Class-12

COMPUTER SCIENCE

GENERAL EDUCATION DEPARTMENT
SAMAGRA SHIKSHA, KERALA

Chapter 1
Structures and Pointers

Overview

Fundamental (basic) data types of C++ are int, char, float, double & void. We know that an array is a collection of similar data items. So dissimilar data items cannot be stored in an array. To overcome this problem a new data type named **structure** is introduced in this chapter. Also we will learn the concept of pointers to access memory locations directly using pointer variables.

> ## Focus Area
>
> Concept of structure and examples, Definition of pointers,
>
> Use of & and * operators, Static Vs. Dynamic memory allocation
>
> new and delete operators

Structure

- Structure is a user-defined data type.
- It is used to represent a collection of logically related data items with a common name.
- These data items may be of diffferent types.

Syntax	Example 1	Example 2

struct structure_tag
{
    data_type variable1;
    data_type variable2;
    ....;
    data_type variableN;
};
	struct student
	{
	    int rollno;
	    char name[30];
	    float marks;
	};
		struct employee
		{
		    int empno;
		    char empname[30];
		    float salary;
		};

Structure variable declaration and memory allocation

Structure variables are declared using the following syntax:-

struct structure_tag var1, var2, ..., varN; OR structure_tag var1, var2, ..., varN;

Assigning values for variables during declaration

structure_tag variable={value1, value2,..., valueN};

Eg., student st={3452, "Vaishakh", 27.00};

Accessing elements of structure

The period symbol (.) known as <u>dot operator</u> is used to connect a structure variable and its elements.
E.g.:-   cin>>st.rollno>>st.name>>st.marks;
              cout<<st.rollno<<st.name<<st.marks;

Pointer

Pointer is a variable that can hold the address of a memory location. Consider the following C++ statement:-

int num=25;　　　　　We know that, it is a variable initialisation statement, num is a variable that is assigned with the value 25. Being int type, 4 bytes (in GCC) are allocated.

Naturally, this statement causes memory allocation as shown in figure below:-
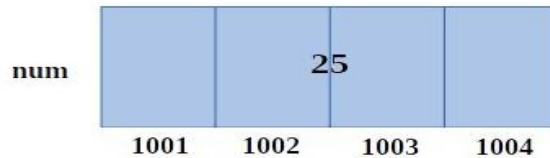
A variable is associated with two values: L-value and R-value, where L-value is the address of the variable and R-value is its content. Figure shows that, the L-value of num is 1001 and R-value is 25. If we want to store the L-value of a variable, we need another variable. This variable is known as **pointer variable.**

Declaration of pointer variable

　　　Syntax:- data_type * variable;

The data_type can be fundamental or user-defined and variable is an identifier.

　　　Example:- int *p;

The operators & and *

C++ provides an operator named *address of operator (&)*, to get the address of a variable. If num is an integer variable, its address can be stored in pointer ptr by the statements int the following table:-

Code	After execution
int num=25; int *ptr; ptr = # These statements, on execution, establishes a link between two memory locations as shown in Figure.	
cout<<num; cout<<*ptr;	25 25

The *indirection or dereference operator or value at operator (*)* retrieves the value at the location pointed to by the pointer. Note that the operators address of (&) and indirection (*) are **unary operators**.

Methods of memory allocation

The memory allocation that takes place before the execution of the program is known as **Static memory allocation**. Eg., int x, y; (variable declaration statements in the program).

The memory allocation that takes place during the execution of the program is known as **Dynamic memory allocation.** It is facilitated by an operator, named **new**. C++ provides another operator, named **delete** to de-allocate the memory.

Static memory allocation Vs. Dynamic memory allocation

Sl. No.	Static memory allocation	Dynamic memory allocation
1	Takes place before the execution of the program.	Takes place during the execution of the program.
2	Normal variable is used.	Pointer variable is essential.
3	Data is referenced using variables.	Data is referenced using pointer variables.
4	Allocated memory remains depending on the scope and life of variables.	Allocated memory can be released at any time during the program execution by using delete statement.

Sample Questions

1. What is a pointer variable in C++? Write the syntax or example to declare a pointer variable. (2 marks)   MARCH 2020

2. Write any two differences in static and dynamic memory allocation

   (2 marks)   JUNE 20I8   MARCH 2020

3. Define structure. Write any two differences between structure and array.

   (3 marks)   MARCH 2020

4. Consider the given structure definition: struct complex { int real; int imag;};

   a) Write a C++ statement to create a structure variable?

   b) Write a C++ statement to store the value 15 to the structure member real.

   (2 marks)   JUNE 2OI9

5. Write the use of * and & operators used in pointer. (2 marks)   JUNE 2OI9

6. Define a structure named 'Time' with elements hour,minute and second.

   (2 marks)   MARCH 2OI9

7. What are the different memory allocations in C++? Explain .

   (3 marks)   MARCH 2OI9

8. Identify and correct the errors in the following code segment.

   struct
   {   int regno;
           char name[20];
           float mark=100;
           };   (2 marks)   JUNE 2OI8

Chapter 2
Concepts of Object Oriented Programming

Overview

In this chapter we come across the Object-oriented programming concepts, which will helps to handle real-world entities.

> **Focus Area**
>
> POP Vs OOP, Five concepts of OOP

Paradigm is a set of basic principles, how a computation or algorithm is expressed. The programming is always done based on some paradigm. This helps to design the solution to a problem. The two major principles are:

1. **Procedural programming**   2. **Object-oriented programming**

Procedural Programming Vs. Object Oriented Programming

Procedural programming	Object oriented programming
1. Data is undervalued.	1. Data is given importance.
2. Procedure is given importance.	2. Procedure is driven by data.
3. Creating new data types is difficult.	3. New data types and associated operations can easily be defined.
4. Poor real world modeling.	4. Easy to define real world scenarios.

The Object-oriented programming concepts are implemented using **class** and **object**.

Class: It is the method to combine data (also known as state or property) and its associated member functions (also known as behaviour or method). **Data** are the values that the object has and **Member functions** are the ways in which the object can interact with its data.

**Object**: It is an instance of a class.

Five basic concepts of OOP

* Data abstraction
* Encapsulation
* Inheritance
* Polymorphism
* Modularity

1. Data abstraction: It means revealing only the essential features by hiding the background details from outside world. It is implemented using access specifiers. The three access specifiers are public, private and protected. The default access specifier in C++ is private.

2. Data encapsulation: The wrapping or binding of data and its associated member functions together.

3. Polymorphism: Polymorphism means "multiple forms". The ability to process the data in more than one form.

Types of Polymorphism:-
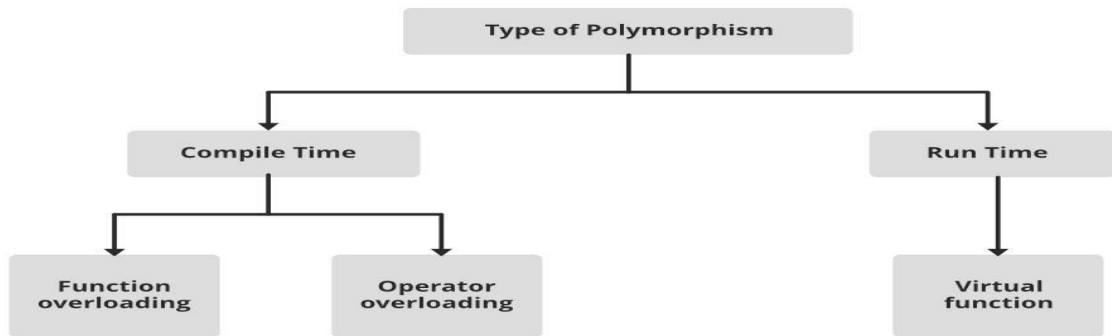
        (1) Compile time (Static) polymorphism (or early binding): Polymorphism during and compilation. E.g.- Function overloading and operator overloading.
        (2) Run time (Dynamic) polymorphism (or late binding): In run time polymorphism or dynamic binding, the code to be executed in response to the function call is decided at runtime. For example, Virtual function.

4. Inheritance: It is the way in which an object of a class acquire the properties and behaviour of another class. The advantage of inheritance is re-usability.

Types of inheritance
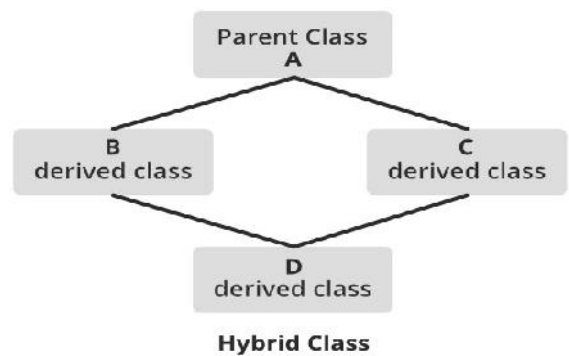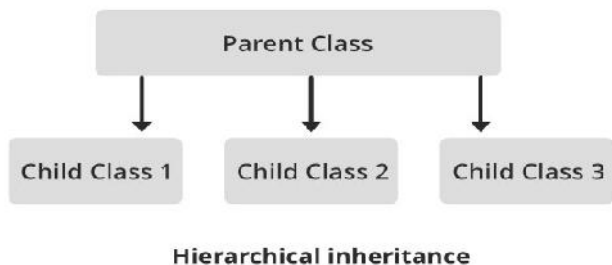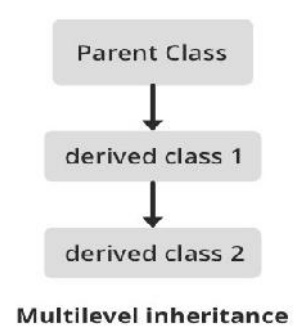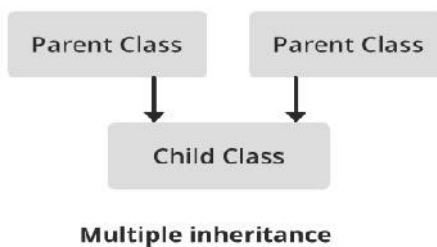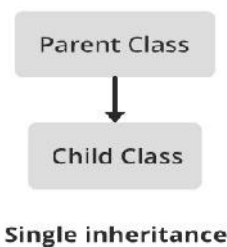
5. Modularity: Fragmenting or decomposing the program into small modules.

Sample Questions

1. Decomposing of program into small units is _____. (1)

2. Feature of OOP that illustrates the code re-usability is _____. (1)

3. Instance of a class is called _____. (1)

4. If a data can be processed in more than one type it is called _____. (1)

5. If different properties and functions are grouped or embedded into a single

   unit, then it is called _____. (1)

6. Which among the following doesn't come under OOP concept?
   a) Platform independent.

   b) Data binding.

   c) Encapsulation.
   d) Data hiding (1)

7. Differentiate Procedural programming and OOP's? (3)

8. Differentiate between data abstraction and data encapsulation. (3)

9. List the basic concepts of OOP (3)

10. In inheritance the existing class is called _____.   MAR 2020 (1)

11. What is polymorphism? Which are different types of polymorphism? SAY 2019 (2)

　　　　　　　　　　　　　　　　　　　　　　　　　MAR 2019 (3)

12. Distinguish between procedure oriented programming & object oriented programming

　　　　　　　　　　　　　　　　　SAY 2019　　　　　　　(2)

13. The wrapping up of data and functions into a single unit is called _____

　　　　　　　　　　　　　　　　　MAR 2019　　　　　　　(1)

14. The ability of data to be processed in more than one form is called _____

　　　　　　　　　　　　　　　　　SAY 2018　　　　　　　(1)

15. What is procedural oriented programming? What are the disadvantages of POP?

　　　　　　　　　　　　　　　　　SAY 2018　　　　　　　(3)

16. What is Object oriented programming? What are the disadvantages?

　　　　　　　　　　　　　　　　　MAR 2018　　　　　　　(3)

17. Default access specifier is _____　　SAY 2017　　　　　　　(1)

Chapter 3
# Data Structures and Operations

Overview

Data structures are widely used in almost every aspect of Computer Science i.e. operating system, compiler design, artificial intelligence, graphics and many more. It plays an important role in enhancing the performance of a software or a program and is used to store and retrieve the user's data as fast as possible. This chapter makes you understand the concepts and style of data structures.

> ### Focus Area
>
> Classification of data structures, Operations on data structures,
>
> Concepts of stack, queue (linear only) and linked list.
>
> PUSH and POP operations with algorithm

Data structure means specialized format for organizing, processing, retrieving and storing logically related data items as a single unit. There are several basic and advanced structure for handling data.

Classification of data structures
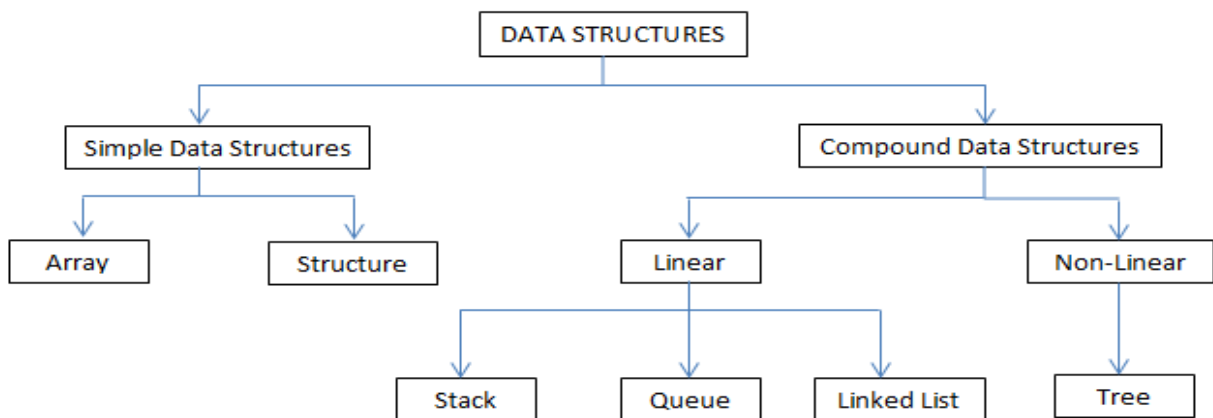
Data structures can be generally classified into two:- Simple data structure and Compound data structure. Simple data structures are arrays and structures. Compound data structures are formed by combining simple data structures. Compound data structures are further classified into linear and non-linear data structures.

Depending upon memory allocation, data structures may be classified as,
    1. Static data structure- They are associated with primary memory. The required memory is allocated before the execution (compile time) of the program. e.g. Arrays.
    2. Dynamic data structure- Memory is allocated during execution (i.e. runtime) according to our programming needs. e.g. Linked lists.

Basic operations on data structures

Traversing: Traversing the data structure means visiting each element of the data structure.
Insertion: Insertion can be defined as the process of adding new elements to the data structure.

Sorting: The process of arranging the data structure in a specific order is known as sorting.
Searching: The process of finding the presence of an element within a data structure is called searching.
Merging: Combining two similar data structures is called merging.
Deletion: The process of removing an element from the data structure is called deletion.

Stack and its Operations

Stack is a linear data structure, which follows LIFO (Last In First Out) principle to organise data items. The insertion and deletion always take place at one end called **TOP OF STACK (TOS).**
The process of inserting a new data item into the stack is called **PUSH**. Once the stack is full and if you try to insert an item, it will not be allowed. This situation is known as **stack overflow.**
The process of deleting an element from stack is called **POP**. If you try to delete an item from an empty stack, this situation is known as **stack underflow.**

Algorithm of PUSH operation:
Let STACK[N] is an array of stack with size N and TOS denotes the stack top position.
Let VAL be the data to be inserted into the stack.
Step 1: Start.
Step 2: If (TOS < N-1) Then
Step 3:   TOS = TOS + 1
Step 4:   STACK[TOS] = VAL
Step 5: Else
Step 6:   Print "Stack Overflow "
Step 7: Stop

Algorithm of POP operation:
Let STACK[N] is an array of stack with size N and TOS denotes the stack top position.
Let VAL be a variable to store the deleted item.
Step 1: Start
Step 2: If (TOS > -1) Then
Step 3:   VAL=STACK[TOS]
Step 4:   TOS = TOS - 1
Step 5: Else
Step 6:   Print "Stack Underflow "
Step 7: Stop

Queue:
Queue is a data structure that follows FIFO (First In First Out) principle to organise data items. A queue has two end points, Front and Rear. Insertion of data item takes place at the rear end and deletion takes place from the front end.

Linked list:
Linked list is a collection of nodes. Each node consists of data (information) part and a link part (pointer) to the next node.

The address of the first node is stored in a special pointer called **HEAD/ START**. Linked list is a dynamic data structure. So there is no issues of overflow. It grows when new data items are added, and shrinks when data is deleted. Linked list is created with the help of self referential structures.

Linked List
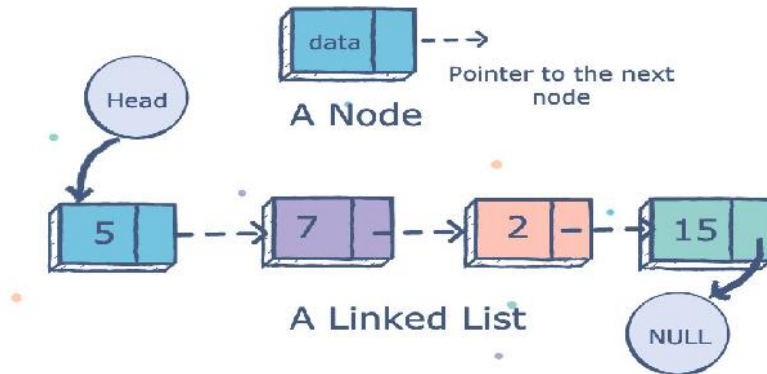
Sample Questions

1. Attempting to insert in an already full stack leads to _____.   (1) (March 2016)

2. Explain how push operation is done in a stack.   (2) (March 2016)

3. Linked list usually do not have the problem of overflow. Discuss.   (2) (March 2016)

4. Consider the following cases:

   (i) Paper cups are arranged on a dining table one above the other.

   (ii) Many people are waiting in a row to tickets for a cinema. Identify and compare the data structures that you know in connection with the above mentioned contexts.   (3) (SAY 2016)

5. Queue follows the _____ principle.   (1) (March 2017)

6. How does stack overflow and underflow occur?   (2) (March 2017)

7. Name the data structure that follows LIFO principle. (a) stack (b) queue (c) array (d) linked list   (1) (SAY 2017)

8. Match the following: (2) (SAY 2017)

A	B	C
1. Stack	i. Front	a. Inserting a new item.
2. Queue	ii. Push	b. Elements are accessed by specifying its position.
3. Array	iii. Start	c. Contains the address of the first node.
4. Linked List	iv. Subscript	d. Removing an item.

10. List the various operations that can be done on data structures.   (2)

11. Write the algorithm for POP operation on stack.   (3)

12. How does Stack differ from Queue?   (3)

Chapter 4
WEB TECHNOLOGIES

Overview

This chapter presents an overview of communication over the Internet and the role of web servers in it. The different tools and technologies that are available for developing websites are introduced here.

> ### Focus Area
> Static and dynamic web pages, Comparison of Client side & Server side scripts,
> Structure of HTML code, Container Tags & Empty Tags,
> Common attributes of the <BODY> tag,
> Use of important tags:-
> (Headings, <BR>, <P>, <HR>, text formating tags, <MARQUEE>, <FONT>, <IMG>)
> Only the essential attributes need to be considered.

Website
A website is a collection of web pages. A web page may contain texts, graphics, sounds, animations, and videos. Web pages are developed with the help of a language called **Hyper Text Markup Language (HTML)**. HTML is also known as the language of the Internet.

Static Vs. Dynamic web pages

Static web pages	Dynamic web pages
The content and layout of a web page is fixed.	The content and layout may change during run time.
Static web pages never use databases.	They use database to change content.
Static web pages directly run on the browser and do not require any server side application program.	Dynamic web page runs on the server side application program and displays the results.
Static web pages are easy to develop.	Dynamic web page development requires programming skills.

Scripts

The program code written inside HTML pages are called scripts. The commonly used scripting languages are JavaScript, VB script, PHP, Perl etc.

Different types of Scripting
      1. Client side scripting
      2. Server side scripting.

Client side scripting languages: JavaScript, VB Script

Server side scripting languages: PHP, JSP, ASP, Pearl

Client side scripting Vs. Server side scripting

Client side scripting	Server side scripting
Script is copied to the client browser.	Script remains in the web server.
Script is executed in the client browser.	Script is executed in the web server and the web page produced is returned to the client browser.
Client side scripts are mainly used for validation of data at the client.	Server side scripts are usually used to connect to databases and return data from the web server
Users can block client side scripting	Server side scripting cannot be blocked by a user

HTML (Hyper Text Markup Language)

HTML is the most widely used language to create web pages. The commands used in HTML are called tags. HTML was created by Tim Berners Lee.

Eg: <HTML>, <BR>, <HR>

Tags in HTML are of two types-.

Empty tags and Container tags
Container Tags – Tags that require opening tag and closing tag.
        E.g : <HTML> ……… </HTML>
Empty Tags – Tags that do not require closing tags.
        E.g : <BR>, <HR>….etc.
Attributes of a Tag
        The additional information supplied with HTML tags are called attributes. They are the properties of a tag.
Eg: <BODY bgcolor = "Yellow">. Here, bgcolor is the attribute.

Structure of HTML page

An HTML page begins with the <HTML> and end with </HTML>tag. The source code is written using a text editor. The files are saved with extension .htm or .html. The HTML documents are viewed in a web browser such as Internet Explorer, Firefox, etc.

The basic structure of an HTML document is as follows:-

<HTML>
        <HEAD>
                <TITLE> .... **</TITLE>**
        </HEAD>
        <BODY>
                                ....
        </BODY>
</HTML>

Essential HTML tags

1) **<HTML> Tag**
         It informs the browsers that this is an HTML document. This is a container tag. <HTML> is always the first tag in the HTML program and the </HTML> is the last tag.

The attributes of the <HTML> tag are dir and lang

Attribute	Use
lang	Used to specify the language used in the document. Value "en" for English language and "ar" for Arabic language. For example, <HTML lang = "ar">
dir	Used to specify the direction of the text to be displayed on the web page. Values of this attributes are **ltr** (read from left to right) and **rtl** (read from right to left) For example, <HTML dir = "rtl">

2) **<HEAD> tag**
         It is used to define head section of the document. This is a container tag.

3) **<TITLE> tag**
         The text within the tag pair is displayed in the title bar of the browser window. This is a container tag.

4) **<BODY> tag**
         It is used to create body section of HTML document. This is a container tag.

Attributes of the <BODY> tag

Attribute	Use
bgcolor	It specifies background colour for the document body. Eg:- <BODY bgcolor="RED"> Or <BODY bgcolor="#FF0000">
background	To set image as background
text	It specifies the colour of the text contents in the page
link	It specifies the colour of the unvisited links. The default colour for Link attribute is blue.
alink	It specifies the colour of the active hyperlink. The default colour for Alink is green.
vlink	It specifies the colour of visited link. The default colour for Vlink is purple
leftmargin	It specifies the left margin of the webpage.
topmargin	It specifies the top margin of the webpage.

Important tags

1)Heading tags <H1>, <H2>, <H3>, <H4>, <H5>, <H6>

They are used to create headings of different sizes. There are six levels of heading tags.These are container tags.

Attribute	Use
align	Values of Align are **left ,right, center** **left**: Text is aligned to the left margin. **right**:Text is aligned to the right margin. **center** :Text is aligned to the center of the page

2) <P> tag

It is used to create paragraphs. This is a container tag.

Attribute	Use
align	Values of Align are **left ,right, center** or **justify**

3)
 tag

It is used to create a line break. This is an empty tag.

4) <HR> tag

It is used to create a horizontal line. This is an empty tag.

Text Formatting Tags

Tags	Use
<B> and <STRONG>	To make the text **bold** face.
<I> and <EM>	To make the text *italics* or *emphasis*.
<U>	To underline the text
<S> and <STRIKE>	To strike through the text
<BIG>	To make the text big sized
<SMALL>	To make the text small sized
<SUB>	To make the text subscripted
<SUP>	To make the text superscripted
<Q>	To enclose the text in "double quotes"
<BLOCKQUOTE>	To indent the text

Eg**.** Write the HTML code to display the statements
1. a^2+b^2
2. H_2SO_4

Ans :1. a²+b²

2. H₂SO₄

<MARQUEE> tag

It displays a piece of text or image scrolling horizontally or vertically in the web page.

Attribute	Use
height	Sets the height of the marquee
width	Sets the width of the marquee
direction	It specifies the direction in which marquee should scroll. It's values are **up, down, left, right**
behavior	It specifies the style of movement. Scroll,slide and alternate are the values.
scrolldelay	It specifies time delay between each jump.
scrollamount	It specifies the speed of the marquee text.
loop	How many times the marquee element should scroll on the screen.
bgcolor	It specifies the background colour of the marquee.
hspace , vspace	It specifies horizontal and vertical spaces around the marquee

<FONT> tag

This tag allows us to change the size, style and colour of the text enclosed within <FONT> and </FONT> tags. This is a container tag.

Attribute	Use
color	It specifies colour of the text
face	It specifies font face.
size	It specifies the font size (ranges from 1 to 7). The default value is 3

<IMG> tag

This tag is used to insert an image in a web page. This is an empty tag.

Attribute	Use
src	It specifies the filename of the image to be inserted.
align	It specifies the alignment of the image. It's values are **top ,middle, bottom**
width , height	It specifies the width and height of the image in pixel.
border	Used to set border around an image.
hspace, vspace	Set horizontal and vertical space between images

Eg: <IMG src="cat.jpg">

Sample Questions

1. Face attribute is used with _____ tag.

2. _____ is the main attribute of <IMG> tag.

3. How will you distinguish a static web page from a dynamic web page?

    2 marks   MAR 2016

4. Categorize the following tags in HTML appropriately. (container tag and empty tag)

    < br> , < h1 > , < img > , < font >

5. What are the various types of scripting languages?

6. Explain about container tag and empty tag with example.

7. Name the attributes of <HTML> tag.

8. Explain the different attributes of <BODY> tag.   5 marks   MAR 2019

9. Name some of the text formatting tags.

10. What are the main attributes of <MARQUEE> tag?

11. Write an empty tag used in HTML.   1 mark   MAR 2020

12. Differentiate static and dynamic webpages   3 marks   MAR 2020

    3 marks   MAR 2019

13.

   (a) Explain about container tag and empty tag with an example 2 marks   SAY 2019

   (b) Write IITML code to display the following in a web page

        A^3B_5

        x>y   2 marks   SAY 2019

   (c) Which tag is used to insert an image into a web page? 1 mark   SAY 2019

14. a) What are scripts in web programming?   2 marks   SAY 2018

    b) Differentiate client side scripting and server side scripting.

    3 marks   SAY 2018

Chapter 5
Web Designing using HTML

Overview: This chapter discusses about enhancing websites with lists, tables and hyperlinks. Also this chapter gives a brief idea of form creation facility for user inputs.

> ### Focus Area
> Lists (ordered, unordered,definition),
> Hyperlinks <A> tag and href attribute,
> Definition of Internal Linking , External Linking,
> <TABLE> tags, Listing and use of Input controls in FORM,
> *Coding questions may focus only on simple lists and simple tables.*

Lists in HTML

There are three kinds of lists in HTML – unordered lists (UL), ordered lists (OL) and definition lists (DL).

1. Unordered list (<UL> .... </UL>)

Unordered list or bulleted list displays a bullet or other graphic in front of each item in the list. It is a container tag. Each item in the list is presented by using the tag pair <LI> and </LI>.

Attribute	Use	Example	Output
type	To specify the type of bullet. **"Disc", "Circle"** and **"Square"** are the values for ●, ○ and ▪	<UL Type= "disc"> <LI> RAM </LI> <LI> Hard Disk </LI> <LI> Mother Board </LI> <LI> Processor </LI> </UL>	● RAM ● Hard Disk ● Mother Board ● Processor

2. Ordered list (<OL> .... </OL>)

Ordered list or numbered list present the items in numerical or alphabetical order. Each item in the list is presented by using the tag pair <LI> and </LI>.

Attribute	Use	Example	Output
type	To specify the type of numeral. The values are "1", "I", "i", "a" and "A"	<OL **Type**= "1"> <LI> RAM </LI> <LI> Hard Disk </LI> <LI> Mother Board </LI> <LI> Processor </LI> </OL>	1. RAM 2. Hard Disk 3. Mother Board 4. Processor
start	To specify the starting number. The value should be an integer	<OL **Type**= "a" **Start**="3"> <LI> RAM </LI> <LI> Hard Disk </LI> <LI> Mother Board </LI> <LI> Processor </LI> </OL>	c. RAM d. Hard Disk e. Mother Board f. Processor

3. Definition lists (<DL> .... </DL>)
        A definition list is a list of terms and the corresponding definitions. Each term in the list is created using the <DT> tag and the <DD> tag is used to describe the term. All these tags are container tags.

Example	Output

<DL>
<DT>Spam :</DT>
<DD> Spam is the unsolicited e-mail sent. </DD>
<DT>Phishing :
</DT>
<DD> Phishing is an attempt to acquire information.
</DD>
</DL>
	Spam :
	    Spam is the unsolicited e-mail sent.
	Phishing :
	    Phishing is an attempt to acquire information.

Hyperlink (Link)
        A hyperlink is an element, a text, or an image in a web page, on clicking, browser shows another document or another section of the same document.
<A> tag, called **anchor tag** is used to give hyperlinks. **Href** is the main attribute of <A> tag. The URL (address of the web page / site) is given as its value.

There are two types of linking – **internal linking** and **external linking.**
        Internal Linking – links a particular section of the same document.
        External Linking – linking from one webpage to another webpage.

Example for external linking (Creating e-mail linking:)-
        To create an e-mail hyperlink in a web page, use the hyperlink protocol mailto:-
        E.g: <A href= mailto: "scertkerala@gmail.com"> SCERT</A>
        E.g: <A href= "http://www.dhsekerala.gov.in">Higher Secondary</A>
Example for internal linking:-

```
<html>
<body>
<a href="#ch1">Chapter 1</a><br/>
<a href="#ch2">Chapter 2</a><br/>
-------------------------------
<br><br><br><br><br><br><br><br><br><br><br><br>
<br><br><br><br><br><br><br><br><br><br><br><br>
<a id="ch1">Introduction of Chapter 1</a>
     <p>This is chapter 1</p>
<br><br><br><br><br><br><br><br><br><br><br><br>
<br><br><br><br><br><br><br><br><br><br><br><br>
<a id="ch2">Introduction of Chapter 2</a>
     <p>This is chapter 2</p>
</body>
</html>
```

Tables
Creating tables - <TABLE> tag

A table consists of rows and columns of cells.**<TABLE>** tag is used to create tables. It is a container tag. Table rows are created using **<TR>** tag. In a table there are two types of cells- **Heading cell** and **Data cell**.**<TH>** tag is used to define heading cell and **<TD>** tag is used to define data cell.

Attributes of <TABLE> tag

Attribute	Use
border	Thickness of the border line around the table.
bordercolor	To set the colour to the border
cellspacing	To specify the space to be left between cells.
cellpadding	To specify the space in between the cell border and cell content.

Attributes of <TH>   and <TD> tag

Attribute	Use
colspan	To span a cell over 2 or more columns in a row.
rowspan	To span a cell over 2 or more rows in a column.

Eg: To create a web page containing a simple table

Roll No.	Name
1	Aliya
2	Arun

```
<HTML>
        <HEAD> <TITLE> Html Tables </TITLE>
        </HEAD>
        <BODY>
                <TABLE Border="1">
                        <TR>
                                <TH>Roll No</TH>
                                <TH>Name</TH>
                        </TR>
                        <TR>
                                <TD>1</TD>
                                <TD>Aliya</TD>
                        </TR>
                        <TR>
                                <TD>2</TD>
                                <TD>Arun</TD>
                        </TR>
                </TABLE>
        </BODY>
</HTML>
```

Forms

Forms are used to collect data through the user's web browser and send it to the server. Forms are created by the <FORM> tag. There are different types of **Form controls** used to collect data using HTML Form.

Listing and use of Input controls in forms

Textbox – To input a line of text.	`<html>`
Password box – To input passwords.	`<body>`
Option button (Radio button) – To select an item from a groups of options.	`<form action="/action_page.php">` `<input type="text" id="fname" name="fname">`
Checkbox – To select one or more items in a group.	....
List box – To select one or more items from list of items.	`<input type="submit" value="Submit">`
Text area – To input multi line text.	`</form>`
Submit button – To submit data to the Form handler.	`</body>`
Reset button – To clear the entries in the Form.	`</html>`

Sample Questions

1) Tag<A> is known as .... tag.

2) Write the attributes of <OL>tag.

3) What are the common attributes of <UL> and <OL> tags?

4) What are the different kinds of lists available in HTML ? Briefly explain about the tags used for each kind.   3 marks   MAR 2020

5) What is the difference between <UL> tag and <OL> tag?

6) Name the tags used in the definition list.

7) What is a hyperlink ? Explain about different types of hyperlinks available in HTML.

8) Write HTML tags for the following

   (a) Hyperlink to the website http://www.dhsekerala.gov.in

   (b) Email link to dhseexam@gmail.com   2 marks   MAR 2019

9) The <DD> tag gives _____   1 mark   MAR 2016

10) Create a table with 5 types of fruit names, using headings as serial number, name and cost
                                               OR
    Create an ordered list of five fruits numbered using small Roman numerals
                                                              5 marks   MAR 2016

11) List and explain any three attributes of BODY tag in HTML.   3 marks   MAR 2016

    List the various attributes of BODY tag in HTML   5 marks   MAR 2019

12) Identify the errors in the following code:

    (a) <UL type="A" start=5>

    (b) <h1> web programming </i> </h1>

    (c) <a href="contact@gmail.com">

    (d) Question from FRAMESET NOT included in focus area   5 marks   MAR   2018

Chapter 6
Client Side Scripting Using JavaScript

Overview

This chapter introduces JavaScript as a popular client side scripting language. Basic features of JavaScript like data types, variables, operators, control structures and built-in functions are discussed in detail.

> ### Focus Area
> <SCRIPT> tag, Data types, var keyword, Operators,
> Control structures and Built-in functions

<script> tag

JavaScript is a client side scripting language used for data validation at client side and to include programming segments in HTML pages. For embedding script inside HTML pages, <script> tag is used. Important attribute is language, used to specify the type of scripting language.

Syntax	Example
<script language="javascript"> ....… </script>	<html> <body> <script language = "javascript"> document.write("Hello World!") </script> </body> </html>

document.write() is a function to include a text in the body section of the web page.
Java script engine: It is a virtual machine for interpreting JavaScript code at runtime.

Data types in JavaScript

Type	Description	Examples
number	All category of numbers	34, -56,78.9 etc
string	Any combination of numbers, characters or symbols enclosed in double quotes	"hello", "123", "$name" etc
boolean	Two values only	true, false

Variables in JavaScript

The keyword 'var' is used to declare all types of variables in javascript. The type of a variable is decided only when a value is assigned to it.

    e.g. var x, y;
        x="hello";
        y=654;

 typeof() function is used to find the type of a variable.
    e.g. typeof(x);   (string)
        typeof(y);   (number)
        typeof(z);   (undefined)

undefined is a special data type in javascript to represent variables not declared using keyword var.

Operators in Java script

1. Arithmetic operators : They are used for arithmetic calculations.

Operator	Description	Example	When a=10, value of b?
+	Addition	b=a+5;	15
-	Subtraction	b=a-5;	5
*	multiplication	b=a*5;	50
/	Division	b=a/5;	2
%	modulus	b=a%5;	0
++	increment	b=a++;	b=10, a=11
--	decrement	b=a--;	b=10, a=9;

2. Assignment operators

Operator	Description	Example	When a=10, value of a?
=	Assignment	a=10;	10
+=	Add and Assign	a+=10;	20
-=	Subtract and Assign	a-=10;	0
*=	Multiply and Assign	a*=10;	100
/=	Divide and Assign	a/=10;	1
%=	Modulus and Assign	a%=10;	0

3. Relational operators: They are used for comparing values.

Operator	Description	Example	Result (a=10 and b=3)
==	Equal to	a==b;	false
!=	Not equal to	a!=b;	true
>	Greater than	a>b;	true
<	Less than	a<b;	false
>=	Greater than or equal to	a>=b;	true
<=	Less than or equal to	a<=b;	false

4. Logical Operators : They are used for combining expressions.

Operator	Description	Example	Result (when a is true and b is false)
&&	AND	a && b	false
||	OR	a || b	true
!	NOT	! a	false

5. String addition operator(+) : This operator is used for joining or concatenating two strings.
Consider the following

1) var a,b,c;
    a="hello";
    b=" world";
    c=a+b;

    Value of c: hello world

2) var a,b,c;
    a="123";
    b=45;
    c=a+b;

    Value of c:: 12345

3) var a,b,c;
    a="123";
    b=45;
    c=Number(a)+b;
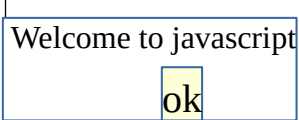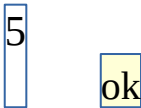
    Value of c: 168

Number() is a function that converts a string type data containing numbers to number type.

Built-in functions in Javascript

Function Name	Description	Example	Result
alert()	This function displays a message on the screen	alert("welcome to javascript");	Welcome to javascript ok
isNaN()	This function checks whether a value is a number or not.	isNaN("hello"); isNaN(13);	True False
toUpperCase()	This function returns the upper case form of the given string.	y=toUpperCase("hello".); alert(y);	HELLO
toLowerCase()	This function returns the lowercase form of the given string.	y=toLowerCase("HELLO"); alert(y);	hello
charAt()	This function returns a character at a specified location.	var x, y; x="hello"; y=charAt(0);	H
length	Returns the length of a string.	var x,y; x="hello"; y=x.length; alert(y);	5 ok

Control Structures in JavaScript

Control structures are used to change the sequential flow of execution in a program.
Two categories: Selection (if and switch) and Iteration or looping (for, while)

Control structure	Syntax
Simple if : Statements are executed when the test-expression is true.	if(test_expression) { statements; }

if.....else: When test_expression is true, statement block1 is executed otherwise statement block2 is executed.	if(test_expression)
	    { statement block1; }
	else
	    { statement block2; }

switch: Program code is executed based on the value of an expression.	switch(expression)
	{ case value1: statements;
	          break;
	   case value2: statements;
	          break;
	....
	   default: statement;
	}

for loop: It is used to execute a group of instructions repeatedly.	for(initialisation; test_expression; updation)
	{
	   statements;
	}

while loop: A group of statements are executed many times only when the given condition is true.	initialisation;
	while(test_expession)
	{
	   statements;
	   updation;
	}

Sample Questions

1) How to include JavaScript in HTML pages?
2) Name the important attribute of <script> tag?
3) What are the three data types in JavaScript?
4) Categorize the data type of the following data in JavaScript: -
       78.5, "769",true,"False",0.006,false,"hello",-54
5) ....… keyword is used to declare variables in JavaScript.
6) Which function identifies the type of data in JavaScript?
7) List out the assignment operators in JavaScript?
8) Write the names and their use of any two built-in functions in JavaScript ?
                          (2 marks) SAY 2019
9) Which property of JavaScript is used to find the number of characters in a string?
10) Which built-in function is used to check whether the given value is a number or not?
11) Consider the following code:
     var a,b;   a=65;   b="123";   typeof(a);   typeof(b);   typeof(c);
     Write the output of the above code?
13) Explain the looping statements in JavaScript?
14) a) Write the meaning of the following statement:
     document.write("Happy New Year");
   b) How it differs from the statement   alert("Happy New Year");
15) What are the different control structures used in JavaScript ? Explain any one with an example.   (2 marks)   MAR 2020
16) Breifly explain any two built-in functions available in JavaScript.   (3 marks)   MAR 2020
17) Write the JavaScript statements for storing an integer value to a variable.
                          (2 marks) SAY 2019

Chapter 7
WEB HOSTING

Overview:

This chapter gives an overview on different aspects of web hosting. It focuses on the types of hosting and the steps involved in hosting. It also introduces concepts like free hosting, CMS (Content Management System) and responsive web designing. The aim of this chapter is to encourage students in creating and hosting websites.

> **Focus Area**
>
> Types of Web hosting,
>
> FTP client software, Free hosting

Web Hosting

Web hosting is the service of providing storage space in a web server to serve files for a website to be made available for internet users. The companies that provide web hosting services are called web hosts.

Types of web hosting

Shared Hosting	Dedicated Hosting	Virtual Private Server (VPS)
Common type of web hosting in which several websites are stored in a single server.	The entire web server and its resources are leased by the client.	A physical server is virtually divided into several servers using virtualisation software.
It is suitable for small websites with less visitors.	It is suitable for large organisation and government departments with large number of visitors.	It is suitable for websites that requires more features than shared hosting and less features than dedicated hosting.
Cheaper and easy to use.	Expensive but provides good performance.	Provides almost same service like dedicated hosting but at a lesser cost.

Steps involved in web hosting

1. Create the website and choose the correct type of Hosting.
2. Buying web space on the server.
3. Domain Name Registration.

Domain names are used for identifying a website on the internet.

4. Connecting domain name with IP address of web server.

To watch the contents of the website using the domain name, first the domain name has to be connected to the IP address of the web server. This can be done by setting the
 '**A record'** or Address record of the domain name with the IP address of the web server.

5. Uploading the created website.

Final step is to transfer the webpages into the web server. This can be done using **FTP client software**.

Popular FTP Client software are File Zilla, Cute FTP, Smart FTP etc.

Co-location: Keeping the client's server at the service providers facility is called co-location.

Free Hosting

It provides free web space for hosting our website. The expenses of hosting are met by the service providers by displaying advertisements. Their may be some restrictions on the size and type of files (audio/video) to be uploaded. Free hosting is helpful for sharing contents on web among family groups, non profitable organisations etc. They provide own subdomain and domain name registration. Sites.google.com, yola.com etc are free web hosting services.

Content Management System (CMS)

It is a web based software system capable of creating or designing, managing and publishing attractive websites. It enables people with less technical knowledge to develop secure and attractive websites. E.g. Word Press, Drupal, Joomla etc.

Responsive Web Design

It is a way of building a website suitable to work on devices with different screen sizes regardless of the type of device like mobile phone, tablets, desktop etc. Responsive web pages can be designed using flexible grid layouts, flexible images and media queries.

Sample Questions

1) Define Web Hosting?
2) The companies that provide web hosting services are called.................
3) Explain about various types of web hosting.   (3 marks)   MAR 2020
4) What FTP Client software? Differentiate FTP & SFTP.   (2 marks)   SAY 2018
5) Which type of hosting is best for hosting family websites? Justify?
6) Mention some drawbacks of free hosting?
7) Distinguish between shared hosting and dedicated hosting?   (3 marks)   MAR 2019

Chapter 8
Database Management System

Overview: In this chapter an effective mechanism called DBMS is discussed to overcome traditional record keeping system.

> ### Focus Area
>
> Advantages of DBMS, Components of DBMS, Types of users,
>
> RDBMS terminologies, Relational operations (Select, Project, Union, Intersection)

DBMS means Data Base Management System. It is a tool used to store a large volume of data, retrieve and modify the dataase and when required. DBMS consists of both data and programs.

Advantages of DBMS

a) **Controlling data redundancy:-** Duplication of data is known as data redundancy. In DBMS data is kept in one place in centralized manner and the users can access this centrally maintained data for their purpose. So data redundancy is controlled.

b) **Data consistency:-** Data redundancy leads to data inconsistency (Different copies of same data hold different values because the updation of data may not occur in all the copies. In DBMS it is avoided by eliminating redundancy.

c) **Efficient data access:-** DBMS utilizes a variety of techniques to store and retrieve data efficiently.

d) **Data can be shared:-** The data stored in the database can be shared among many users and new programs can be developed to share the existing data.

e) **Data integrity:-** Integrity refers to the overall completeness, accuracy and consistency of data in the database. It can be achieved by use of error checking, validation, avoiding duplicationetc.

f) **Security:-** Information inside a database is very valuable for acompany. Security refers to accidental or intentional disclosure or unauthorized access, modification or destruction. Through the use of passwords, information in the database is made available only to authorized person. Access to specific information can be limited to selected users by using access rights.

g) **Enforcement of standards:-** The database administrator defines standards like display formats, report structure, update procedures, access rules etc.. for the DBMS.

h) **Crash recovery:-** If the system crashes, data in the database may become unusable. DBMS provides some mechanism to recover data from the crashes.

Database

Data base is an organized collection of data related to a particular enterprise. It may contain different types files each one containing many records.

Components of DBMS

a) **Hardware**: It include actual computer system used for storage and retrieval of database. i.e., computers, storage devices, network devices, and other supporting devices.

b) **Software**: It consists of DBMS, application programs and utilities.

c) **Data**: The database should contain all the data needed by the organization.For effective storage and retrieval of information, data is organized as fields, records and files.
   1) Field: A field is a smallest unit of stored data. e.g. Name, Mark, etc.
   2) Record: A record is a collection of related fields.
   3) File: A file is a collection of records.
d) **Users**: Theusers of database can be classified depending on the mode of their interactions with DBMS. Users of database are
   - Database administrator
   - Application Programmer
   - Sophisticated users
   - Naive users
e) **Procedures**: Procedures refers to the instructions and rules that govern the design and use of the database.

Users of Database

The users of a database system can be classified into:

Database Administrator (DBA): The person who is responsible for the control of the centralized and shared database. He is responsible for,

   a) Design of the physical and conceptual schema.
   b) Security and authorization.
   c) Data availability and recovery fromfailures.

Application Programmers: Computer professionals who interact with the DBMS through application programs.

Sophisticated Users: This include engineers, scientists, business analysts, and others who interact with the database through their own queries to generate information.

Naive Users: People accessing data by invoking one of the application programs. Clerical staff in an office, bank clerk, etc. are examples

Relational data model

It is a model of DBMS that represents database as a collection of tables called relations. Most of the database products are based on the relational model and they are known as Relational DataBase Management System (RDBMS). Eg: Oracle, Microsoft SQLServer, MySQL.

Terminologies in RDBMS

Entity: It is a person or a thing in the real world that is distinguishable from others. For example, student, teacher etc.

Relation: It is a collection of data organized in the form of rows and columns. A relation is also called Table.

Tuple: The rows (records) of a relation are known as tuples.

Attribute: The columns of a relation are called attributes.

Degree: The number of attributes in a relation determines the degree of a relation.

Cardinality: The number of rows(records) or tuples in a relation is called cardinality of the relation.

Domain: It is a pool of values in a given column of a table.

Schema: The description or structure of a database is called the database schema.

Instance: An instance of a relation is a set of tuples in it.

Key: It is an attribute or a collection of attributes in a relation that uniquely distinguishes each tuple from other tuples in a given relation. There are different types of keys.
Candidate key: It is the minimal set of attributes that uniquely identifies a row in a relation.
Primary key: It is one of the candidate keys chosen to uniquely identify tuples within the relation.
Alternate key: It is a candidate key that is not chosen as the primary key.
Foreign key:A key in a table can be called foreign key if it is a primary key in another table.

Relational algebra

The collection of operations that is used to manipulate the entire relations of a database is known as relational algebra.
Relational Operations
The fundamental operations in relational algebra are **SELECT, PROJECT, UNION, INTERSECTION**, SET DIFFERENCE, CARTESIAN PRODUCT.

SELECT operation: It is used to select rows from a relation that satisfies a given condition. This operation is denoted using lower case letter sigma (σ). The general format of select operation is:

$\sigma_{condition}$ (Relation)

PROJECT operation: It selects certain attributes from the table and forms a new relation. It is denoted by lower case letter π. The general format of project operation is:

$\Pi_{A1,A2,\ .An}$ (Relation)
Here A1, A2,. .. ., An refer to the various attributes that would make up the relation specified.
UNION operation: It is a binary operation and it returns a relation containing all t u p l e s appearing in either or both of the two specified relations. It is denoted by $\cup$. The two relations must be unioncompatible, which means that the attributes of the relations should be the same in name, number, type and order.
INTERSECTION operation: It is also a binary operation and it returns a relation containing the tuples appearing in both of the two specified relations. It is denoted by $\cap$. The operand relations must be union-compatible.
SET DIFFERENCE operation: It is also a binary operation and it returns a relation containing the tuples appearing in the first relation but not in the second relation. It is denoted by – (minus). The operand relations must be union-compatible.
CARTESIAN PRODUCT operation: It returns a relation consisting of all possible combinations of tuples from the two operand relations. The cardinality (number of tuples) of the new relationistheproduct of the number of tuples of the two relations operated upon. CARTESIAN PRODUCT is denoted by X (cross). It is also called CROSS PRODUCT.

Sample Questions

1. Explain any three advantages of DBMS.

2. List and explain different users in DBMS.   (3 marks)   SAY 2018

3. Distinguish between the terms degree and cardinality used in RDBMS.

                                               (2 marks) MAR 2020

4. Define the term Data independence. Explain different levels of data independence.

5. Explain about UNION, INTERSECTION and SETDIFFERENCE Operations in Relational
Algebra.   (3 marks)   SAY 2019

6. Define the following terms

   a) Relation

   b) Candidate key

   c) Tuples and attributes   (3 marks)   MAR 2018

Chapter 9
Structured Query Language

Overview

This chapter introduces a language called Structrured Query Language (SQL) for doing the database operations such as creation of tables, insertion of data into a table, manipulating and deleting data in a table, modifying the structure of a table, removing a table etc.

> ### Focus Area
>
> SQL components, SQL data types, Constraints,
>
> Use of commands (DDL-create table, drop table; DML- select, delete, update with
>
> essential clauses only). **SQL queries are to be avoided.**

Structured Query Language (SQL) is a language designed for managing data in relational database management system (RDBMS).

Features of SQL:-
- It is a relational database language which is simple, flexible and powerful.
- It provides commands to manage tables inside the database.
- Also it provides security settings for databases.
- It provides the concept of views.

Data types in SQL

Numeric Data type	- INT or INTEGER: Represent integer numbers.
	- DEC or DECIMAL:Represent fractional numbers.
String	- CHAR- Represent fixed length character data type.
	- VARCHAR - Represent variable length character data type.
Date and Time	- Date: used to store date.Format is yymmdd
	- Time: used to store time.Format is hh:mm:ss

Components of SQL

SQL components are classified as DDL commands, DML commands and DCL commands.

DDL (Data Definition Language) commands include creation, modifications and removal of tables. DML (Data Manipulation Language) commands include insertion, retrieval, modification, updation and deletion of records.   DCL (Data Control Language) includes controlling the access of data.

DDL (Data Definition Language) – DDL component is dealing with schema (structure) definition of the RDBMS. DDL commands are used to create, modify and remove the database objects such as tables, views and keys

Some of the DDL commands are:

1)	**Create Command** **Create** is a DDL SQL command used to create a table or a database in relational database management system.
	To create a database in RDBMS, **create** command is used using the following syntax,
Syntax	CREATE DATABASE <data_base_name>;
	Create command can also be used to create tables.

Syntax	**CREATE TABLE** (column_name1 datatype1, column_name2 datatype2, column_name3 datatype3, column_name4 datatype4);
Example	CREATE TABLE student(student_id INT, name VARCHAR(100), age INT);
Syntax	CREATE TABLE table_name(column_name1 datatype1 <constraint>, column_name2 datatype2 <constraint>, …………………………….); **Column constraints:-** Constraints are the rules enforced on data that are entered into the column of a table. Column constraints are NOT NULL, AUTO_INCREMENT, UNIQUE, PRIMARY KEY, and DEFAULT. NOT NULL:- It specifies that a column cannot have null values. UNIQUE:- It specifies that no two rows have the same value for that column. PRIMARY KEY:- It specifies a column as the primary key of that table DEFAULT:- It specifies a default value for that column.
Example	CREATE TABLE student (roll_no INT PRIMARY KEY, name VARCHAR(30), mark INT);

2)	**Alter Table Command** alter command is used for altering the table structure, such as, to add a column to existing table to rename any existing column to change datatype of any column or to modify its size. to drop a column from the table.
Syntax	ALTER TABLE table_name ADD/MODIFY/RENAME/DROP(column_name datatype <constraint>);
Example	ALTER TABLE student ADD(address VARCHAR(200));
	ALTER TABLE student MODIFY(address varchar(300));
	ALTER TABLE student RENAME address TO location;
	ALTER TABLE student DROP(address);
3)	**Drop Table**
	DROP command completely removes a table from the database. This command will also destroy the table structure and the data stored in it. Following is its syntax
	DROP TABLE table_name;
Example	DROP TABLE student;

DML (Data Manipulation Language) – DML permits users to insert data into tables, retrieve existing data, delete data from tables and modify the stored data. Data Manipulation Language (DML) statements are used for managing data in database.

1	INSERT Command:- Insert command is used to insert data into a table. Following is its general syntax,
Syntax	INSERT INTO table_name VALUES(data1, data2, ...)
Example	INSERT INTO student VALUES(101, 'Anoop', 15);
	Insert value into only specific columns
Example	INSERT INTO student(id, name) values(102, 'Alex');
	Insert NULL value to a column
Example	INSERT INTO student VALUES(102,'Alex', null);

2)	SELECT command- SELECT query is used to retrieve data from a table. It is the most used SQL query. We can retrieve complete table data, or partial by specifying conditions using the WHERE clause.
Syntax	SELECT column_name1, column_name2, column_name3, ... column_name_N FROM table_name; (Instead of specifying all columns, WHERE condition; the symbol * can be used
	Selecting all columns using *
Example	SELECT *FROM student;
	Select a particular record based on a condition
Example	SELECT s_id, name, age FROM student;
	Eliminating duplicate values in columns using DISTINCT
Example	SELECT DISTINCT name FROM student;
	Performing Simple Calculations using SELECT Query
Example	SELECT eid, name, salary+3000 FROM employee;
	Selecting specific rows using WHERE clause
Example	SELECT s_id, name, age, address FROM student WHERE name = 'Anoop';
Example	SELECT * FROM student WHERE mark > 200;
	Sorting results using ORDER BY clause:
Example	SELECT * FROM student ORDER BY name;
	Grouping of records using GROUP BY clause:-
Example	SELECT name, count(*) FROM student GROUP BY mark;
	Operators for WHERE clause condition

	= !=	Equal to Not Equal to	< >	Less than Greater than	BETWEEN	Between a specified range of values
	>= <=	Greater than than or equal to Less than or equal to			LIKE	This is used to search for a pattern in value.
					IN	In a given set of values

3)	**UDATE Command:-** UPDATE command is used to update any record of data in a table. Following is its general syntax,
Syntax	UPDATE table_name SET column_name = new_value WHERE some_condition;
Example	UPDATE student SET age=18 WHERE student_id=102;
	Updating Multiple Columns
	UPDATE student SET name='Abhi', age=17 where s_id=103;
	Updating Multiple Rows
	UPDATE student SET age = age+1;

4)	**DELETE Command:-** DELETE command is used to delete data from a table.
Syntax	DELETE FROM table_name;
	Delete a particular Record from a Table
Example	DELETE FROM student WHERE s_id=103;

DCL (Data Control Language) – DCL includes commands that control a database, including administering privileges and committing data.

1	**GRANT, REVOKE Command:-**
Syntax	**GRANT** Gives a privilege to user
	REVOKE Takes back privileges granted from user.

SQL functions (Aggregate functions):-
　　　　Aggregate functions are built in functions applied to all the rows in a table or to a subset of the table specified by a WHERE clause. Important aggregate functions are the following.

Function	Return value	Example
SUM( )	Total of the values in a column	SELECT SUM(mark) FROM student;
AVG( )	Average of the values in a column	SELECT AVG(mark) FROM student;
MIN ( )	Smallest value in a column	SELECT MIN(mark) FROM student;
MAX( )	Largest value in a column	SELECT MAX(mark) FROM student;
COUNT( )	Number of non NULL values in a column	SELECT COUNT(*) FROM student;

Sample Questions
1) Write short note about numeric and string data types of SQL.   (3 marks)   MAR 2020
2) Explain any two constraints used in SQL   (2 marks)   MAR 2019
3) Explain about different components of SQL.   (3 marks)   SAY 2019
4) Write short notes on any three data types in SQL.   (3 marks)   MAR 2018
5) Differentiate DELETE and DROP in SQL. Write the syntax of DELETE and DROP.
　　　　(3 marks) MAR 2018

6) Which command is used to delete the table?   (1 mark)   SAY 2017

7) Differentiate between CHAR and VARCHAR data types in SQL . (3 marks)   SAY 2017

8) Name the appropriate SQL datatypes required to store the following data

a) Name of a student (Maximum 70 characters)

b) Date of birth of a student

c)Percentage of marks obtained (correct to two decimal places)   (3 marks)SAY 2017

9) Distinguish between DDL and DML and give examples for each. (5 marks) MAR 2O16

10) Null values in tables are specified as " null ". State whether true or false.

(1 mark)   MAR 2O16

11) ………………. keyword is used in SELECT query to eliminate duplicate values in a column.

(a) UNIQUE

(b) DTSTINCT

(c) NOT NULL

(d) PRIMARY KEY   (1 mark)   MAR 2O16

12) Which constraint in MYSQL specifies that a column can never has a null value

(a) UNIQUE

(b) DEFAULT

(c) NOT NULL

(d) PRIMARY KEY   (1 mark)   MAR 2O16

13) Write short notes on commonly used numeric data types in SQL.

(2marks)   MAR 2O16

Chapter 10
SERVER SIDE SCRIPTING USING PHP

Overview

This chapter mainly deals with the server side scripting using PHP and see how we can embed a PHP code into HTML.

Focus Area

echo Vs. print, PHP data types, Operators and control structures

---

PHP stands for PHP Hypertext Preprocessor. Earlier version of PHP was known as Personal Home Page.

PHP is a HTML embedded language that runs on a web server.

Combining HTML and PHP:-

We can write PHP code in between HTML code using "<?php" and "?>"

```
<html>
<body>
<?php
echo "Welcome to PHP programming!";
?>
</body>
</html>
```

OUTPUT

Welcome to PHP programming!

Output statements in PHP:-

echo and print:-

Both are used to display all types of data, but multiple outputs can be produce using echo command.

To demonstrate use of echo & print in PHP:-   **OUTPUT**

```
<?php
echo "Welcome to PHP <br>", "Welcome to web programming";
print "Welcome to PHP";
?>
```

Welcome to PHP
Welcome to programming!
Welcome to PHP

echo	print
Can take more than one parameter when used without paranthesis.	Takes only one parameter.
Does not return any value.	Returns True or 1 on successful output, and False or 0 if it was unable to print the string.
Little faster than print.	Little bit slower than echo.

Data types in PHP:-
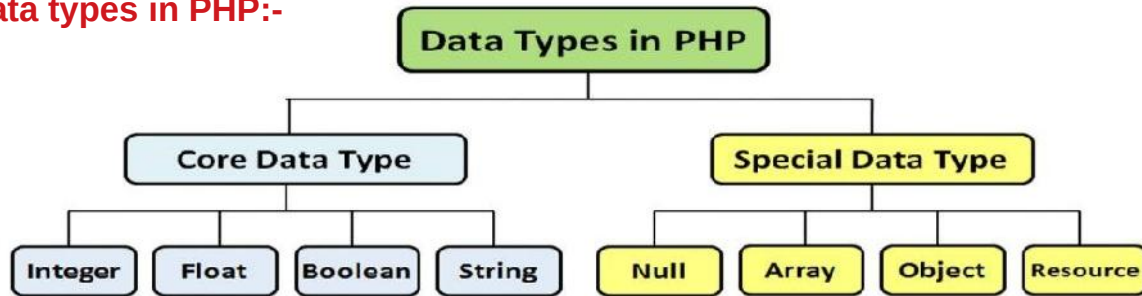
Core data types:

Integer	-32, 32, 986 etc.
Float/Double	123.56, 5.6, 1.2e3, 7E-10 etc.
String	"Apple", 'PHP' etc.
Boolean	A Boolean data type can represent Boolean values like, yes/no, on/off, 1/0, true/ false etc.

Special data types:

Null:- Null variable can only have the value NULL.

Array:-Array element has a key and a value.

Object:- An object can contain variables and functions.

Resource:-Resources hold references to file handler, data base object etc.

Operators in PHP

Sl. No.	Types	Operators	Example	Result
1	Assignment Operator	=	$a=5; $b=2; $c=3;	a=5, b=2, c=3;
2	Arithmetic Operators	+ - * / %	$a+$b;	7
3	Relational Operators	< <= > >= == !=	($a>$b)	True
4	Logical Operators	|| or && and ! xor	($a>$b) &&($a>$c)	True
5	String Operators	.	$a = "Hello"; $b = " World"; $c = $x.$y;	Hello World
6	Combined Operators	+= −= *= /= %= .=	$a+=5;	10
7	Increment and decrement operators	++ --	echo ++$a;	6
8	Escape sequences	\"" \' \n \t \r \$ \\	echo "Hello\nWorld"	Hello World

Control structures in PHP

(a) Conditional Statements in PHP

(b) Loops in PHP

(a) Conditional Statements in PHP

if / switch Statements	Syntax	Example	Result
if statement :- if statement checks the expression and if it is true, the statement is executed.	if (test_expression) statement;	$a=5; $b=2; if($a>$b) echo "a is bigger"	a is bigger
else statement:- If the condition is false, else statement is executed.	if (test_expression) statement_1; else statement_2;	$a=5; $b=12; if($a>$b) echo "a is bigger" else echo "b is bigger"	b is bigger
else-if statement:- Another if condition can be given in the else statement.	if (test_expression1) statement_1; else if (test_expression2) statement_2; ……………………………….. ……………………………….. statement_n;	$a=5; $b=5;; if($a>$b) echo "a is bigger" elseif($b>$a) echo "b is bigger" else echo "Both are equal"	Both are equal
switch statement:- Multiple if statements can be written using switch statement. In PHP, strings can be used as case identifiers.	switch(variable / expression) { case value1: statement1; break; case value2: statement2; break; ……………………………... default: statement; }	$num=2; switch($num) { case 1: echo "ONE"; break; case 2: echo "TWO"; break; default: echo "Incorrect choice"; }	TWO

(b) Loops in PHP

Loops	Syntax	Example	Output

while loop:- the body of while loop will be executed as long as the condition is true.	initialization;
	while(condition)
	{
	body of loop;
	increment;
	}
		$i=5;
		while($i>=1)
		{
		echo $i;
		$i--;
		}
			5
			4
			3
			2
			1

do-while loop:- The loop body will be executed at least once and then the loop will be repeated if the condition is true.	initialization; do { body; increment; } while (condition);	$i=1; do { echo $i; $i++; } while($i<=5);	1 2 3 4 5
for loop:- the body of for loop will be executed as long as the condition is true.	for(initialization; condition; increment) body of loop;	for($i=1; $i<=5; $i++) echo $i;	1 2 3 4 5

SAMPLE QUESTIONS

1. Differentiate echo and print used in PHP.　　　　　　　　(2 marks) MAR 2020
2. In PHP the name of the variable starts with …….. sign.　　(1 mark)   JUN 2OI9
3. Prepare short notes on different data types in PHP.　　　　(3 marks) JUN 2OI9
4. List the core data types in PHP.　　　　　　　　　　　　(2 marks) MAR 2OI9
5. What is the difference between echo and print used in PHP.　(3 marks) MAR 2OI8
6. Discuss about operators used in PHP.　　　　　　　　　　(5 marks)
7. Writes short notes on control structures in PHP　　　　　(5 marks)
8. Discuss about special data types in PHP.　　　　　　　　(2 marks) MAR 2OI7

CHAPTER 11
ADAVANCES IN COMPUTING

Overview

In this chapter we have a brief understanding about the advanced concepts and technologies of computing.

> ## Focus Area
>
> Serial Vs. parallel computing, Cloud computing and three services,
>
> Appliations of computational intelligence, -listing only

Distributed Computing

It is a method of computing in which large problems are divided into many small problems.

These are distributed to many computers in a network.

Advantages: Economical,   Speed,   Reliability,   Scalability.
Disadvantages: Complexity,   security,   Network reliance

Types of Distributed Computing

Advanced computing paradigm includes parallel computing, cluster computing, grid computing, cloud computing, etc.

Serial Vs. Parallel Computing

Parallel Computing	Serial Computing
Single processor is used	Multiple processors are used
A problem is broken into a discrete series of instructions	A problem is broken into discrete parts that can be solved concurrently
Instructions are executed sequentially one after another.	Instructions from each part execute simultaneously on different processors
Only one instruction is executed on a single Processor at a time.	More than one instruction is executed on multiple processors at any moment of time.

Advantages of parallel computing:
1. Fault tolerance
2. Share the computing resources in the system with other users.
3. Load sharing-Distributing several tasks to different nodes.
4. It is easily expandable and scalable.

Disadvantages of parallel computing:
1. More complex than serial computing.
2. A program ported to a different computer changes made the program to run.

Cloud computing:

Cloud computing is the use of computing resources that resides on a remote machine and are delivered to the end users as a service over network.

It uses Internet and central remote servers to maintain data and applications.

Cloud service models
    1.SaaS(Software as Service)
    2.PaaS(Platform as Service)
    3.IaaS(Infrastructure as Service)

1.SaaS:
    A SaaS provider gives subscribers access to both resources and applications as a service on demand.
    Adobe, Microsoft, facebook.com etc
2.PaaS:
    A PaaS provider gives subscribers access to the components that they require to develop and operate applications over the Internet,
    Google's App Engine, Microsoft Azure, Force.com
3.IaaS: It deals primarily with computational infrastructure. IaaS provides basic storage and computing capabilities as standardized services over the network.
    Amazon Web Services, Joyent, AT & T,Go Grid.

Advantages of Cloud computing:
    1. Cost savings   2. Scalability/Flexibility   3.Reliabilty:
    4. Maintenance: 5.Mobile accessible:
Disadvantages: 1.Security and privacy: 2.Lack of standards.

Computational Intelligence(CI)
    Computational Intelligence (CI) is the study of algorithms to facilitate intelligent behavior in complex and changing environment so as to solve real life problems.
Paradigms of CI: -   a) Artificial Neural Networks (ANN) b) Evolutionary Computation (EC)
                c) Swarm Intelligence (SI)   d) Fuzzy Systems (FS)

Applications of Computational Intelligence
    Some of the latest applications of computational Intelligence are:
a) Biometrics
b) Robotics
c) Computer vision
d) Natural Language Processing
e) Automatic Speech Recognition
f) Optical Character Recognition and handwritten Character Recognition Systems
g) Bioinformatics
h) Geographic Information System
a) Biometrics:
    Biometrics refers to metrics (measurements) related to human characteristics and traits like finger print, palm veins, face, hand geometry, iris, retina, scent etc.
b) Robotics:
    Robotics can be defined as the scientific study associated with the design, fabrication, theory and application of robots.
c) Computer vision:
    Computer vision is concerned with the theory and technology for building artificial systems that obtain information from images or multi-dimensional data.
d) Natural Language processing (NLP):

Natural language processing is the branch of computer science focused on developing systems that allow computers to communicate with people using any human language such as English, Malayalam etc.

e) Automatic Speech Recognition (ASR):

This system allows a computer to identify the words that a person speaks into a microphone or telephone and convert it into written text.

f) Optical Character Recognition(OCR) and Handwritten Character Recognition Systems(HCR):

OCR and HCR is used for pattern recognition. ,**OCR** converts the scanned images of printed text (numerals, letters or symbols) into computer processable format.

g) Bioinformatics:

Bioinformatics is the application of computer technology to the management of biological information.

h) Geographic Information System (GIS):

Geographic Information System(GIS) technology is developed from digital cartography and Computer Aided Design(CAD) database management system.

Sample Questions

1. What do you mean by GIS?
2. What is NLP?
3. Compare parallel and serial computing　　　　　　　　　(2 marks) SAY 2018
4. What is Computational Intelligence?
5. Briefly explain different types of cloud services.　　(3 marks) MAR 2018, 2019, 2020
6. Briefly explain any three applications of computational intelligence.(2 marks) SAY 2018

CHAPTER 12
ICT AND SOCIETY

Overview

Information Communication Technology(ICT) has become a part of our life by making it simpler. Internet became the largest communication media. In this chapter, we discuss about various ICT services, their benefits and challenges, cyber space, cyber crimes and cyber ethics.

Focus Area

Applications of ICT – Education, Business, Governance.
Cyber Crimes against individuals.

ICT Services	1. e-Governance 2. e- Business 3. e- Banking 4. e-Learning
Types of Interactions in e-Governance	1. Government to Government (G2G) 2. Government to Citizens (G2C) 3. Government to Business (G2B) 4. Government to Employees (G2E)
e-Governance infrastructure	In India, the e-Governance infrastructure mainly consists of State Data Centers (SDC) for providing core infrastructure and storage, State Wide Area Network (SWAN) for connectivity and Common Service Centers (CSC) as service delivery points.

e-Business	The sharing of business information, maintaining business relationships and conducting business transactions by means of the ICT application.
Electronic Payment System (EPS)	A system of financial exchange between buyers and sellers in an online environment.

e-Banking	Also known as electronic banking is defined as the automated delivery of banking services directly to customers through electronic channel.

e-Learning	The use of electronic media and ICT in education is e-learning
e-Learning tools	Electronic books reader (e-Books), e-Text, Online chat, e-Content, Educational TV channels.

Cyber Space	A virtual environment created by computers systems connected to the internet.
Cyber Crime	A criminal activity in which computers or computer networks are used as tools, target or place of criminal activity. Cyber crimes are classified into cyber crime against – individual, property, government.

Cyber crimes against individuals	• **Identity theft** occurs when someone uses another person's identifying information, like their name, credit card number, etc. without their permission to commit fraud or other crimes. • **Harassment** means posting humiliating comments focusing on gender, race, religion, nationality at specific individuals in chat rooms, social media, e-mail, etc. is harassment. • **Impersonation and cheating:** Impersonation is an act of pretending to be another person for the purpose of harming the victim. • **Violation of privacy:** Violation of privacy is the intrusion into the personal life of another, without a valid reason. • **Dissemination of obscene material:** Hosting website containing prohibited materials, use of computers for producing obscene material, downloading obscene materials through the Internet, etc.

Sample Questions

1. An educational channel of Kerala Government is _____

2. ICT stands for _____.

3. Which of the following e-Governance helps citizens for interacting with the Government?

    G2E b. G2B c. G2C d. G2G

4. "For the implementation of e-Learning different tools are used". List any
    four e-Learning tools.

5. Define the following terms.
    a) Cyber space
    b) Cyber crime

6. "Due to anonymous nature of Internet it is possible for the people to engage in variety
    of criminal activities." Justify the statement with special reference to cyber crimes
    taking place against individual.

7. Which among the following are considered as violation to privacy?
    1) Keeping hidden cameras in private places
    2) Publishing private photos of individual in social media without their permission
    3) Use of unauthorized software
    4) Using simple password

8. Textual information available in electronic format is called ---------------

    (SAY 2017)

9. What are the different types of interaction between stakeholders in e-Governance?

    (Feb 2018)

43

10. What is Electronic Payment System ?   (Feb 2019)

11. Describe any three cyber crimes against individuals.   (Feb 2019)

12. List and explain any three e-learning tools .   (Mar 2019)

13. Define the following cyber crimes   (Mar 2018)

    (a) Identity Theft (b) Harassment (c) Impersonation and cheating

14. Briefly explain about any two e- learning tools   (SAY 2019)

15. What is e – governance ? List the different types of interactions in e governance

                                                             (SAY 2019)

16. How does ICT help students in learning ?   (Mar 2018)

GENERAL EDUCATION DEPARTMENT

SAMAGRA SHIKSHA, KERALA