doa.y

Value of one structure variable can be assigned to another only if they belongs to the same structure tag.

**Pointers:-** A pointer is a variable which stores address of a memory location. Pointer must have a data type and must be defined. To specify pointer, use \* before variable name.

Eg; int \*p, \*q, \*r;

**Dynamic memory allocation:-** In this case, memory will be allocated only during execution of a program. Pointers must

be used for dynamic memory allocation. To allocate memory use **new** operator and to release memory use **delete** operator.

If memory allocated in dynamic memory allocation is not released, the memory block is called **orphaned memory block** which is unusable. The following are reasons for orphaned memory blocks.

- Forgot to use delete operator.
- Poor logic of the program
- Assigning a new address to a pointer before deleting old.

### Operators with pointers

& - Address of – to get address of a variable.

\* - Content At Address – to get content at a given address.

new – to allocate memory dynamically.

delete - to release memory.

-> - to access member of a structure using pointers.

+ - to get nth address after a pointer.

- - to get nth previous address of a pointer.

**Arrays and pointers:-** Every array name is a pointer which contains base address of the array (address of first location). The address in the array name cannot be changed because it is a **static pointer**. The same concept is applicable for strings also.

**Self referential structure:-** A structure containing a pointer to the same structure inside it. It is used for creating linked lists.

1. Write the output of the following C++ code from the given options.

```
char *ptr;
char Str[] = "computer";
ptr = Str;
ptr += 5;
cout << ptr;
```

- a) uter            b) ter  
c) compu        d) u

Score 1

- 7(a) Declare a structure with suitable variable names to store the following information:

Score 2

Reg No	Name	Date of Birth			Sex
		DD	MM	YY	

15. What is pointer? Explain the use of new and delete operators. Score 3

### March 2016 Questions

1. Represent a structure student with attributes of different types and give the advantages of using structures. (3)
2. Structure within a structure is called ----.

Ans:- Nested Structure

3. Orphaned memory blocks are undesirable. How can they be avoided?

OR

Discuss problem created by memory leaks. (2)

**Say 2016 Questions**

- How will you free the allocated memory? (1)
- Define a structure called Time to group the hours, minutes and seconds. Also write a statement that declares two variables current\_time and next\_time which are of type struct Time. (2)

**March 2017 Questions**

- \* Compare the aspects of arrays and structures (3)
- \* Runtime allocation of memory is triggered by ===== (1)
- \* Represent names of 12 months as an array of strings (2)
- \* A structure can contain another structure. Discuss (2)

**Say 2017 Questions**

- \* If ptr is a pointer to the variable num, which of the following statement is correct? (1)
  - a. ptr and num may be different data types.
  - b. ptr points to num and num points to ptr.
  - c. the statement num = &ptr is valid.
  - d. \*ptr will give value of num .
- \* What is difference between structure and class? (2)

**March 2018 Questions**

- \* Identify and correct errors in the following. (2)

```
strcut
{
    int regno;
    char name[20];
    float mark=100;
};
```

- \* What is difference between static and dynamic memory allocation? (2)

\* Read the following code fragment.

```
Int a[] = {5, 10, 15, 20, 25};
int *p = a;
```

Predict output of the following. (3 scores)

- a. cout << \*p;
- b. cout << \*p + 1;
- c. cout << \*(p+1);

**Say 2018 Questions**

- \* What is a self referential structure? (2)
- \* What is the difference between the two statements. (2)
  - a. int \* ptr = new int(10);
  - b. int \*ptr = new int[10];
- \* What is a pointer in C++? Declare a pointer and initialize with the name of your country. (3)

**Chapter 2**

**Object Oriented Programming Programming paradigm**

Programming paradigm refers to the style or way of programming. **Procedure oriented programming** consists of a set of instructions and organizes these instructions into functions. Programming using high-level languages such C,COBOL is known as procedure-oriented programming. **Object Oriented Programming** binds data and function into a single unit called Object. In OOP program is divided into objects. Objects communicate with each other by using functions and sending messages. C++, Php, Java etc. are OOP.

**Limitations of Procedure oriented programming are,**

- 1) **Data is undervalued**
- 2) **Adding new data element needs modification to functions**
- 3) **Difficult to create new data types**
- 4) **Poor Real world modeling**

**Object Oriented Programming Paradigm :-**

**Advantages of Object Oriented Pogramming**

- Easy to maintain and modify code.
- Provides modular structure for programs.
- Code sharing.
- Information hiding.
- It is good for defining abstract data type.
- It implements real life scenario.

**Basic concepts in Object Oriented Programming**

**1)Objects:-**Objects are real world objects such as a person, student, book car, TV ...etc. In a programming language like C++, Objects are a combination of data and functions. .An object has a unique identity, state and behavior. Objects interact with each other by sending messages.

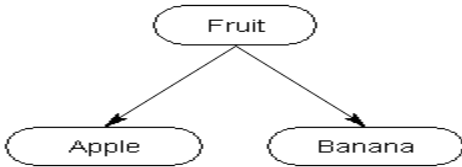
**2) Classes:-**Classes are user defined data type which contains both data and function. A class is a collection of objects. An object is an instance of a class. Objects communicate with each other by message passing

**3)Abstraction:-**Abstraction refers to displaying essential features by hiding other details. Data abstraction separates interface and implementation. Abstraction provides data security.

**4)Encapsulation:-**The wrapping up of data and function into a single unit is called encapsulation. It prevents data from accidental modifications by external functions. We can control the access on data by defining the access modifier. Three commonly used access modifier are public ,private and protected..

**5)Modularity:-**Modularity is the process by which a larger program is sub-divided into smaller programs called modules. In OOP, each class can be considered as a module.

**6)Inheritance:-**Inheritance is the process by objects of one class acquires the properties of objects of another class. The concept of inheritance provides reusability. The existing class is called base class and the new class is called derived class.

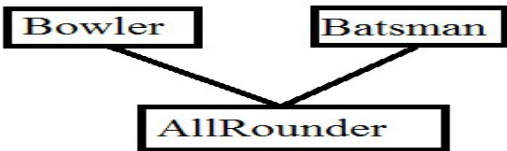


**Different types of Inheritance**

**Single Inheritance :-** When a derived class inherits properties and behaviors of only one base class, it is called single inheritance. Cricketer is a derived class from the base class Player.



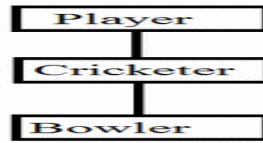
**Multiple inheritance :-** When a derived class inherits properties and behaviors of more than one base class, it is called multiple inheritance. In following figure, AllRounder is a derived class from two base classes: Bowler and Batsman.



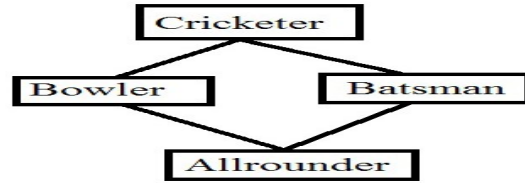
**Hierarchical Inheritance :-** When properties and behaviors of one base class are inherited by more than one derived class, it is called hierarchical inheritance. In following figure, Bowler and Batsman are two derived classes from same base class Cricketer.



**Multilevel Inheritance :-** When properties and methods of a derived class are inherited by another class, it is called multilevel inheritance. In following figure, Cricketer is derived class from Player base class. Then Cricketer acts as base class for the Bowler class.



**Hybrid Inheritance :-** It is combination of multiple and multilevel inheritance.



**7)Polymorphism:-**‘Poly’ means many, ‘Morph’ means shape. Polymorphism is the ability of an object or function to take multiple forms.

There are two types of polymorphism

- a) Compile Time (Early Binding/Static)
- b) Run Time (Late Binding/Dynamic)

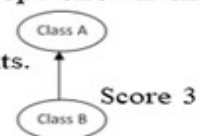
**Compile time polymorphism :-** Compile time polymorphism is achieved through Function overloading and operator overloading. In function overloading ,function have same name but different arguments.

**Run-time polymorphism :-** Run-time polymorphism is achieved through virtual functions. Here binding or linking of a function with function definition is done during execution(run) time.

Difference between Procedural & Object Oriented Programming Systems	
Procedural Programming	Object Oriented
i)Focus is on procedure rather than data.	i)Focus is on the data rather than Procedure.
ii)Data is not secure .	ii) Data is secured.
iii) Employs top-down approach.	iii)Employs bottom-up approach.
iv)It does not model real world’s objects.	iv)It model the real world’s objects.
v)Programs are decomposed into functions	v)Programs are decomposed into objects.

16. Observe the figure and

- a) Name the OOP concept shown in figure.
- b) Identify the components.
- c) Explain this concept.



**March 2016 Questions**

- Compare static and dynamic polymorphism.

### Say 2016 Questions

- A program is implemented to find area of a circle and area of a rectangle with two functions having the same name but with different signature.
  - Name this concept (1)
  - Explain the concept by writing the above program. (2)

### March 2017 questions

- \* Differentiate data abstraction and encapsulation.

### March 2018 Questions

- \* Showing only essential features and hiding complexities from outside world is ----- (1)
- \* What is OOP? Give any two advantages. (3)

### Say 2018 Questions

- \* The ability to process data in more than one form is ----. (1)
- \* What is procedure oriented programming? What are its disadvantages? (3)

## Chapter 3

### Data Structures

A data structure is used to store different kinds of data within a computer system with the help of arrays or self-referential structures based on algorithm. Data structure can be simple or compound data structures. **Simple** data structures include arrays and structures. **Compound** data structures include **linear** and **non-linear** structures. Linear structures include stack, queue and linked list. Non-linear structures include tree and graphs. Data structures implemented using arrays are generally **static data structures**. Data structures implemented using structure and pointers are **dynamic data structures**. The data structure operations are as follows.

- Traversal:- Go through all elements.
- Insertion:- Adding an item into the data structure.
- Deletion:- Removing an item from the data structure.
- Sorting:- Rearranging values in the data structure.
- Searching:- Looking for an item in a data structure.
- Merging:- Combining two data structures.

*Trying to add an item into a data structure which is full is called **Overflow**. Trying to delete an item from the structure which is empty is called **Underflow**.*

A **stack** is a data structure in which items are added or removed from the top of the stack. It follows LIFO (Last In First Out) structure.

Algorithm Push Start 1. If TOS<N Then 2. TOS = TOS + 1 3. STACK[TOS]=ITEM 4. Else 5. PRINT "OVERFLOW" 6. End Of If Stop	<pre>void push(int stak[], val) {   if (tos&lt;n)   { tos++;     stak[tos] = val;   }   else     cout &lt;&lt; "Overflow"; }</pre>
Algorithm Pop Start 1. If TOS>-1 Then 2. VAL = STACK[TOS] 3. TOS = TOS - 1 4. Else 5. PRINT "UNDERFLOW" 6. End Of If Stop	<pre>int Pop(int stak[]) { int val;   if (tos&gt;-1)   { val = stak[tos];     tos--;   }   else     cout &lt;&lt; "Underflow";   return val; }</pre>

A **queue** is a data structure in which items are added at the rear end and removed from the front end. It follows FIFO (First In First Out). Queue can be linear queue or circular queue. In a linear queue, the spaces obtained after removing an item from the front side cannot be used until the queue became empty. In a circular queue, the space at the beginning can also be utilized.

Algorithm Insertion Start 1. If (REAR=-1) 2. FRONT=REAR=0 3. Q[REAR]=ITEM 4. Else if (REAR<N) then 5. REAR = REAR + 1 6. Q[REAR] = VAL 7. ELSE 8. PRINT "OVERFLOW" 9. End Of If Stop	<pre>void insert(int q[], int val) {   if (rear==-1)   { front=rear=0;     Q[rear]=val;   }   else if (rear&lt;n)   { rear++;     Q[rear]=val;   }   else     cout &lt;&lt; "Overflow"; }</pre>
Algorithm Deletion Start 1. If (FRONT>-1) then 2. VAL = Q[FRONT] 3. FRONT = FRONT + 1 4. ELSE 5. PRINT "UNDERFLOW" 6. END OF IT 7. IF (FRONT>REAR) 8. FRONT=REAR=-1 9. END OF IF Stop	<pre>int delete(int q[]) { int val;   if (front&gt;-1)   { val=Q[front];     front++;   }   else     cout &lt;&lt; "Underflow";   if (front&gt;rear)     front=rear=-1;   return val; }</pre>

A **linked list** a dynamic data structure in which any amount of data can be stored. It uses linked lists and pointers.

Traversing a linked list

1. Get address of the first node in start to temp.
2. Using address in temp, get the data
3. Store address of next node in the link part into temp.
4. If temp is not null, then goto step 2

Insertion in a linked list

1. Create a node and store its address in temp.
2. Store data and link part using temp.
3. Get address of PreNode and PostNode
4. Store temp into link part of preNode.
5. Copy address of PostNode to link part of temp

Deletion of a node from a linked list

1. Get PreNode and PostNode address.
2. Copy address of PostNode to link part of PreNode.
3. Free the node at position POS.
2. In a situation when data have to be stored and then retrieved in reverse order \_\_\_\_\_ is very useful .
  - a) Stack                      b) Queue
  - c) List                         d) Linked list     *Score 1*
8. Explain the situations 'overflow' and 'underflow' that occur in some operations on data structures.
9. The following figure shows a linked list of names of some students. Write the procedure to remove the 2<sup>nd</sup> node.



March 2016 Questions

- Attempting to insert in already full stack leads to
- Explain how push operation is done in stack (2)
- Linked list usually do not have problem of overflow. Discuss (2)

Say 2016 Questions

- Write the advantages of linked list over arrays. (2)
- Consider the following cases. (3)
  - (1) Paper cups are arranged on a dining table one above the other.
  - (2) Many people are waiting in a row to take tickets for cinema.
 Identify and compare the data structure that you know in connection with above contexts.

March 2017 questions

- \* Queue follows ----- principle. (1)
- \* How does stack overflow and underflow occurs? (2)
- \* Write the procedure to traverse a linked list (2)

Say 2017 Questions

- \* Name the data structure that follows LIFO principle (1) Stack, Queue, , Array, Linked List

\* Match the following. (2)

A	B	C
1. Stack	I. Front	a. Inserting new item
2. Queue	ii. Push	b. Elements are accessed by its position number.
3. Array	Iii. Start	c. Address of first node
4. Linked List	iv. Subscript	d. Removing an item

March 2018 Questions

- \* Name the data structure where memory allocation is done at the time of execution of the program. (1)
- \* Write an algorithm to add a new item into stack. (2)
- \* What is a data structure? How are they classified? (3)

Say 2018 Questions

- \* Each node in a linked list has a ----- to next node. (1)
- \* Differentiate between static and dynamic data structure (2)
- \* Write an algorithm to add a new item into a queue. (3)

## Chapter 4

### Web Technology

HTML (Hyper Text Markup Language) is the language of Internet which allows you to design web pages. It tells the browsers how to display a web page.

#### Communications on the web:-

TCP/IP (Transmission Control Protocol/Internet Protocols) is the basis for communications on the web. The Communication on the web can be client to web server communication and web server to web server communication. Authentication and security are essential for communication. Authentication means determining whether the server is the one that it claims to be and security should be provided so that messages should not be modified or accessed by hackers. When authentication and security is needed, the protocol HTTPS is being used. It works using SSL (Secured Socket Layer) and SET (Secured Electronic Transaction) to identify the server and communication is taking place in encrypted form. It is generally used in bank sites, government sites etc.

A **web server** stores or hosts web pages in connection with a web site. It process requests from a client computer and provides information. A web server requires a software called web server software in it. Microsoft Internet Information Server, Google Web Server, Apache Web server etc. are examples.

A web server is usually installed in a place called data center. A Data center offers high speed internet connectivity and full time power backup.

**Software ports:-** A software port is used to connect a client computer to a server to access services like FTP, HTTP, SMTP etc. Every software port is given a unique 16 bits number to identify it.

20 & 21	File Transfer Protocol
22	Secure Shell (SSH)
25	SMTP (Simple Mail Transfer Protocol)
53	DNS (Domain Name Service)
80	HTTP (Hyper Text Transfer Protocol). It is the <b>default port</b> .
110	POP3 (Post Office Protocol)
443	HTTP (HTTP Secured)

**DNS Servers:-**DNS server stores domain name and IP address. Browsing steps are

- a. The browser searches its local cache memory.
- b. Then, it searches the Operating System's memory.
- c. Then, it searches the DNS of the local ISP.
- d. It searches from the root server till finding IP.
- e. The ISP then returns the IP address to browser.
- f. The browser then connects using IP Address.

**Web Designing:-** The first step in setting a web site is to develop web pages. It can be done using any text editor software.

**Static and Dynamic web pages:-** A static web page remains the same until the source html document is modified. When a script executed at the server generates html pages each time, it is called dynamic web pages. Their difference follows.

<b>Static Web Pages</b>	<b>Dynamic web pages</b>
The content is fixed.	Content changes.
Does not use database	Database is used.
Directly run on browser	Runs on the server
Easy to develop	Require programming

**Scripting Languages**:- A scripting language is the one used to execute a program from the web page. It is inserted in a web document using the tag <SCRIPT>. It is container tag.

**Javascript**:- It is a scripting language used for client side scripting. It was developed by Netscape. It is inserted directly in the web page using <SCRIPT Language="JavaScript"> tag or from an external java script file (.js) as shown in <SCRIPT type="text/javascript" SRC="filename.js">

**Vbscript**:- It is a scripting language based on Visual basic by Microsoft. It can be used for both client side scripting and server side scripting. It runs correctly on Microsoft web browsers and hence it not so popular.

**AJAX**:- AJAX stands for Asynchronous Java Script and eXtensible markup language. It allows us to create interactive web pages without reloading entire web page. It allows us to generate dynamic content by exchanging small volume of data between browser and server.

**PHP**:- PHP stands for PHP Hyper Text Preprocessor. It is a server side scripting language. It is inserted between HTML code. They are executed by the server and connects to database to generate dynamic content. It

runs on various platforms like Windows, Linux, Unix etc.

**ASP**:- Active Server Pages is a server side scripting language used to create interactive web pages. ASP file has extension .asp . ASP programs contains text, html and scripts. ASP applications are very small and code is written in text mode.

**JSP**:- Java Server Pages is another scripting language developed by Sun Microsystems. JSP pages are compiled into servelets before they were used. A JSP file has the extension .jsp

**CSS (Cascading Style Sheet)**:- It allows us to separate content and format applied in a web page. We can control the colour, style and alignment of text using CSS. It can be used in a document in three ways.

- Inline CSS using the STYLE attribute of any tag.
- CSS can be embedded in the HEAD tag with STYLE tag.
- It can also be inserted from an external file using LINK tag with SRC attribute.

**Tags and attributes**:- A web page is developed using tags and attributes. Tags are instructions to the browser and attributes are additional information given to a tag. Tags are generally enclosed in a pair of angle brackets (< and >). Tags can be container tags or empty tags. A tag with a beginning and ending tag is called **container tag**. A tag without ending tag is called **empty tag**.

**Important tags**:- The important tags are <P> (Paragraph), <ADDRESS> (Displays address), <DIV> (Defines a section or division which follows same style), <FONT> (Changes font size, colour, or face), <BIG> (Bigger size),

<SMALL> (Smaller size), <CENTER> (Aligns to center), <BLOCKQUOTE>/<Q> (Quotation), <B>/<EM>/<STRONG> (Bold), <I> (Italic), <U> (under line), <S>/<STRIKE> (Strike through), <SUB> (Subscript), <SUP> (Super script), <Hn> (Heading), <HR> (draws horizontal line), <BR> (Line break), <IMG> (Used to insert images), <MARQUEE> (Scrolling text), <HTML> (beginning an HTML document), <HEAD> (Head Section), <BODY> (Body section), <TITLE> (Title for document), <PRE> (Pre formatted text) etc.

Escape sequence or special characters means symbols that cannot be directly inserted in an HTML document. It begins with & and ends with a ;. &nbsp; (Space), &copy; ©, &reg; ®, &trade; ™, &quote; “, &apos; ‘, &lt; <, &gt; >

It is also possible to insert comments in an html document by using <!-- and -->. Anything within this will be comment

The attributes of <BODY> tag are BGCOLOR (background colour), TEXT (Foreground colour), LINK, ALINK, VLINK (Changes link colour), LEFTMARGIN, TOPMARGIN (Sets margin), BACKGROUND (Sets background image), The attributes of <P>, <Hn>, <DIV> tags is ALIGN (Sets alignment, which can be left, right, center or justify). <IMG> tag has attributes SRC (name of file), HEIGHT (height of image), WIDTH (width of image), ALIGN (text alignment top, middle or bottom), ALT (Alternate text to display if image not available). The <HR> tag has attributes WIDTH (width of line), SIZE (thickness of line), COLOR (colour of line), ALIGN (Alignment left, right, center). The <MARQUEE> tag has attributes HEIGHT, WIDTH (Size of rectangle in which scrolling

done), HSPACE, VSPACE (Space surrounding the scrolling), SCROLLAMOUNT, SCROLLDELAY (Speed of scrolling), BEHAVIOR (Style of scrolling scroll, slide or alternate), DIRECTION (Direction of scroll), LOOP (No. of times to repeat). The attributes of <HTML> tag are LANG (Language code like en, hi, ar etc), DIR (Direction, ltr or rtl).

## Chapter 5 Web Designing using HTML

**Lists in HTML:-**Lists can be ordered, unordered, or definition list. A ordered list begins with <OL> tag and ends with </OL>. List items are specified using <LI> tag. A unordered list is created using tags <UL> and </UL>. Items are presented using <LI> tag. The attributes of <OL> tag are TYPE (Type of numbering, A, a, I, i, 1) and START (To begin a list with a different number other than 1). The attributes of <UL> tag is TYPE (Type of bullet symbol. circle, square or disc).The Definition List created using <DL> and </DL> tags. The items are presented using <DT> (Definition Term) and <DD> (Definition Description).

**TABLES :-**Tables are used to present information in a tabular form. A table is created using the tag <TABLE> and </TABLE>. A caption is specified using <CAPTION> tag which has ALIGN attribute. Use <TR> tag to start a new row in the table. Use <TH> to specify column heading. Use <TD> to specify column data. The attribute of <TABLE> tag are BORDER (border thickness), BORDERCOLOR (colour of border), FRAME (Outer border. Values are lhs, rhs, above, below, hside, vside, or void), BACKGROUND (Background image), BGCOLOR (Background colour), HEIGHT, WIDTH (Size of table), CELSPACING

(Space between cells), `CELLPADDING` (Space between border and content). `<TH>` and `<TD>` tags has attributes like `ALIGN` (Alignment left, right or center), `VALIGN` (Vertical alignment top, middle, bottom),

The `ROWSPAN` and `COLSPAN` attributes are used to span more than one row and column respectively. It allows us to merge one or more rows or one or more columns to present one information. When data span on more than one row, we can use `VALIGN` attribute to place text on top, middle or bottom of the cell. Cells can be merged using `COLSPAN` or `ROWSPAN` attributes.

**FORMS :-** Forms provide a method to access information from the web user. To create a form, `<FORM>` tag is used. It has two attributes, `METHOD` and `ACTION`. The `ACTION` attribute determines what to do when the data is submitted to the web server. The `METHOD` attribute has two values *get* and *post*. It determines the way in which the data was sent to the server. When *get* is selected, data is appended to the URL specified in the `ACTION` attribute with a `?mark` as the separator. The URL is sent for processing. With *post*, form data is included in the body of the form and sent for processing. *get* is open method and not secure. Only limited volume of data can be sent. *Post* sends the data separately. It is secured and private. We can send unlimited data.

A control in a form is created using `<INPUT>` tag except for menus and text areas. The `TYPE` attribute of this tag determines the control to be created. It supports the values *text*, *radio*, *checkbox*, *password*, *button*, *submit*, *reset* or *hidden* to create respective controls. The tag supports another attribute `NAME` used to assign a

name for the control. For a text box, and password box, `SIZE` is used to specify the width of the box. The `MAXLENGTH` attribute allows to set maximum number of characters that could be type in a box. A text area could be placed using `<TEXTAREA>` tag. The `ROWS` and `COLS` attribute of this tag are used to specify number of rows and columns required for the text area.

A pop-up box or menu could be used to present a list of choices from which the user can select one. This control is created using `<SELECT>` tag. It has `NAME` and `SIZE` attribute. The options or choices of a menu are listed using `<OPTION>` tag. This tag has an empty valued attribute `SELECTED`. If `SELECTED` is used, that option will be selected by default.

**FRAMES:-**A frame is a way to present more than one web page in a single window. The `FRAMESET` tag has a `COLS` attribute. `COLS` attribute is used to specify size for column frames. `ROWS` attribute of this tag is used to specify size for row frames. Size could be mentioned in percentage or in absolute values. The `FRAME` tag has an `SRC` attribute which specify name of a web page to show on the frame.

**LINKING:-**A browser highlights the identified text or image with color or underlines to show that it is a hypertext link. A link always leads us to a new page or to a different section within the page itself. When we are directed to a new page, it is known as external linking while when we are directed to a different section in the same document, it is known as internal linking. Links are provided using `<A>` or anchor tag. It is a container tag. It has an attribute *href* stands for html reference. This specifies name of a page or section to which the user should be

moved. The name of a section must begin with a # symbol. To provide, internal linking, section names are used in href attribute. In such a case, you have to name the section using <A> tag with name attribute.

**VIDEO and MUSIC** :- Video or audio file can be inserted in a web page and they may be played while viewing web page. The tag <EMBED> is a container tag used to insert music or video files in a web page. Its attributes are SRC (to specify name of file), HEIGHT, WIDTH (to define a region), ALIGN (to specify alignment), HIDDEN (to hide or show) and ALT (to provide alternate text). The tag <NOEMBED> can be used to provide an alternate content to be used when the browser is unable to handle video. The tag <BGSOUND> can be used to insert background music in a web page. Its attributes are SRC (name of music file) and LOOP (no. of times/infinite).

## Chapter 6

### **Client Side Scripting Using Java Script**

JavaScript is a client side scripting language. It can be inserted within a html document in the <head> or <body> section. It can also be inserted from an external .js file. In all this cases, we will use the same tag <SCRIPT> to insert JavaScript code. Its main aim is to validate data entered in a form. It is also used for giving special effects or animations withing a web page. JavaScript is executed by the software component called **Script engine**.

In JavaScript, a variable is defined using the keyword **var**. Eg; var a, b, c; A variable can store a Number, String, or a Boolean value. The data type of a variable can be hence **Number, String, Boolean or undefined**. JavaScript supports all operators

in C++ like +, -, \*, /, %, ++, --, <, >, <=, >=, ==, !=, &&, ||, ! etc. In JavaScript + is also used for joining two strings. "ABC"+"XYZ" will be "ABCXYZ". It also supports decision making statement if, if else, if elseif, switch. It also supports looping statement for, while, do while. Similarly, a function can be defined in JavaScript using **function** keyword. The following are important functions in JavaScript.

1. alert("message") :- Display a message in a small window.
2. isNaN(string) :- Determines whether the string contains a number inside it. Returns true if it is not a number.
3. length:- Returns length of a string. Eg. str.length
4. toUpperCase:- Converts a string into capital. Eg: str.toUpperCase()
5. toLowerCase:- Convets a string into small letters.Eg: str.toLowerCase()
6. charAt:- Returns a character at a postion. Eg;  
varstr="COMPUTER";  
alert(str.charAt(3)); will display P
7. Number:- Converts a string to Number type.

**Events in JavaScript**:-JavaScript supports event driven programming. An event is an action by the user made using any input device. The following are important events.

1. onClick:- when user clicks an object.
2. onMouseEnter:- when mouse pointer is over an object.
3. onMouseLeave:- when mouse pointer is out of an object.
4. onKeyDown:- Occurs when a key is pressed downwards.
5. onKeyUp:- Occurs when a pressed key is released.

**JavaScript output:-** There are three ways to display output. Use alert function to display output in a small window. The second is to use document.write method. It displays on the body of the web page. The third is any control in a form which can be accessed as shown below.

document.formname.controlname.value

## **Chapter 7** **Web Hosting**

The process of storing web pages in a remote computer which is available through Internet to anyone in the world is web hosting. The computer in which the web pages to be shared are stored is called web server. A web server offers full time connectivity to Internet and database facility etc. The following are the different types of web hosting services.

- a) **Shared Hosting :-** In this method, many web sites are hosted on a single server. It is cheap and economical. It is suitable for web sites with smaller traffics. Heavy traffic on any web site slow down other web sites is the problem.
- b) **Dedicated Hosting:-** In this method, a web site is hosted in a server which is exclusively used for the hosted site. Hence they will be very faster, but is too expensive. The web sites of large organizations or government departments are hosted in dedicated servers. If we use our own purchased computer in the data center, then it is known as collocation.
- c) **Virtual Private Server:-** It is a single computer but that is logically divided into many servers. Each VPS works like a dedicated server and has its own operating system and web server software. This

offers the facility of a dedicated server at low cost. VmWare, Free VPS, Virtual Box, Microsoft Hyper V etc. are some software for VPS.

**Buying Hosting Space:** Considering the traffic, facilities needed and storage space required, technologies needed like database, php, asp etc. we have to buy a hosting space in a web server.

**Domain Name Registration:-** Domain name is the address of a web site on the Internet. Most web hosting companies offer domain name registration. It can be done using the web site [www.whois.net](http://www.whois.net) which checks whether the domain name we are looking for is available or not. The next step is to set a record, ie. Linking the domain name and IP address of the web server.

**FTP Client Software:-** It is used to transfer files from local computer to the web server. The FTP Client software establishes a connection with the server using user name and password. SSH FTP (SFTP or Secure Shell FTP) can be used to send and receive files in an encrypted form. It is more secured. File Zilla, Cute FTP, Smart FTP etc. are.

**Free Hosting:-** It offers web hosting service at free of cost. They often display an advertisement on the web site to meet the expense. They allow only limited services. They offer a sub domain with free hosting provider's domain name.

**CMS - Content Management System:-** It is an online web application which allows you to create, publish, edit and modify web sites with a limited knowledge. It provides templates for web site designing. They are often used in blogs, shopping sites etc. People who doesn't know web programming can also

create dynamic web pages. Joomla, Drupal and WordPress are examples for CMS

**Responsive Web Design:-** It allows you to develop a web site which will be good looking on any display devices like mobile phone, tablets, desktops, laptops or even on large screens. They automatically adjust its alignment and size depending on the device in which it is viewed. The main technique used is CSS (Cascading Style Sheet).

## Chapter 8

### Data Base Management System

A database is a collection of data. A DBMS is a set of programs used to create, access and maintain a database.

#### Advantages of DBMS

- a) Data Redundancy :- Duplication of data is called redundancy.
- b) Data Consistency:- Since, data redundancy is reduced, inconsistency can be avoided.
- c) Efficient Data Access:- Easy to access data using language called SQL (Structured Query Language).
- d) Data Integrity:- Ensured by rejecting all invalid data.
- e) Data Security:- Ensured by setting passwords for accessing data in the database.
- f) Sharing of Data:- The data in the database can be shared among multiple programs or users.
- g) Enforce Standards:- It defines standards for data so that they can be exchanged.
- h) Recovery:- A DBMS provides a mechanism for data backup and recovery from hardware failure.

#### Components of DBMS

- a) Hardware:- It includes devices like a computer, its high speed high capacity storage device etc.
- b) Software:- The software consists of application programs and utilities.
- c) Data:- Without data a DBMS can't exist. Data is organized into field, several field together form record, and several records together form a file or table. A collection of table is a database. Data can be **meta data and operational data**. Meta data means data about data. Operational data are the actual data.
- d) Users:- The users are also an essential component. They can be DBA (DataBase Administrator), Application Programmers, Sophisticated Users and Naïve Users.

The DBA (DataBase Administrator) has the total control on the database. He creates and assigns permissions and passwords for other users. The Application programmer uses database in his application programs to store and retrieve data for his program. The sophisticated user uses language called SQL to retrieve data from database. The Naïve user uses database through application programs.

- e) Procedure:- They are the tasks to do with the database. It may include instructions like login to database, start and stop database, backup etc.

**Database Abstraction**:- Database abstraction refers to the ability to hide complexities of a database from some users. It is implemented by dividing the database into three levels,

- a) Physical Level (Internal Level):- It describes how data is stored in the secondary storage medium.
- b) Logical Level (Conceptual Level):- It describes what data are stored in the database and their relationship.

c) View Level (External Level):- It is near to the users. It deals with how the users view the data.

**Relational Model**:- A relational model represents the database as a collection of relations or tables. Each relation has a unique name. It stores the data in tabular form. RDBMS is the technology or program that allows you to create and manipulate a database in relational model.

### **Terminologies**

- a) Entity:- An entity is a real world object such as student, teacher etc.
- b) Relation:- A relation is a collection of data in the forms of rows and column.
- c) Tuple:- The row or record in a table is called tuple.
- d) Attribute:- A Column or Field in a table is called attribute.
- e) Degree:- Nnumber of attributes or columns in a relation.
- f) Cardinality:- It is the number of rows in a relation.
- g) Domain:- It is the set of values permitted for an attribute.
- h) Schema:- The overall design of a database.
- i) Instance:- The collection of data stored in the database at a particular moment.

**Keys** :- A Key is an attribute or set of attributes that uniquely identifies a tuple in a relation. A key with two or more attribute values is called composite key.

- a) Candidate Key:- It is a minimal set of attributes that uniquely identifies tuples.
- b) Primary Key:- It is the key selected by the DBA from the available candidate keys.
- c) Alternate Key:- They are the keys not selected by the DBA. They are also called secondary keys.

d) Foreign Key:- It is a nonkey in one relation but the same is a primary key in another relation.

e) Super Key:- It is a combination of key and a nonkey attribute which also serves as a key.

**Relational Algebra**:- It is a collection of operations performed using relations. Their result is a relation.

- a) Select:- It selects tuples or records from relation based on a condition. The symbol used is  $\sigma$
- b) Project:- It selects attributes from a relation. The symbol used is  $\pi$ .
- c) Set Union:- It selects all tuples from first relation and then all tuples from the second relation. The symbol is  $\cup$ .
- d) Set Intersection:- It selects tuples common to both relations. Symbol is  $\cap$ .
- e) Set Difference:- It selects tuples in the first relation that are not in the second. Symbol is  $-$ .
- f) Cross Product:- It joins all tuples in the first relation with every tuples in the second relation. Its symbol is  $\times$ . The degree of cross product is sum of degrees of both relations. The cardinality of the cross product is the product of cardinalities of the two relations.

## **Chapter 9**

### **SQL – Structured Query Language**

**Data Types**:- SQL supports many data types like INT or INTEGER (Represents a number without decimal point), DEC or DECIMAL (Represents a number with a decimal point), CHAR or CHARACTER (Represents a character or short string upto 255 characters in fixed string format), VARCHAR (Represent a long string upto 65535

characters in variable length format.), DATE (to store date) and TIME (to store time).

SQL commands can be classified into three groups. DDL (Data Definition Language) includes CREATE, ALTER or DROP commands used to define, change or remove definition of a table. The DML (Data Manipulation Language) allows us to insert, delete, update and select data. DCL (Data Control Language) used to control access to the data. GRANT and REVOKE are examples.

**CREATE TABLE command** : Tables are defined with the CREATE TABLE command.

CREATE TABLE <table name> ( <column name><data type (size)>, ..... );

At the time of creation of a table, we can add constraints. Constraints can be *column* or *table* constraints. A column constraint is applied to a column while table constraint is applicable to the whole table. The column constraint follows the column definition to which it should be applied. Different constraints are as follows.

**UNIQUE** :- No two rows have the same value in the field.

**PRIMARY KEY** :- This defines the field as primary key.

**DEFAULT** :- Sets a default value for the field.

**NOT NULL** :- Ensures that the column should not be blank.

**AUTO INCREMENT**:- Increases value of field by 1.

**SELECT command** :- This command of SQL lets you make queries on the database. The simplest form is

SELECT <column name>, <column name>  
..... FROM <table name>;

We can remove redundant data from a query by adding the clause DISTINCT after SELECT command. The WHERE clause allows you to specify a condition. Only record satisfying given condition will be displayed. Here we can use relational operators, BETWEEN, IN and LIKE. The ORDER BY clause can be used to rearrange the query on the basis of a given column in ascending or descending order. Include a ASC for ascending order and DESC for descending order.

Instead of column names, SELECT also supports aggregate functions. The following are some aggregate functions.

*Avg* :- to compute average value

*Min* :- to find minimum value.

*Max* :- to find maximum value.

*Sum* :- to find totals.

*Count* :- to count non-null values in a column.

*Count(\*)* :- to count total number of rows in a column.

The GROUP BY clause is used in SELECT statements to divide the table into groups. Grouping can be done by a column name, or with aggregate functions in which case the aggregate produces a value for each group. We can place conditions on groups using HAVING clause.

**INSERT command**:- The rows are added to relations using INSERT command of SQL.

The simplest form is

INSERT INTO <table name> [column list]  
VALUES (<value>, <value>, .....);

**DELETE command**:- This command removes rows from tables. This removes entire rows, not individual fields.

DELETE FROM <table name> WHERE  
<predicate>

To remove entire rows from the table use  
DELETE FROM <table name>

**UPDATE command:-** This can be used to  
change some or all of the values in a table.  
Rows are selected using WHERE clause and  
new data are set using SET keyword. Syntax,

UPDATE table name SET attribute = value  
WHERE predicate;

**CREATE VIEW command:-** A view is a  
virtual table with no data, but can be operated  
like any other table. It is a window through  
which you can view the data of another table,  
which is called the *base table*. Syntax is,

CREATE VIEW <view name> AS SELECT  
<column list> FROM <table>....

**ALTER TABLE command :-** This  
command is used to change definition of a  
table or rename a table.

ALTER TABLE tablename ADD (column  
details);

- Add new fields

ALTER TABLE tablename MODIFY  
(column details);

- Change fields.

ALTER TABLE tablename DROP field;  
Removes a field.

ALTER TABLE tablename RENAME TO  
newname;

:- Changes or renames a file.

**DROP TABLE command :-** The DROP  
TABLE command of SQL lets you drop a  
table from the database. The SQL requires  
you to empty a table before you eliminate  
from the database.

**DROP VIEW command:-** To delete a view  
from the database the DROP VIEW  
command is used. DROP VIEW <view  
name>

But when a view is removed, the base table  
remains intact.

## Chapter 10

### **Server Side Scripting Using PHP**

Php stands for Php – the Hypertext  
Preprocessor. It is a server side scripting  
language. A program or document in Php  
must be saved with .php extension. In this  
document Php code is inserted in between  
<?php and ?>. Php supports various  
operators like +, -, \*, /, % etc. It also supports  
if, if else, switch, for, while, do while etc.

In Php, a variable name must begin  
with a \$ symbol. Its data type may be **Core  
Data types or special data types**. Core Data  
type includes Integer, Float, Boolean or  
String. Special data type includes Array,  
Object, Resource, and NULL.

The following are PHP output  
commands.

1. echo :- It is a multiple output command.  
Use , to separate.
2. print :- It is a single output commands.  
Cannot use ,
3. var\_dump :- To display variable content  
and data type.
4. print\_r :- To display content of an array.

**Arrays:** In Php, there are three types of  
arrays. Index arrays, Associated arrays or  
Multi Dimensional arrays. In an Indexed  
array each item will be identified by an index  
number. In associated array, each item will  
have a key and a value. The key can be

Number or String. It is used to get value stored in the array.

**foreach**:- It is a looping command without any rest condition. It is used to process an array.

```
foreach ( $arrayname as $variable)
{
    Apply process to each element of the
    array
}
```

```
foreach ($arrayname As $keyval -> $value)
{
    Apply the process to each document
}
```

**Database connectivity using Php**:- The following are the different commands used to connect Php and MySQL. The following are the commands to be used.

1. `mysql_connect`:- To connect to the database software.
2. `mysql_select_db` :- To open the desired database.
3. `mysql_query`:- Executes a SQL query.
4. `mysql_close` :- To close connection to mySql.
5. `Mysql_fetch_array`:- Use to retrieve data from table.

**Super global**:- It is a predefined array which contains useful data. The following are super global arrays.

1. `$_SERVER` :- to get information about server.
2. `$_FILES` :- to get data related to file upload.
3. `$_COOKIES` :- to get cookies details in a computer.
4. `$_SESSION`:- Gives you information about a session.

5. `$_REQUEST` :- Gives us data sent to a form.

6. `$_GET`:- Gives us data sent to the server in get method.

7. `$_POST` :- Gives us data sent to the server in post method

## Chapter 11 Advances in Computing

### Distributed Computing Paradigm

- A problem divided into smaller units
- Each unit is distributed to many computers
- Each computer will have its own private memory (not shareable)
- Connected to a network and passes messages each other

### Advantages

**Economical** :- It reduces overall cost.

**Speed** :- Division of work increases speed.

**Reliability** :- Even if a node fails, it functions.

**Scalability** :- Number of nodes can be increased.

### Limitations

**Complexities**:- Need for extra programming.

**Security**:- Messages in the network may be hacked.

**Network Reliance**:- When network fails, became unusable.

### Parallel Computing

- Instructions are executed by parallel processors
- All processors shares the same memory
- So, message sending not needed.
- Weather forecasting, nuclear sciences, aerospace engineering etc. are some applications

**Serial Computing** : Instructions are executed one after the other serially.

### Advantages of Parallel Computing

Fault tolerance:- Even if a node fails, system continues to work.

Sharing :- Computing power and storage may be shared by different users.

Load sharing:- A heavy work may be divided among different processors.

Scalability : It is easily expandable.

### Limitations of parallel computing

Complexity:- It is very complex to develop parallel applications.

Lack of portability:- Changing machine needs change in programming.

### Grid Computing

- Several computers are connected together using network.
- Uses a program that makes use of unused resources in grid.
- Tasks are broken up and each part is sent to different computers
- The completed task by a computer is sent back to the server
- Services over grid are Knowledge grid, data grid etc.
- Disaster Management, Weather forecasting etc.

### Advantages

- Short time for solving problems :- Huge complex problems solved fastly.
- Existing hardware used effectively :- Better use of existing computers.
- Scalable :- Easy to increase computing power by adding computers in grid

### Limitations

- Low speed network :- The decrease in speed of network slows processes
- Licensing issues :- Different computers will have different licensing policies that

may affect execution of some processes on some computers

### Cluster Computing

- Linking several personal computers and storage devices
- Connected over a fast local area network
- It implements parallel processing
- Linux is the mainly used operating system
- Supports e-commerce
- High performance database applications

### Advantages

- Existing hardware will be effectively used
- Price performance ratio :- Reduces cost of computing
- Fault tolerance :- Failure of a single device does not affect
- Scalability :- It is easily expandable by adding more computers.

### Disadvantages

- Programming Issues :- Software differences in computers makes problems
- Fault detection :- Detecting faulty node from the cluster is difficult.

*Beowulf clusters are low cost cluster computing runs under Linux operating system that gives a performance many times better than a single computer*

### Cloud Computing

- Uses Internet and a central remote server
- The server maintains data and applications
- These data and applications are delivered to the end user as a service
- Web based e-mail service like Yahoo, Gmail etc. are examples
  - ✓ Gmail, Yahoo team stores our personal mails in their own computer
  - ✓ When we want e-mail service, we open our web browser

- ✓ Opens their web site and login into it
- ✓ The messages stored in the cloud are accessed by us using Internet
- Office software, Graphic software etc. are also available.
- Peoples can use these software to create documents
- They can even store their files in the private space in the cloud.

### **Requirements for cloud computing**

- ✓ Internet access
- ✓ An account with cloud service provider

### **Cloud service models**

1. SaaS (Software as a Service)
2. PaaS (Platform as a Service)
3. IaaS (Infrastructure as a Service)

### **Software as a Service**

- Allows customers to access both resources and applications
- Customers purchase the ability to use the applications
- Some services are free and some are paid services
- Only one copy of the software installed on the server
- Customer need not install software in his device
- No need for high investment in software license
- Same software runs on all devices
- **Google Docs** is a free cloud service available to Gmail users.
  - ✓ Only one copy of the Word processor runs on the server
  - ✓ Users access this software using Internet

### **Cloud examples**

1. Creative Cloud from Adobe for Image processing

2. Office 365 from Microsoft for Word processor, Spreadsheets etc.

### **Platform as a Service**

- Here, customers gets a development environment.
- Used to design, develop, build and test applications.
- Users has the freedom to build his own applications.
- Provides different OS and servers like LAMP, ASP.NET, Php, Python etc.

**Examples:-** Googles App Engine, Microsoft Azure, Force.Com etc.

### **Infrastructure as a Service**

- Provides basic storage and computing capabilities as a service
- Examples Servers, Storage System, Networking equipment, Data centre etc
- Customers setup their own software in this infrastructure
- **Hosting a web site** is a typical example.  
**Web server** is an infrastructure

### **Examples:-**

Amazon Web Services, Joyent, AT & T, Go Grid etc.

### **Advantages of Cloud Computing**

- **Cost Savings :-** Companies can reduce their cost on infrastructure
- **Scalability/Flexibility :-** Enables to use extra resources at peak time
- **Reliability :-** Services using multiple redundant sites help in recovery
- **Maintenance :-** Cloud service providers will maintain the system
- **Mobile Accessible :-** These services are accessible from any where.

### **Limitations of cloud computing**

- Security and Privacy :- Since data are sent over a public network and stored in a shared disk system, they may be stolen or corrupted.
- Lack of standards :- Since clouds have no standards, they may not be interoperable.

### **Artificial Intelligence**

- Developing programs to make a computer think and act like a man.
- Such programs must have intelligence
- This needs knowledge to be represented effectively.
- The basic unit of knowledge is symbols
- Symbols are used to form data
- Data are processed to form information
- Knowledge is organised information
- Applying knowledge in a particular situation is called intelligence.
- Wisdom is the maturity of mind that utilise intelligence to achieve desired goal.
- Mathematical model of knowledge representation are already developed
- Still no solution to the problem of modelling the following human characteristics
  - Intuition
  - Consciousness
  - Emotions

### **Turing Test Approach to AI**

Alan Turing proposed a test to determine whether a computer is intelligent or not. No computer passed this test till today. A computer, which passes this test, will have the following capabilities.

- a) Natural Language Processing (NLP) :- The computer must be able to understand natural languages like English, Malayalam etc.

- b) Knowledge representation :- The knowledge before or during interrogation must be able to be represented.
- c) Automated reasoning :- Ability to use stored knowledge to draw conclusions
- d) Machine Learning :- Development of algorithms which can make predictions on data based on a model and previous experience.
- e) Computer Vision :- It includes the capability to capture, process, store, analyse, understand and interpret images.
- f) Robotic activities :- Intelligent sensors are used for reading changes in the environment and to issue necessary signals for the intelligent control unit.

**Computational Intelligence (CI)** :- It is the development of adaptive mechanism algorithms to facilitate intelligent behaviour in changing environment in the complex real life problems . The following are the CI paradigms.

- 1) Artificial Neural Networks (ANN) :- ANN means creating a model of human brain to represent images, knowledge etc. This also deals with learning, memorizing, controlling movement etc.
- 2) Evolutionary Computation :-It is applied in fields like data mining, fault diagnosis etc.
- 3) Swarm Intelligence :- It is originated from study of colonies or swarms such as ant colony.
- 4) Fuzzy Logic :-It allows us to implement reasoning with uncertain facts to infer new facts. In other words, fuzzy sets and logic allow the modeling of common sense. It is used to control gear shifting in vehicles, controlling lifts, home appliances, traffic signals etc

## Application of Computational Intelligence

- A. **Biometrics** :- It is especially used in individual identification by using biological features like finger prints, palm veins, face, hand geometry, iris, retina or even behavioral characters like typing rhythm, speed and voice.
- B. **Robotics** :- It is multi-disciplinary branch which includes mechanical, electrical and computer science engineering. It includes design, construction, operation and application of robots. The following are major areas of robotics.
1. Robotics arms are used in vehicle manufacturing industry to weld, cut, lifting, bending etc.
  2. Exploration of outer space which includes launching of satellites, space station etc.
  3. In intelligent home:- Here we may use robotics for security, controlling air conditioner etc.
  4. Exploration in difficult environment like inside a volcano, deepest ocean etc.
  5. Uses in military to use drones for serial attacking.
  6. Used in agriculture in large farms to cut and gather crops.
- C. **Computer Vision** :- It is also called image understanding. It was first developed for military applications. It is an important component used to observe objects and recognize it.
- D. **Natural Language Processing** :- It allows the computer to communicate with human being using languages like English, Malayalam etc. In this, the person can simply talk to the computer in their language. NLP includes NLU (Natural Language Understanding) to learn the input and NLG (Natural Language

Generation) which deals with creation of output.

- E. **Automatic Speech Recognition** :- The ASR (Automated Speech Recognition) identify the words that a person speaks and convert them to written text. The ASR supports applications like dictation, command and control, voice dialing etc. Google Now of Android is an example.
- F. **Optical Character Recognition/Handwritten Character Recognition** :- It allows us to recognize printed or hand written symbols into text format in ASCII code. At present, OCR packages are available for most languages. Google Handwriting Input is an example of handwritten character recognition.
- G. **Bioinformatics** :- It is the application of computer technology to store biological information. A computer gathers, store, analyze and integrate biological and generic information that can be applied in gene-based drug development.
- H. **Geographic Information System** :- It studies data related to images of various position on earth's surface. GIS can show various kinds of data in a map such as Roads, Forests, Rivers etc. It can be used in soil mapping, water resource management, e-governance etc.

## Chapter 12 ICT and Society

ICT services includes the following.

- i) E-Governance
  - ii) E-Business
  - iii) E-Learning
1. **e-Governance**:- It is the application of ICT (Information and Communication

Technology) for delivering Government services to citizens. The objective is to render service promptly and efficiently. The following are types of interactions in e-governance.

- i. G2G (Government to Government)
- ii. G2C (Government to Citizen)
- iii. G2B (Government to Business)
- iv. G2E (Government to Employee)

#### e-Governance Infrastructure

- a. SDC (State Data Centre) :- It works as central data repository, securing data storage, citizen information, online delivery of services, state intranet portal etc.
- b. KSWAN (Kerala State Wide Area Network):- KSWAN is the backbone of network in .
- c. CSC (Common Service Centre):- It is the front-end service points of the government. It helps in payment of electricity, telephone, water bills, submission of online applications for certificates etc. In Kerala, Akshaya Centre is a CSC.

#### Benefits of e-Governance

- a. It leads to automation of govt. services
- b. It strengthens democracy by participating citizen in all levels of governance.
- c. It ensures more transparency.
- d. It makes the govt. department responsible.
- e. It reduces time and money in visiting govt. offices.

The following are limitations.

- a. Those who live in remote areas will find it difficult to enjoy this service.

- b. Security is a problem since e-governance heavily depends on Internet and Web.
- c. Huge initial investment is needed.
- d. Many persons are reluctant to give their private details to the CSC.
- e. Integrity of various departments is essential.

#### Useful websites

- a. [www.dhsekerala.gov.in](http://www.dhsekerala.gov.in)
- b. [www.incometaxindia.gov.in](http://www.incometaxindia.gov.in)
- c. [www.edistrict.kerala.gov.in](http://www.edistrict.kerala.gov.in)
- d. [www.keralamvd.gov.in](http://www.keralamvd.gov.in)
- e. [www.spark.gov.in](http://www.spark.gov.in)

2. e-Business:- It means sharing of data and information by means of ICT applications. It is an extension of e-commerce. E-commerce involves business transaction that involves exchange of money, where as e-business includes all stages like marketing, customer education etc.

EPS (Electronic Payment System):- It is a system of financial exchange between the seller and buyer in e-business. It is implemented through debit cards, credit cards, ATM, internet banking etc.

e-Banking:- It is the automated delivery of banking services directly to the customers through electronic channel.

#### Advantages of e-business

- a. It overcomes geographical limitations.
- b. The operational cost for business can reduce.
- c. It minimizes travel cost and time.
- d. It remains open all time (24 x 7 days)
- e. The customer gets a wider range of choices of all brands.

### Challenges

- a. A good percentage of citizen is unaware of IT.
- b. Most rural customers does not use debit card, credit card, net banking etc.
- c. If not properly used , the customers may loose cash
- d. Customers are not able to physically inspect an item purchasing.
- e. Perfect and efficient shipment service is needed.

### Useful websites

- a. [www.irctc.co.in](http://www.irctc.co.in)
- b. [www.amazon.com](http://www.amazon.com)
- c. [www.ebay.in](http://www.ebay.in)
- d. [www.bookmyshow.com](http://www.bookmyshow.com)
- e. [www.keralartc.com](http://www.keralartc.com)

3. E-Learning:- The use of electronic media and ICT in education is termed as e-Learning. The following are major tools.
  - a. e-Books (electronic Books) :- It is a facility by which we could store a book in digital form and read it using e-book reader software. Some e-books supports voice output and hence just listening to it only needed to learn.
  - b. e-Text:- Textual information available in computer form is e-text. It can be read aloud by a computer or e-Text reader device. It is useful for visually challenged people.
  - c. Online chat:- It is a real time exchange of text chat between two or more persons. It can be used to discuss topics between teacher and students.
  - d. e-Content:- Learning materials in different multimedia formats like audio, video etc. are called e-content. They may be telecasted or uploaded in web sites for use by students.
  - e. Educational TV Channels:- These channels telecasts recorded classes,

interviews with experts, lab experiments etc. VYAS of DoorDarshan and VICTERS of Keral govt. are examples.

### Advantages of e-learning

- a. It offers variety of courses in various subjects to a number of students at distant location.
- b. Cost of learning is much lesser.
- c. People with limited income are supported.
- d. It allows to do online courses.
- e. Time and place is not a constraint.

### Challenges

- a. Face to Face contact of teacher and student is not possible.
- b. Proper interaction of teacher and students may be limited.
- c. Need for equipment and technology.
- d. Learners who need constant motivation may not get it.
- e. Hands on practice in a real laboratory is challenging.

### Useful websites

- a. [www.ignouonline.ac.in](http://www.ignouonline.ac.in)
- b. [www.ncert.nic.in](http://www.ncert.nic.in)
- c. [www.scert.kerala.gov.in](http://www.scert.kerala.gov.in)
- d. [www.w3schools.com](http://www.w3schools.com)
- e. [www.gcflearnfree.org](http://www.gcflearnfree.org)

### Information Security

1. Intellectual Property Right (IPR):- The outcome of a creative work like music, literary works, artistic works, inventions etc. are called intellectual properties. IPR refers to protecting rights of intellectual .
  - A. INDUSTRIAL PROPERTY:- An industrial or agricultural product is protected by patents, trade marks, industrial design and geographical indications.

A patent is an exclusive right granted for an invention. An invention must be related to a process or product, must be new, involve inventive steps, industrial use etc. to get patent.

A trademark is a distinctive sign that identifies a particular service or goods. A trade mark can be name, logo, symbol etc.

Industrial design protection is another one. Here, a product will have shape, pattern or colour on it that others cannot imitate. Geographical indication are signs used on the product to identify its place of making that indicates or guarantees quality. Eg. Aranmula Kannadi.

B. COPYRIGHT:- `A copyright is a legal right given to the creator of a work for a limited period. It prohibits reproduction, performance and broadcasting to the public, translation or adaptation.

2. Infringement:- Unauthorized use of intellectual property such as selling a patented invention, using a trademark name, or copying a music file etc. is called infringement. It is a punishable offence.
3. Cyberspace:- It is an unreal world in which communication take places through computer networks. It is a place where social interaction dominates. It is uncontrolled and unregulated.
4. Cyber Crimes:- Banking and other crucial information may be stolen using malicious software (malware) or through illegal hacking. Cyber crime is defined as such criminal activity using computer and computer networks. It can be cyber crime

against individuals, against property or against govt.

### Cyber crimes against Individuals

- a. Identity theft:- It occurs when some one uses features like name, credit card number etc. of a person without his permission.
- b. Harassment:- It means posting comments focusing gender, race, religion, nationality etc.
- c. Impersonation and Cheating:- It means pretending to be another person with a intention to harm the victim.
- d. Violation of privacy:- Posting images or videos of others without their permission is violation or privacy.
- e. Dissemination of obscene material:- It means downloading or disseminating prohibited images or videos.

### Cyber Crimes Against Property

- a. Credit Card fraud:- It means using credit card information of a person without his consent to make payment or transfer cash
- b. Intellectual Property Theft:- Using some ones ideas or thoughts without permission is called *plagiarism*. It is an offence.
- c. Internet Time Theft:- It means usage of internet time by unauthorized persons.

### Cyber Crime Against Government

- a. Cyber terrorism:- It is a cyber attack against sensitive computer like nuclear system, air traffic, telephone etc.
- b. Website defacement:- It is hacking the govt. web site and posting hackers messages in the site.
- c. Attack against e-governance site:- It deny a particular govt. service. It is initiated through denial of service attack.

5. Cyber Laws:- It is a law governing the use of computers and Internet. It is necessary to control the transactions in Internet.
6. Information Technology Act 2000:- It protects the intellectual property. Under this Act, violations are viewed seriously and offences will be punished.
7. Cyber Forensics:- Forensic is the process of using scientific knowledge for proving evidence against crimes in courts. Cyber forensic means the use of ICT procedures to retrieve data from computers, networks and communication systems.
8. Infomania:- It occurs due to accumulation of information from various sources like Internet, e-mail etc. but cannot be processed. This may result in neglecting duties, family etc. Constantly checking social media sites, e-mail, are symptoms of infomania.

**Previous Year Questions**

**Chapter 4**  
**Web Technology**

**March 2016 Questions**

- HTTP Stands for ----- (1)
- Distinguish between static and dynamic web pages (2)
- Write HTML code for a web page of an institution with the following features. It should have a marquee welcoming users, a heading in different fonts and a picture and address. (3)

**Say 2016 Questions**

- Classify the following languages into client side and server side.

ASP, PHP, JavaScript, VBScript (2)

- Write any one of the use of client side scripting (1)
- Fill the following table with appropriate points to distinguish between <P> tag and <BR> tag.

<P> tag	  tag
1.	1. Break the current line.
2. Container tag	2.
3. Align attribute sets alignment.	3.

**March 2017**

1. The default port number for HTTP is (1)
2. What are the various client side scripting languages? (2)
3. Develop a web page with the following.
  - a. Has an image as background
  - b. Welcomes users with a scrolling text.
  - c. Display address of the firm. (3)

**Say 2017**

1. Which HTML tag is used to create an ordered list? (1)
2. Expand name of the language used to develop web pages. (1)
3. Write an HTML code for a web page for your super market named “HELPLINE SUPERMARKET” with the following details. (5)
  - (i) A heading followed by a paragraph of 2 sentences about the districts using text formatting tags.
  - (ii) Give postal address of the firm.
  - (iii) Include a scrolling text “Hurry up, 50% off for all purchases”
4. Explain and compare features of any four scripting languages. (5)

**March 2018**

1. Write the HTML tag to insert an image “profile.jpg” aligned in centre of a web page. (2)
2. List and explain any three attributes of <BODY> tag. (3)
3. Name the different communications on the web and explain briefly. (3)
4. What is a web server? (2)

**Say 2018**

1. In client side scripting, processing is done by -----.
2. Categorise the following tags. (2)  
<br> <h1> <img> <table>
3. What are scripts in web programming? 2
4. Differentiate between client side scripting and server side scripting. (3)

**Chapter 5****Web designing using html****March 2016 Questions**

- The tag <DD> gives ----- (1)
- Create a table with 5 types of fruits names, use headings Serial number, name and cost (5)
- Create an ordered list of five fruits numbered using Roman small letters. (5)

**Say 2016 Questions**

- Rahim wants to connect his webpage to [www.yahoo.com](http://www.yahoo.com). Write the tag and attributes required for these. (2)
- Write HTML tags for the following list (5)
  - I. Hardware
    1. Cables

- i. UTP
  - ii. Coaxial
  - iii. Fiberoptic
2. Storage Devices
  - i. USB
  - ii. Harddisk
  - iii. Tape
- II. Software
  1. Application Software
    - i. MS Office
    - ii. Inventory Management System
  2. System Software
    - i. Compiler
    - ii. Assembler

**March 2017**

1. A link to a particular section of the document is called ----- (1)
2. Create a web page using frames for Tourism department for displaying list tourist places in Kerala. When a place is selected its details should be available in the other window. (5)
3. Create a form that accetps information regarding a student. Fields are name, age, class, sex, roll number, hobbies and date of birth. Use apt form controls. (5)

**Say 2017**

1. Write an HTML code for a web page to show the following in blue background.  
Components of a Computer
  - Hardware
    1. RAM
    2. ROM
    3. Hard Disk
  - Software
    1. System Software
    2. Application Software (3)

2. <FORM> tag contains some other tags to facilitate interaction between user and web page. Write any two such tags and explain their use? (2)

### March 2018

- The space between content and cell border in a table can be changed using ---- attribute. (1)
- Identify errors in the following. (5)
  - <UL TYPE="A" START=5>
  - <h1><b>Programming</b></i></h1>
  - 
  - <a href="contact@gmail.com">
  - <frameset rows = "50%, 25%, 25%">
    - <frame src="1.html">
    - <frame src="2.html">
</frameset>

### Say 2018

- NORESIZE is an attribute of --- tag. (1)
- List and explain any three attributes of <INPUT> tag in HTML. (3)
- Name and explain any two attributes of <FORM> tag. (2)
- Check the following HTML code and fill in the missing places.
 

```
<HTML>
<body>
<form name="loginForm">
user name :
    <input type=text>
password:
    -----
<input type="....." value="Login">
    -----
</form>
</body>
</html>
```

## Chapter 6 Java Script

### March 2016 Questions

- "True and False are used to represent boolean values". State whether True or False. (1)
- Explain the use of for loop with an example.
- Develop a web page that implements a JavaScript function that takes two numbers as input and displays their product. (2)

### Say 2016 Questions

- Give the function in JavaScript that converts a string data containing numbers to number type (1)
- Design a web page with a form tag which accepts a number in a textbox and another textbox which should display either odd or even. Write a function in Javascript to check whether even or odd (2)
- Develop a web page that accepts a number after validation and prints its factorial (2)
- JavaScript has a large number of built-in functions.
  - Name any two of them with an example. (2)
  - The property which returns size of a string is ----- (1)

### March 2017

- A virtual machine for executing JavaScript code is ----. (1)
- Discuss about six built-in functions in Javascript. (3)
- Design a procedure in Javascript that takes two strings as input and displays the concatenated string as output. (3)

**Say 2017**

1. State whether following are true or false.
  - a. JavaScript is the only client side scripting language.
  - b. JavaScript is case sensitive language.
  - c. The keyword to declare a variable in JavaScript is var.
2. Predict output of the following code.

```
<html>
<body>
<script language="JavaScript">
var i, s=0;
for (i=1; i<=10; i+=2)
    s+=i;
document.write(s);
</script>
</body>
</html>
```

**March 2018**

1. The following code in HTML will call the ShowMessage() in JavaScript. (2)
 

```
<input type=button value=show
onClick="ShowMessage()">
```

 Modify the code to call the ShowMessage when
  - a. User moves the mouse over the button.
  - b. User presses any key on the keyboard.
2. Consider the two strings “Education is the most powerful weapon” and “you can use to change the world”. Write Javascript to
  - a. Store these in two string variables.
  - b. Combine the two string variables. (2)
3. Identify suitable JavaScript data types for the following. (3)
  - a. “super computer”
  - b. true
  - c. 67.5

**Say 2018**

1. Explain two data types in JavaScript. (2)
2. Write the JavaScript code to display “Welcome to Kerala”. (2)

3. Consider a string “Gandhiji”. Write JavaScript code for the following.
  - a. Convert the string to upper case.
  - b. Find length of the string
  - c. Display 3<sup>rd</sup> letter in string. (3)

## **Chapter 7** **Web Hosting Services**

**March 2016 Questions**

- Name a protocol that provides secure file transfer (1)
- What type of hosting will you use to support a government web site? Give its advantages. (2)

**Say 2016 Questions**

- List the factors to be taken into consideration while buying hosting space on a web server. (2)
- What type of web page designing is called responsive web design? (1).

## **Chapter 8** **Concepts of DBMS**

**March 2016 Questions**

- Discuss levels of data abstraction in RDBMS (3)
- Consider the Account relation given below.

Acc.No	Name	Balance	Type
1000	Simon	150000	SB
1001	Abey	200000	SB
1003	Vishnu	100000	SB
1004	Rahim	250000	SB

- a. Identify primary keys and candidate keys.
- b. Select all account holders with balance above 200000 (2)

### Say 2016 Questions

- Classify the following operations in relational algebra into unary and binary operations. (1)  
(1) UNION (2) SELECT (3) SET DIFFERENCE (4) PROJECT
- Explain about SELECT, INTERSECTION, and SET DIFFERENCE operations with examples. (3)

### Chapter 9 SQL

#### March 2016 Questions

- Give the correct syntax for the following.
  - Renaming a table.
  - Deleting rows from a table.
  - Changing definition of a table.
  - Removing columns from a table.
  - Adding a new column. (5)

#### Say 2016 Questions

- What happens when we use DELETE FROM command without a WHERE clause? (1)
- If a table named 'Mark' has field RegNo, SubCode, and Marks, write SQL statements for the following.
  - List subject codes eliminating duplicates.
  - List the marks obtained by students with subject codes 3001 and 3002.
  - Arrange the table based on marks for each subject.
  - List all the students who have obtained marks above 90 for subject codes 3001 and 3002.
  - List contents of the table in descending order of marks. (5)

### Chapter 10

#### Server side scripting using Php

#### March 2016 Questions

- Php is (1)
  - Freeware
  - Proprietary
  - both
  - None
- Compare indexed and associated arrays in Php (2)
- Write a Php program to display prime numbers below 50. (3)
- Write a Php program to display perfect numbers below 100. (3)

#### Say 2016 Questions

- An array in Php is given as follows.  
\$family = array("Father"=>"Ajay", "Son"=>"Arjun", "Daughter"=>"Archana");  
Name the type of this array. Write a foreach loop that prints all the array elements. (2)
- What are the difference between GET and POST methods in form submission. (2)
- Study the following steps and determine correct order. (1)
  - Open a connection to mysql server
  - Execute the SQL query.
  - Fetch the data from query.
  - Select database
  - Close connection
  - 4, 1, 2, 3, 5
  - 1, 4, 2, 3, 5
  - 1, 5, 4, 2, 3
  - 4, 1, 3, 2, 5

#### March 2017

- A web server that supports PHP on any operating system is ----- (1)
- Discuss about special data types used in php. (2)

3. Create a HTML form in Php to show the difference between GET and POST methods. (3)
4. Write a function in Php to find factorial of a number. (3)

### Say 2017

1. Write a Php program to determine biggest of three numbers. (3)
2. What is the difference between echo and print statements in Php? (2)
3. What is the difference between Php and JavaScript? (2)

### March 2018

1. What is expansion of LAMP? (1)
2. Name the global variables used for passing data using HTTP GET and POST methods. (2)
3. What is the difference between echo and print in Php? (3)

### Say 2018

1. Write output of the following Php code. 2  
function justAfun(\$num)  
{  
    \$num = \$num \* 5 + (\$num + 6);  
    return \$num;  
}  
echo justAfun(100);
2. Name the different types of arrays in Php. Explain with an example. (3)

## Chapter 11 Advances in Computing

### March 2016 Questions

- The computing technology in which a problem is broken into pieces and solved concurrently is called ----- (1)
- Categorize the cloud service models (3)

### Say 2016 Questions

- Define Robotics (1)
- Give any three advantages and disadvantages of grid computing. (3)

## Chapter 12 ICT and Society

### March 2016 Questions

- Name a digital financial instrument. (1)
- Discuss about various IPR with examples. (3)

### Say 2016 Questions

- Give the goal of computer forensics. (1)
- Explain different categories of cyber crimes against government. (3)