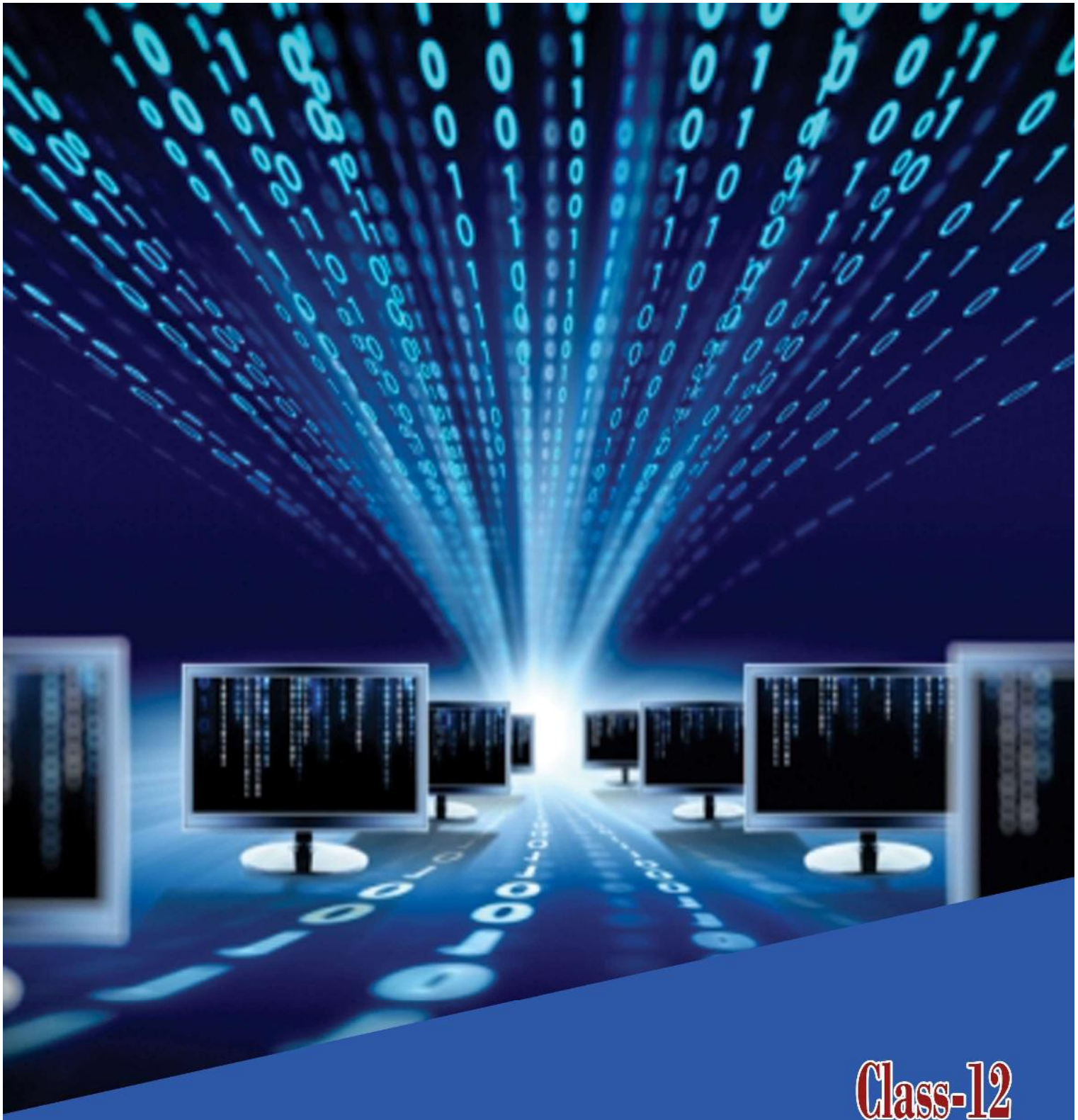


Class-12

COMPUTER APPLICATION

(Commerce)

GENERAL EDUCATION DEPARTMENT

SAMAGRA SHIKSHA, KERALA

Chapter 1
Review of C++ Programming

Overview

This chapter gives an idea about C++ programming. Here the basic elements of C++ language like character set, tokens, definition of data type and various control statements are discussed. This chapter helps us to develop simple programming and logical skills.

Basics of C++

The basic elements of C++ language are discussed below

Character set

It is the fundamental unit of C++ language. The characters are classified into letters (a-z, A-Z), digits (0-9), special characters (# , ; { } etc.), white spaces (space bar, tab , new line) and some other characters (ASCII code 0-255).

Tokens

Tokens are the basic building blocks of C++ programs, constituted by one or more characters.

1. Keywords	Reserved words that convey specific meaning to the C++ compiler. Example: int, float ,for ,while etc.
2. Identifiers	User defined words that are used to name different program elements such as memory locations, functions, statements, objects etc. Identifiers include variables, labels, function names etc. Example. Mark1, Count, Sumof2numbers, avg_height etc.
3. Literals(Constants)	Tokens that do not change their value during program run. Classified into • Integer constants Example: 453 , 1776 , -78 ,+235 • Floating point constants Example: -743.8, 212E04,34.0, 152E+8 • Character constants Example: 'z','A','7','\n' • String constants. Example: "hello", "123", "C++"
4. Operators	Operators are the symbols used for doing some operation like addition, subtraction, multiplication etc. **1)** Arithmetic operators: + , - ,* , / .% **2)** Relational operators : < , <= , > , >= ,== , != **3)** Logical operators: && , | | , ! **4)** other operators are input operator(get from operator) >> output operator(put to operator) << assignment operator = increment /decrement operator ++ , - - arithmetic assignment operators(+= ,- =,*=,%=,/=)
5. Punctuators	Special characters like comma(,), semi colon (;), hash(#), braces ({ })etc. are used for the perfection of syntax of various constructs of the language used in programs.

Tokens in C++ are Keywords, Identifiers, Literals, Operators and Punctuators.

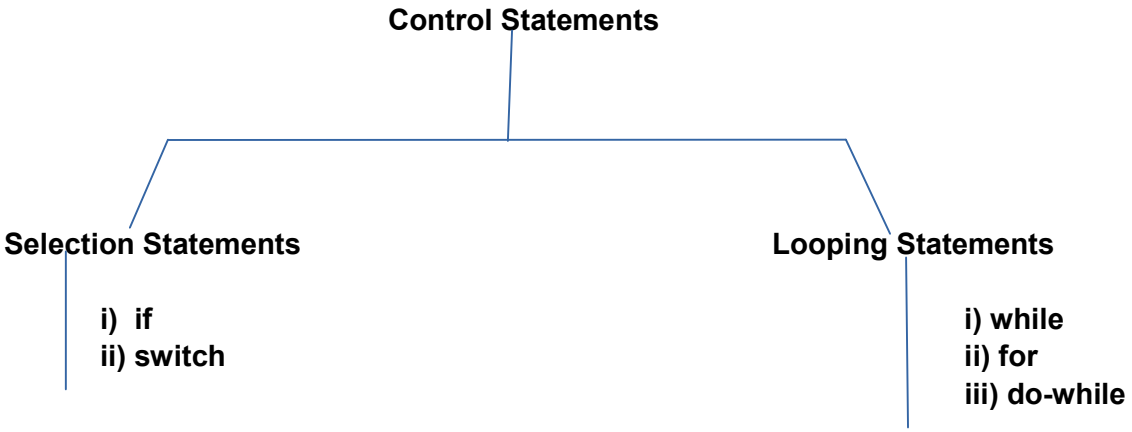
Data Types

These are the means to identify the type of data and the set of operations that can be handled by that data. Data types are classified into fundamental data types, derived data types and user defined data types. Fundamental data types include int, char, float, double and void.
Examples of derived data types are array, pointers, functions etc.
Examples of user defined data types are structure (struct), enumeration (enum), union, class etc.

Control statements

Control statements are used for altering the flow of the program based on the need. These are classified into two.

1. Selection statements (Decision making or condition statements)
2. Looping statements (Iteration statements)



Selection statements		
	Syntax	**Working**

if	if(test expression)
	{
	statement block;
	}
		If the test expression (condition) evaluates to true then the statement block is executed.

If-else	if(test expression)
	{
	statement block1;
	}
	else
	{
	statement block2;
	}
		If the test expression (condition) evaluates to true then the statement block1 is executed. If the condition is false then statement block2 is executed.

if-else if	if(test expression1)
	  statement block1;
	else if(test expression2)
	  statement block2;
	else if(test expression3)
	  statement block3;
	---------- 	
	else
	  statement block n;
		It is a multi-branching statement. If test expression 1 evaluates to true statement block1 is executed and the control comes out of the ladder. Otherwise test expression 2 is evaluated and so on. If it is true statement block 2 is executed and the control comes out of the ladder. If all the test expressions are evaluated to false then statement block n in the else block is executed.

switch	switch(expression)
	{
	  case constant1 : statement block1;
	  break;
	  case constant1 : statement block2;
	  break;
	  case constant1 : statement block3;
	  break;
	---------- 	
	  default : statement block n;
	}
		switch , case , break and default are keywords. The expression is evaluated to get an integer or character constant and when a match is found, the statement block associated with that case is executed until the break statement or the end of switch statement is reached. If no match is found, the statements in the default block get executed. The default statement is optional and if it is missing, no action takes place when all matches fail.

Comparison between switch and if- else if statements

Switch	if-else if
1. Only equality conditions are checked 2. Program control goes outside the block only if break is used after each case 3. default case is for an action where all the conditions fail	1. Any relational expression can be used for conditions 2. No need of break statement to take the control outside after executing a block 3. else is used for an action where all the conditions fail

Elements (components) of looping statements

Four elements

1. **Initialization:** The loop control variable (Variable used in the condition) gets its first value. The initialization statement is executed only once, at the beginning of the loop.

2. **Test expression:** It is a relational or logical expression whose value is either true or false. It decides whether the loop-body will be executed or not. If the test expression evaluates to true, the loop-body gets executed, otherwise it will not be executed.

3. **Update statement**: The update statement modifies the loop control variable by changing its value. The update statement is executed before the next iteration.

4. **Body of the loop**: The statements that need to be executed repeatedly constitute the body of the loop.

Looping statements (Iteration statement)		
	Syntax	**Working**

while	initialization of loop control variable;
	while(test expression)
	{
	body of the loop;
	updating of loop control variable ;
	}
		It is an entry-controlled loop. The condition is checked first and if it is True the body of the loop will be executed. That is the body will be executed as long as the condition is True

for	for(initialization;test expression;update statement)
	{
	body of the loop;
	}
		It is also an entry controlled loop. Three loop elements are placed together in for loop statement. At first, the initialization takes place and then the test expression is evaluated. If its result is true, body of the loop is executed. Otherwise the program control goes out of the for loop. These three steps (test, body, update) are continued until the test expression is evaluated to false.

do-while	initialization of loop control variable; do { body of the loop; updating of loop control variable; } while(test expression);	It is an exit controlled loop. Here the test expression is evaluated only after executing the body of the loop. After that the test expression is evaluated. If it is true the loop body is again executed, otherwise the control goes out of the loop.

Entry controlled loop	Exit controlled loop
In this case body of the loop will be executed only after the test expression is evaluated to true.	In this case the test expression is evaluated only after executing the loop body.
Example: for and while	Example: do-while

Self-assessment questions

1. ---------- are the basic building blocks of C++.
2. Pick the odd one from the following.
   a) Operators b) Punctuators c) Data types d) Literals
3. ..... is an exit controlled loop.
   a) for loop b) while loop c) do ...while loop d) break
4. Identify the following C++ tokens.
   (a) "Welcome" (b) int (c) ; (d) ++
5. Which one of the following is NOT an iteration statement in C++?
   a) while b) continue c) for d) do ... while
6. Which of the following is not a character constant in C++?
   a) 'C' b) '2' c)'\n' d)'t6'
7. Which selection statement tests the value of a variable or an expression against a list of integer or character constants?
   a) for b) if c) switch d) Conditional expression
8. What are the main components of a looping statement?
9. Match the following

A	B	C
switch	Looping statement	Multiple branching
for	break is used	Selection statement
If-else if	Equality checking	All the three elements are placed together

10. Define data types and list the name of fundamental data types in C++.
11. Differentiate entry controlled loops and exit controlled loops.
12. Write the comparison between switch and if-else if statements.
13. a) Name the type of loop which can be used to ensure that the body of the loop will surely be executed at least once.
    b) Write the syntax of for and while loops.
14. Explain the working of switch statement.

Chapter 2
Arrays

Overview

This chapter introduces a derived data type named 'array'. The word array is a kind of data type derived from other data types to handle large number of data easily. Here we discuss the creation and initialization of arrays, accessing of array elements, string handling and I/O functions to handle strings.

Array and its need

An array is a collection of elements of same type placed in contiguous memory locations. Arrays are used to store a set of values of the same type under a single variable name. Each element in an array can be accessed using its position in the list called index value or subscript. In C++array index starts with 0(zero). If we want to store more than one values of same type in a single variable, we use arrays. Example, if we want store the mark of 50 students, we can use arrays.

Declaring arrays

The syntax for declaring an array in C++

data type array_name [size];	Here data type is the type of data that the array variable can store, array_name is an identifier for naming the array and size is a positive integer that specifies the number of elements in the array.
Example: int mark[50];	Here mark is an array and it can store 50 integer values. The index (subscript) values are between 0-49. mark[0] represents the 1st element, mark[1] 2nd element, mark[2] 3rd element and so on mark[49] represents the last element.

Memory allocation for arrays

The memory space allocated for an array can be computed using the following formula:

Total bytes = size of (array type) X size of array

For example, total bytes allocated for the array

int mark[50]; will be,

total bytes = 4 X 50 = 200 bytes

Array initialization

Array elements can be initialized in declaration statements using { } braces.

Example:

int a[7] = { 55,67,23,11,44,32,65 };	Here a[0]=55, a[1]=67 , a[2]=23, a[3]=11, a[4]=44, a[5]=32, a[6]=65
float avg[4]={89.56, 45.90 ,55.00,99.45};	Here avg[0]=89.56 ,avg[1]=45.90 ,avg[2] =55.00, avg[3]=99.45
int height [ ]={154,153,167,172};	Here size is not declared and four elements are stored in this array. So the size is 4

Accessing array elements

The array elements can be easily accessed using for loop.

Example:

```
int mark[50];
for(int i=0; i<50;i++)
   cin>>mark[i];
```

These elements can be displayed using the output statement as shown below

```
for(int i=0; i<50;i++)
  cout<<mark[i];
```

Accessing each element of an array at least once to perform any operation is known as ***array traversal.***

Memory allocation for strings

A character array can be initialised as follows

```
char s1[7]="Ammu";
```

Here the string "Ammu" has 4 characters and at the end of this string a'\0' (null character) is stored as the delimiter. ie.

A	m	m	u	\0		
0	1	2	3	4	5	6

For storing the above string 5 memory locations are allocated and the last 2 left unused.
So the memory required to store a string = No. of characters + null character('\0').

String handling using arrays

A character array can be used to store a string, since it is a sequence of characters. The array **char str[10] ;** can store a string of 9 characters. At the end of the string a '\0' is stored as string terminator.

In the above string array a string can be input using the statement

```
cin>>str;
```

This statement can store a string without any white space (that is only one word).

For example if we input a string named Sachin Tendulkar, only Sachin is stored in the memory. Because using cin, space is considered as the delimiter. If we want to input a string containing white spaces C++ provide a console function named **gets( );**. We can also use the stream functions gets() and getline().

Syntax

gets (character_array_name);

Example:

```
char str[20];
gets(str);
cout<<str;
```

While executing this statement we get the output: Sachin Tendulkar.

C++ gives a console function named **puts( )** to output string data. The function puts() is a console output function used to display a string data on the standard output device(monitor).

Example:

```
char sname[10];
gets(sname);
puts(sname):
```

Self-assessment questions

1. Write the syntax for declaring an array.
2..... is a concole output function used to display a string data on the standard output
device (monitor).
3. An array element is accessed using .....
4. Identify the last index of the array float p[8] ; from the following choices
a) 7 b) 8 c) 0 d) 9
5. Consider the array int a[20]; Write the first and last index values.
6. Outputting the elements of an array is an example for ……...operation
7. Consider the array initialization int mark[5]={ 30,40,50,60,70}; What is the value of mark[3]?
8. How memory is allocated for a float array?
9. Write the initialization statement to store the string “WELCOME”.
10. Define an array. Give an example of an integer array declaration.
11. Write array declarations for the following.
a) To store the heights of 50 students in your class.
b) To store your name
c) To store all odd numbers between 2 to 20

12. A student used two different statements for reading a string “Sachin Tendulkar” as follows
In both cases the string is printed. Compare the outputs and give reason.

Method1	**Method2**
char str[20];	char str[20];
cin>>str;	gets(str);
cout<<str;	cout<<str ;

13. Consider the following C++ code

```
char text[20];
cin≫text;
cout≪text;
```

If the input string is “Computer Programming”; what will be the output? Justify your answer.

Chapter 3
Functions

Overview

In this chapter we are going to learn how large programs are divided into smaller sub-programs for making program development easier. It also saves time and effort to develop large programs.

Modular Programming / Modularization

The process of breaking up large programs into smaller sub-programs.

Merits/Advantages of modular programming.

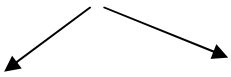
1. It reduces programming complexity
2. It improves reusability
3. It reduces errors
4. It reduces the size of the program

Demerits/Disadvantages of modular programming

1. Breaking the problems into sub-problems is a difficult task.
2. Each sub-problem must be independent of others.

Function – It is a named group of program statements that will do a specific task.

Functions



Pre-defined Function
(Sub-programs that are ready to use.)

User-defined Function
(Sub-programs written by the user.)

Pre-defined /Built-in function	User-defined function
*Commonly used sub-programs. Example: To find square root of a number. *Ready to use sub-programs. *They are already written, debugged, compiled and stored in header files.	*Sub-programs as per the requirement of the user. Example. To calculate simple interest. *Should be declared, defined and called by the user. *They are written, debugged and compiled by the user.

Pre-defined Functions

	Header File	Name of the function	Explanation
Console functions for Character I/O	cstdio	getchar()	To accept a character input through the keyboard.
		putchar()	To display the given character on the monitor

Stream I/O functions	iostream	**Input Functions** Allows a stream of bytes to flow from input object (cin) into the memory	To accept a single or multiple characters through the keyboard.
		get()	
		getline()	To accept multiple characters(string)
		Output Functions Allows a stream of bytes to flow from memory into an output object(cout)	
		put()	To display a character on the monitor
		write()	To display the given string on the monitor
String Functions	cstring	strlen()	To find the length (number of characters) in the string. Example: strlen("Plustwo"); Output is 7
		strcpy()	To copy one string into another.
		strcat()	To append (join) one string to another. Example: strcat("Hello","Students"): Output is Hello Students
		strcmp()	To compare two strings alphabetically.
		strcmpi()	To compare two strings alphabetically ignoring cases. Example:strcmpi("hai","HAI"); output is 1(True) Ie., both are same.
Mathematical Functions	cmath	abs()	To find the absolute value of an integer. Example: abs (10) Output is 10. abs (-10) Output is 10.
		sqrt()	To find the square root of the given number. Example : sqrt(25) Output is 5
		pow()	To find the power of a number. Example:pow(5,2) Output is 25.
Character Functions	cctype	isupper()	To check whether the given character is in upper case or not. Example: isupper('H'); Output is 1(True) isupper('h'); Output is 0(False)
		islower()	To check whether the given character is in lower case or not. Example: islower('h'); Output is 1(True) islower('H'); Output is 0(False)
		isalpha()	To check whether the given character is an alphabet or not. Example: isalpha('h'); Output is 1(True) isalpha('4'); Output is 0(False)
		isdigit()	To check whether the given character is a digit or not. Example: isdigit(4); Output is 1(True) isdigit(h); Output is 0(False)

		isalnum()	To check whether the given character is an alphanumeric or not. Example: isalnum('h'); Output is 1(True) isalnum('4'); Output is 1(True) isalnum('-'); Output is 0(False)
		toupper()	To convert the given character to upper case. Example: toupper('h'); Output is H
		tolower()	To convert the given character to lower case. Example: tolower('H'); Output is h

User-defined functions

Arguments/Parameters: Values given to a function for processing are called Input arguments/Input Parameters.

Formal arguments: The arguments used in the function definition.
Actual Argument: The arguments used in a function call statement.

A function can have more than one input arguments.
After processing, a function can either return no value(void) or only one value.

Two methods of calling a function.

Call by value	Call by reference
Separate memory space is allotted for each formal arguments	Both formal and actual arguments share the same memory location.
The changes made in the formal arguments do not reflect in actual arguments	If changes are made in the formal arguments , they are reflected in actual arguments also.
Ordinary variables are used as formal arguments	Reference variables are used as formal arguments
Actual argument can be a constant, variable or an expression.	Actual arguments can only be variable.

Self-assessment questions

1. Name the mathematical function that returns the absolute value of an integer number.
2. Explain any two built-in functions in C++ that are used for string manipulation.
3. The process of breaking large programs into smaller sub-programs is called _____
4. Identify the built-in C++ function for the following cases:
   i. to convert -25 to 25.
   ii. Compare "computer" and "COMPUTER" ignoring cases.
   iii. To check the given character is a digit or not.
   iv. To convert the character 'B' to 'b'.
   v. to find the square root of 64 or a number.

5. Define built in functions. Give two examples.

6. Difference between global and local variable.

7. Explain three string functions in C++.

8. Explain two stream functions for input operation with example.

9._____function is used to check whether a character is alphanumeric.

a. isdigit( ) b. isalnum( ) c. isupper( ) d. islower( )

10. a. Define modular programming.

b. Explain the merits of modular programming.

11. Differentiate actual argument and formal argument in C++.

12. Compare call-by-value and call-by-reference methods for calling functions.

13. What will be the result of following C++ statements?

a. strlen(“Applications”);

b. pow(5,3);

14. The data required for a function to perform the task assigned to it are called as _____.

15. Distinguish getchar() and putchar() in C++.

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.

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 <u>underline</u> 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 $_{\text{subscripted}}$
<SUP>	To make the text $^{\text{superscripted}}$
<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">

Self-accessment Questions

4. Face attribute is used with _____ tag.
5. _____ is the main attribute of <IMG> tag.
6. How will you distinguish a static web page from a dynamic web page? 2 marks MAR 2016
7. Categorize the following tags in HTML appropriately. (container tag and empty tag)
   < br> , < h1 > , < img > , < font >
8. What are the various types of scripting languages?
9. Explain about container tag and empty tag with example.
10. Name the attributes of <HTML> tag.
11. Explain the different attributes of <BODY> tag. 5 marks MAR 2019
12. Name some of the text formatting tags.
13. What are the main attributes of <MARQUEE> tag?
14. Write an empty tag used in HTML. 1 mark MAR 2020
15. Differentiate static and dynamic webpages 3 marks MAR 2020
    3 marks MAR 2019

16.

1. Explain about container tag and empty tag with an example 2 marks SAY 2019
2. Write IITML code to display the following in a web page

   A^3B_5

   x>y 2 marks SAY 2019
3. Which tag is used to insert an image into a web page? 1 mark SAY 2019

17. 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.

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.
Password box – To input passwords.
Option button (Radio button) – To select an item from a groups of options.
Checkbox – To select one or more items in a group.
List box – To select one or more items from list of items.
Text area – To input multi line text.
Submit button – To submit data to the Form handler.
Reset button – To clear the entries in the Form.

```
<html>
<body>
<form action="/action_page.php">
<input type="text" id="fname"
name="fname">
……..
<input type="submit"
value="Submit">
</form>
</body>
</html>
```

Self-assessment questions

1. Tag<A> is known as ..... tag.
2. Write the attributes of <OL>tag.
4. What are the common attributes of <UL> and <OL> tags?
5. What are the different kinds of lists available in HTML ? Briefly explain about the tags used for each kind. 3 marks MAR 2020
6. What is the difference between <UL> tag and <OL> tag?
7. Name the tags used in the definition list.
8. What is a hyperlink ? Explain about different types of hyperlinks available in HTML.
9. 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
10. The <DD> tag gives _____ 1 mark MAR 2016
11. 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
12. 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
13. 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.

<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

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");	
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);	

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;
	}

Self-assessment 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.

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.

Self-assessment 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.

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

1) Database administrator
2) Application Programmer
3) Sophisticated users
4) 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:

$\sigma_{condi\ ion}$ (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 ∪ . 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 ∩. 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.

Self-assessment question

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.
4. Define the term Data independence. Explain different levels of data independence.
5. Explain about UNION, INTERSECTION and SET DIFFERENCE 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.

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

Features of SQL:-

5) It is a relational databse language which is simple, flexible and powerful.
6) It provides commands to manage tables inside the database.
7) Also it provides security settings for databases.
8) 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	<	Less than	BETWEEN	Between a specified range of values
	!=	Not Equal to	>	Greater than		
	>=	Greater than than or equal to			LIKE	This is used to search for a pattern in value.
	<=	Less than or equal to				
					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;

Self-assessment question

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 2016
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 2016
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 2016
13) Write short notes on commonly used numeric data types in SQL.
(2marks) MAR 2016

Chapter 10
ENTERPRISE RESOURCE PLANNING (ERP)

Overview

An enterprise consists of a group of People (Man), Machines, Materials, Procedures (Methods), Capital (Money) which are working together for a common goal. Earlier days independently functioning sections (Departments) used individual software's/systems for information management. Because of this disintegrated information system, top management felt difficulty in decision making.

ERP SYSTEM: - A fully integrated business management system covering functional areas of an enterprise like finance, human resources, production, sales, and logistics etc. ERP replaces the old standalone computer systems used in different departments such as finance, human resource, manufacturing, sales, etc. Use of a centralized database as a central repository of data is the key element of an ERP system.

Common Functional Modules (Units) of an ERP System.

Financial module: - Collect financial data from various functional departments and generate valuable financial reports. This module also includes financial accounting, investment management, enterprise controlling and treasury.

Manufacturing module: - Provides information for the entire operation to be carried out for production.

Production planning module: - Identifies the materials required, allocates optimal resources using historical production and performs sales forecasting with the sales data.

HR module: - Maintains an updated and complete employee database including personal information, salary details, attendance, performance, promotion, etc. of all employees in an enterprise**.**

Inventory control module: - Responsible for identifying the inventory requirements, setting target, monitoring item usages, reporting inventory status, etc.

Purchasing module: - Generating purchase order for the supplier, evaluating the supplier, and billing etc. are made available in this module.

Marketing module: - For monitoring and tracking customer orders, increasing customer satisfaction and for eliminating credit risks.

Sales and distribution module: - Deals with important parts of a sales cycle. Sales cycle include inquiries, order placement, order scheduling, dispatching and invoicing.

Quality management module: - Focus on Quality planning, Quality inspection and Quality control.

Benefits of ERP system

1. Improved resource utilization
2. Better customer satisfaction
3. Provides accurate information
4. Decision making capability
5. Increased flexibility
6. Information integrity.

Risks involved in ERP implementation

1. High Cost
2. Time consuming
3. Requirement of technical staff
4. Operational and maintenance overheads and its cost

ERP Solution Providers / ERP Packages

Some of the popular ERP packages that are implement ERP system are given below.

Oracale: It provides strong finance and accounting module. It also provides good customer and supplier intraction, effective production analysis, efficent human resource management and better pricing module.

SAP: SAP stants for System Application and Products for data processing. SAP developed Customer Relationship Management(CRM), Supply Chain Management(SCM), and Product Life Cycle Management(PLCM) softwares.

Odoo: It is an open source ERP. The source code can be modified as necessary, based on the requirement of organisation.

Microsoft Dynamics: It provides a group of enterpize resource planning products aimed at midsized enterprises. It can be easly installed and provides good user interface.

Tally ERP: It is a businessaccounting software for accounting, inventory and payroll.

Self-assessment questions

1. Match the Following

A	B
a) BPR	Middle Level Managers
b) Odoo	Focus on Transformation
c) ERP	Senior Managers
d) MIS	focus on automation
e) DSS	Open Source ERP

2. What are the three elements of a Business Process?
3. Which one is conducted first in an organization-BPR/ERP?
4. PLC stand for _____.
5. List and explain any five functional components of ERP system.
6. What are benefits of an ERP system?
7. Briefly describe any two ERP related technologies.
8. What are the components of an ERP software?
9. List and explain the phases of ERP software package implementation.
10. Describe CRM.

CHAPTER 11
TRENDS AND ISSUES IN ICT

Overview

In this chapter, we discuss the different technologies and services in mobile communication. The various mobile operating systems are discussed with special focus on Android operating system. Intellectual properties like music, films, software, designs, etc. have also ownership rights. These rights are called Intellectual Property Rights (IPR) and the issues related to them are discussed in this chapter. Every technology has a dark side. Some people use internet for performing illegal activities called cybercrimes. Various types of cybercrimes and how we can safeguard ourselves in the Internet are also discussed.

Mobile Communication Services

Short Message Service (SMS)

a.Text messaging service in mobile communication systems.
b. Allows exchange of short text messages.
c. SS7 protocol is used.

Multimedia Messaging Service (MMS)

a. Allows exchange of multimedia content using mobile phones.
b. MMS supports contents such as text, graphics, music, video clips and more.

Global Positioning System (GPS)

a. Satellite based navigation system.
b. Used in vehicle tracking, oil exploration, atmospheric studies etc.

Smart cards

a. Plastic card embedded with a computer chip that stores and transacts data.
b. In mobile communication, the smart card technology is used in SIM.
c. It is secure, intelligent and convenient.

Mobile Operating System

a. An operating system used in a mobile device.
b. It manages the hardware, multimedia functions, Internet connectivity, etc.
c. Application programs run on this platform.
d. Example: Android from Google, iOS from Apple, BlackBerry OS from BlackBerry and Windows Phone from Microsoft.

Cybercrimes against individuals

a. Identity theft: information like name, credit card number, etc. without their permission to commit fraud or other crimes.
b. Harassment: Posting humiliating comments focusing on gender, race, religion, nationality at specific individuals in chat rooms, social media, e-mail, etc.
c. Impersonation and cheating: An act of pretending to be another person for the purpose of harming the victim.
d. Violation of privacy: The intrusion into the personal life of another, without a valid reason.
e. Dissemination of obscene material: Hosting website containing prohibited materials, use of computers for producing obscene material, downloading obscene materials through the Internet, etc.

Self-assessment questions

1. The protocol used to send SMS messages is _____.
2. Criminal activity using computer, mobile phone and Internet is termed as _____.
3. Stealing one's information such as username and password is _____.
4. Write a short note on Identity Theft.
5. What is a GPS?
6. Name the technology used to send multimedia content using mobile phones.
7. What are the functions of a mobile operating system?
8. What is cybercrime against a person?
9. _____ is a Linux based operating system?

    a) ios b) Blackberry c) Android d) Windows Phone (March 2016)

10. SIM stands for ……

    (a)Subscriber Information Module.

    (b)Subscriber Identity Module

    (c)Subscriber Identity Machine.

    (d)Subscriber Information Memory (Say June 2016)

11. What is Cyber Crime? Write a short note on any two cybercrimes against individuals. (Say June 2016)
12. GPS is useful for tracking vehicles by Transport Company. How is it possible? (Say June 2016)
13. Write short note on mobile operating system. (SAY 2018)
14. Define the following terms I. SIM II. MMS (SAY 2018)
15. Name the following: (March 2018)

    (a) Satellite based Navigation system

    (b)Service used to send messages with Multimedia content.

    (c) Packet oriented mobile data service on GSM

    (d) Smart card technology used only in GSM phone Systems

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GENERAL EDUCATION DEPARTMENT

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