

## Chapter 1

### Review of C++ Programming

- **Tokens:** Fundamental building blocks of a program.
- Five types of tokens: 1. Keywords 2. Identifiers 3. Literals 4. Punctuators 5. Operators
- 1. **Keywords:** Reserved words that convey a specific meaning to the compiler.
- 2. **Identifiers:** User-defined words used to name memory locations, functions etc.
- 3. **Literals/Constants:** Tokens that never change their value during the program run.  
Literals Classified into:
  - (i) **integer constants:** Tokens constituted only by digits.
  - (ii) **floating point constants:** Numbers having fractional parts.
  - (iii) **character constants:** Single character enclosed in single quotes.
  - (iv) **string constants:** Sequence of one or more characters enclosed in double quotes.
- 4. **Punctuators:** Special characters like comma (,), semi colon (;), hash (#), etc. that have syntactic or semantic meaning to the compiler.
- 5. **Operators:** Symbols that tells the compiler about a specific operation.  
They consist of arithmetic (+, -, \*, /, %), relational (<, <=, >, >=, ==, !=) and logical (&&, ||, !) operators.
- **Data types** define the size and the type of data a variable can store.
- Data types are classified into: **Fundamental data types** and **User-defined data types**.
- Fundamental data types in C++ are: **char, int, float, double and void**.

#### Control Statements

- **Control statements** are used for altering the normal flow of program execution.
- Control statements are classified into two:
  - (i) **selection statements:** Used to take decisions based on certain conditions. (if, switch)
  - (ii) **looping statements:** Used to perform repeated execution of a set of one or more statements. (while loop, for loop, do...while loop.)
- **Elements of a loop:** 1. Initialization 2. Test expression 3. Update statement 4. Body of the loop
- **Entry-controlled loop:** The condition is checked first and if it is True the body of the loop will be executed. Eg: for loop, while loop
- **Exit controlled Loop:** The condition is checked only after executing body of the loop.  
Eg: do...while loop

#### Nested Loops

- A loop placed inside another loop is called a nested loop.  
Eg: a 'for' loop inside a 'while' loop

## Chapter 2

### Arrays

- **Array** is a collection of elements of the 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.

#### Syntax for declaring an array:

```
data_type array_name[size];
```

Eg:- `int num[10]; //This array can store 10 integer numbers.`

#### Array initialisation

- Array elements can be initialised at the time of declaration, values must be included in braces.

Eg:- `int score[5] = {8, 7, 2, 9, 5};`

Here `score[0]` initialized to 8, `score[1]` initialized to 7,....., `score[4]` initialized to 5

#### Accessing elements of arrays

- An array element can be accessed by array name with index number.

Eg:- `cout << score[2]; // Prints 2`

- Elements of an array are easily accessed using a for loop.

Eg: `for(i=0; i<5; i++)`

```
    cout<<score[i]; // Prints 8 7 2 9 5
```

#### String handling using arrays

- **String** is a sequence of characters enclosed in double quotes. A **character array** can be used to store a string.

Eg:- `char my_name[10];` can store a string of 9 characters.

A **null character '\0'** is stored at the end of the string as **string terminator**.

- A string can be stored in the variable **my\_name** using the statement:

```
cin >> my_name;
```

The above statement can store a string without any white space. (i.e, if we input the string "Maya Mohan", only the first word "Maya" is stored.)

- **cin** cannot read string with white spaces, whereas **gets()** can read string with white spaces.

#### Input/Output functions to handle strings

- (i) **gets() function:** To input a string with white spaces. (i.e, if we input the string "Maya Mohan", the entire string "Maya Mohan" is stored.)

Eg: `gets(my_name);`

- (ii) **puts() function:** To output a string.

Eg: `puts(my_name);`

## Chapter 3

### Functions

- **Function** is a named unit of statements in a program to perform a specific task.
- Functions are classified into two: **Predefined functions** and **User-defined functions**.

#### Predefined functions

- **Predefined functions (built-in functions)** are readily available for use, and are stored in header files.

Predefined functions are classified into:

#### 1. Console functions for character I/O

The header file **cstdio** is to be included in the program to use these functions.

**i. getchar()** - To input a character.

Eg:- `char ch = getchar();`

**ii. putchar()** - To display the character given as the argument.

Eg:- `char ch = 'B';`  
`putchar(ch); //displays 'B' on the screen`

#### 2. Stream functions for I/O operations

The header file **iostream** is to be included in the program to use these functions.

##### A) Input functions

**i. get():** To input a single character or a string.

Eg:- `ch=cin.get(ch); //accepts a character and stores in ch`

**ii. getline():** To input a string.

Eg:- `cin.getline(str,10); // accepts a string of maximum 10 characters`

##### B) Output functions

**i. put():** To display a character given as argument.

Eg:- `char ch='c';`  
`cout.put(ch); //character 'c' is displayed`

**ii. write():** To display the string given as argument.

Eg:- `char str[10]="hello";`  
`cout.write(str,10); //display the string "hello"`

#### 3. String functions

Used for the manipulation of strings.

The header file **cstring** is to be included in the program to use these functions.

**i. strlen():** To find the length of a string (i.e., number of characters in the string).

Eg:- `n = strlen("Welcome"); //Stores 7 in n.`

**ii. strcpy():** To copy one string into another.

Eg:- `char str[10];`  
`strcpy(str,"Welcome");` // string constant "Welcome" will be stored in str.

**iii. strcat():** To append one string to another string.

Eg:- `char s1[20] = "Welcome", s2[10] = " to C++";`  
`strcat(s1,s2);`  
`cout << s1;` // will display "Welcome to C++"

**iv. strcmp():** Used to compare two strings.

The syntax is: `strcmp(string1, string2)`

**v. strcmpi():** Used to compare two strings ignoring cases. (i.e., the function will treat both the upper case and lower case letters as same).

#### 4. Mathematical functions

The header file **cmath** is to be included in the program to use these functions.

**i. abs():** Used to find the absolute value of an integer.

Eg:- `int n = -25;`  
`cout << abs(n);` //Returns 25.

**ii. sqrt():** Used to find the square root of a number.

Eg:- `sqrt(25);` //Returns 5.

**iii. pow():** Used to find the power of a number.

Eg:- `z = pow(4, 3);` //Returns 64. (i.e.,  $4^3 = 4*4*4 = 64$ )

#### 5. Character functions

The header file **cctype** is to be included in the program to use these functions.

**i. isupper():** Used to check whether a character is in upper case or not.

The function returns a +ve number if the character is in upper case, and 0 otherwise.

Eg:- `char c = 'A';`  
`int n = isupper(c);` //Returns a +ve number

**ii. islower():** Used to check whether a character is in lower case or not.

The function returns a +ve number if the character is in lower case, and 0 otherwise.

Eg:- `char c = 'A';`  
`int n = islower(c);` //Returns 0

**iii. isalpha():** Used to check whether the given character is an alphabet or not.

The function returns a +ve number if the character is an alphabet, and 0 otherwise.

Eg:- `int n = isalpha('3');` //Returns 0  
`int n = isalpha('a');` //Returns a +ve number

**iv. isdigit():** Used to check whether the given character is a digit or not.

The function returns a +ve number if the character is a digit, and 0 otherwise.

Eg:- `char c = 'b';`

```
int n = isdigit(c); //Returns 0
```

**v. isalnum():** Used to check whether a character is alphanumeric or not.

The function returns a +ve number if the character is alphanumeric, and 0 otherwise.

```
Eg:- int n = isalnum('3'); //Returns a +ve number
```

```
int n = isalnum('a'); //Returns a +ve number
```

```
int n = isalnum('@'); //Returns 0
```

**vi. toupper():** Used to convert the given character into its uppercase.

```
Eg:- char c = toupper('a'); //Returns A
```

**vii. tolower():** Used to convert the given character into its lower case.

```
Eg:- char c = tolower('A'); //Returns a
```

### Methods of calling functions

- Arguments can be passed to a function in two ways.

#### 1. Call by value (Pass by value) method

In this method, a copy of the actual argument is passed to the function.

#### 2. Call by reference (Pass by reference) method

In this method, the reference of the actual argument is passed to the function.

### Call by value v/s Call by reference

Call by Value Method	Call by Reference Method
Ordinary variables are used as formal parameters.	Reference variables are used as formal parameters.
The changes made in the formal arguments do not reflect in actual arguments.	The changes made in the formal arguments do reflect in actual arguments.

# Chapter. 4

## Web Technology

### Static and dynamic Web pages

Static web page	Dynamic web page
The content and layout of a web page is fixed.	The content and layout may change
Static web pages never use databases.	Static web pages use databases.
Static web pages directly run on the browser	Dynamic web page run on the server.
Static web pages are easy to develop	programming skills requires to develop dynamic web page

### Client side Scripting and 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
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

### Scripting languages

Client side scripting languages	Server side scripting languages
JavaScript, VB Script	PHP , ASP , JSP

### Structure of HTML Document

```

<HTML>
  <HEAD>
    <TITLE> This is the title of web page </TITLE>
  </HEAD>
  <BODY>
    Hello, Welcome to the world of web pages!
  </BODY>
</HTML>
```

- Here the contents inside < > pairs in known as Tags.
- Tags are commands used to create HTML documents
- Attribute is used with tag to provide additional information.

## Container Tag and Empty Tag

- Tag that requires an opening tag and a closing tag is known as container Tag.
- Eg: -<HTML> </HTML> , <BODY> </BODY> , etc ..
- Tag that do not requires a closing tag is known as empty Tag.
- Eg:- <BR> , <IMG> , etc..

## Essential HTML tags

<HTML> - It is a container tag used to start a HTML page.

<HEAD> - It is a container tag used to specify head section a HTML page.

<TITLE> - It is a container tag used to provide title for HTML document.

<BODY>- It is a container tag used to to define body section web page.

Important Attributes <BODY>	
Bgcolor	To provide Background colour for web page
Background	To provide Background image for web page
Text	To specify the colour of the text in a web pag

## Important HTML tags

Tag	Use	Attribute	Use
<H1>, <H2>, <H3>, <H4>, <H5>, <H6>	To provide Heading text in web page	Align	To specify horizontal alignment of heading text.
<P>	To organise the text within the <BODY> tag into paragraphs.	Align	Sets the alignment of the text to <i>left , right , center or justify .</i>
 	To provide line break. (New Line) . It is an empty tag.	---	-----
<HR>	creating horizontal line. It is an empty tag.	size	To set thickness of the line
		width	To set length of the line
		Color	To set colour of the line

## Text formatting tags

Tag	Use
<B> and <STRONG>	To set the text <b>bold</b>
<I> and <EM>	To set the text <i>Italics</i>
<U>	To set the text <u>underlined</u>
<S> and <STRIKE>	To set the <del>strike through</del> text
<BIG>	To increase the size of text than usual text in web page

<SMALL>	To decrease the size of text than usual text in web page
<SUB>	To set the <sup>Subscripted</sup> text
<SUP>	To set the <sup>Superscripted</sup> text
<BLOCKQUOTE>	To indent the content than usual left margin space
<Q>	To indicate the text enclosed in double quotation

### Other Important Tags

Tag	Use	Attribute	Use
<MARQUEE>	Displays scrolling text or image in a web page.	Height	Sets the height of the marquee
		Width	Sets the width of the marquee
		Direction	specifies the scroll direction
		Bgcolor	specifies background colour of the marquee
<FONT>	To change the size, style and colour of the text	Color	Sets the text colour
		Face	Sets the text face
		Size	Sets the text size
<IMG>	To insert images in a web page	Src	Specifies the file name of the image to be inserted
		Height	Set the the height of the image
		Width	Set the the width of the image



## Chapter. 5

# Web Designing using HTML

### Lists in HTML

#### Unordered lists

- `<UL>` Tag is used to create unordered list
- `<LI>` Tag is used to add each item to list
- *Type* is important attribute of `<UL>` tag used to specify type of bullet appears before list item
- Eg:-

```
<UL>
  <LI> RAM </LI>
  <LI> Hard Disk </LI>
  <LI> Mother Board </LI>
  <LI> Processor </LI>
</UL>
```

#### Ordered lists

- `<OL>` Tag is used to create ordered list
- `<LI>` Tag is used to add each item to list
- *Type* is important attribute of `<OL>` tag customise the numbering system used in ordered list (I ,2,3 .. or A ,B ,C, .... or I ,II, III ,.....)
- *Start* attribute of `<OL>` tag help to change the beginning value.
- Eg:-

```
<OL>
  <LI> Registers </LI>
  <LI> Cache </LI>
  <LI> RAM </LI>
  <LI> Hard Disk </LI>
</OL>
```

#### Definition lists

- `<DL>` Tag is used to create definition list.
- `<DT>` is used to create term in the list.
- `<DD>` tag supplies the definition of the term.

#### `<A>` (Anchor tag)

- It is used to create links in web pages
- **Href** is the main attribute of `<A>` tag . (Href means hyper reference.)
- The value of this attribute specify the URL.
- A link to a particular section of the same document is known as **internal linking**.
- The link from one web page to another web page is known as **external linking**.
- **mailto:** protocol is used to create e-mail hyper link to a web page.

## Creating tables in a web page

Tag	Use	Attribute	Use
<TABLE>	To create table in Web page	<i>Border</i>	To specifies the thickness of the border line of the table.
		<i>Bgcolor</i>	To set the background colour for the table
<TR>	To create rows in a table	<i>Bgcolor</i>	To set the background colour for a particular row
<TD>	To create columns in a table	<i>Bgcolor</i>	To set the background colour for a particular column
<TH>	To create heading columns in table	<i>Bgcolor</i>	To set the background colour for the heading column.

**Eg :** Create the following table using HTML

Year	2020
Smokers	412
Pan users	159
Alcohol users	219
Other cases	280

### HTML Code

```
<HTML>
  <HEAD>
    <TITLE> Table </TITLE>
  </HEAD>
  <BODY>
    <TABLE Border= "3">
      <TR>
        <TH> Year </TH>
        <TH> 2020</TH>
      </TR>
      <TR>
        <TD>Smokers </TD>
        <TD>412 </TD>
      </TR>
      <TR>
        <TD>Pan users </TD>
        <TD>159 </TD>
      </TR>
      <TR>
        <TD>Alcohol users </TD>
        <TD>219 </TD>
      </TR>
      <TR>
        <TD>Other cases </TD>
        <TD>280 </TD>
      </TR>
    </TABLE>
  </BODY>
</HTML>
```

```

        <TD>Alcohol users </TD>
        <TD>219 </TD>
    </TR>
    <TR>
        <TD>Other cases </TD>
        <TD>280 </TD>
    </TR>
</TABLE>
</BODY>
</HTML>

```

### Input controls in Web forms

Control	Use
TextBox	To input a text (Single line)
Password	To input password (Hidden characters)
Radio (Option Button)	To select single item from group of option
CheckBox	To select multiple item from group of option
Submit	To submit data
Reset	To clear data in form

## Chapter 6

### Client Side Scripting Using JavaScript

#### <SCRIPT> Tag

- <SCRIPT> tag is used to include scripting code in an HTML page.
- Scripts are programming codes with in HTML page.

#### Data types in JavaScript

Date Types	Description	Eg:
Number	All numbers (Integer , fractional , -ve and +ve ) are treated as Number Data type in JavaScript	100 , 9.8 , -1.6 , +10001 etc..
String	Any combination of characters enclosed within double quotes, are treated as a string in JavaScript	“Hai” , “45” , “true” , “false” etc..
Boolean	The result <i>true</i> and <i>false</i> are considered as Boolean data type in JavaScript	true , false

#### Variables in JavaScript

- **var** keyword is used to declare all type of variables.
- Eg:- var p;

#### Operators in JavaScript

Category	Operators	Eg:-	Result
Arithmetic Operators	+	10 + 5	15
	-	10 - 5	5
	*	10 * 5	50
	/	10 / 5	2
	%	10 % 5	0
Relational Operators	<	10<5	false
	>	10>5	true
	<=	10<=5	false
	>=	10>=5	true
	==	10==5	false
	!=	10!=5	true
Logical Operators		10 < 5    10 == 5	false
	&&	10 < 5 && 10 == 5	false
	!	!(10==5)	true
Increment and decrement Operator	++	x++	x= x+1
	--	x--	x=x-1
Arithmetic	+ = , - = , * = , / = and %=		

assignment Operator	E:= x+=10 means x=x+10
String addition +	“Java” + “Script “ result will be JavaScript

## Control structures in JavaScript

Control structure	Syntax	Eg:-
Simple if	<pre>if (condition) {   statements; }</pre>	<pre>if (mark&gt;17) {   alert("passed"); }</pre>
If .. else	<pre>if (condition) {   statements; } else {   statements; }</pre>	<pre>if (mark&gt;17) {   alert("passed"); } else {   alert("failed"); }</pre>
switch	<pre>switch (expression) { case value1: statements;               break; case value2: statements;               break; . . default:     statements; }</pre>	<pre>witch (letter) { case 'a': alert("apple");           break; case 'b': alert("ball");           break; case 'c': alert("Cat");           break; default: alert("Enter latter a-c");; }</pre>
for loop	<pre>for(initialisation; condition; updation) {   body of the loop; }</pre>	<pre>var i,s=0; for(i=1; i&lt;10; i++) {   s= s+i; } alert(s);</pre>
while loop	<pre>initialisation; while(condition) {   body of the loop;   updation; }</pre>	<pre>var i=1,s=0; while(i&lt;10) {   s= s+i;   i++; } alert(s);</pre>

## Built-in functions in JavaScript

### 1. alert()

- This function is used to display a message on the screen
- Eg: `alert("Welcome to JavaScript");`

## 2. isNaN()

- This function is used to check whether a value is a number or not
- The function returns true if the given value is not a number.
- Eg: -

```
isNaN("welcome"); return true  
isNaN("13");      return false
```

## 3. toUpperCase()

- This function returns the upper case form of the given string
- Eg:-

```
var x;  
x = "JavaScript";  
alert(x.toUpperCase()); display JAVASCRIPT
```

## 4. toLowerCase()

- This function returns the lower case form of the given string
- Eg:-

```
var x;  
x = "JAVASCRIPT";  
alert(x.toLowerCase()); display javascript
```

## 5. charAt()

- It returns the character at a particular position.
- charAt(0) returns the first character in the string.
- Eg:-

```
var x;  
x = "JavaScript";  
alert(x.charAt(4)); display S
```

## 6. length property

- length property returns the length of the string.
- Eg:-

```
var x;  
x = "JavaScript";  
alert(x.length); display 10
```

# Chapter. 7

## Web hosting

### Web hosting

- It is the service of storing web sites in web server.

### Types of hosting

- Three types of web hosting are ,
  1. **Shared hosting**
    - Two or more web sites are stored in a single web server.
    - Most suitable for small websites that have less traffic.
    - Cheaper and easy to use
  2. **Dedicated hosting**
    - A single web site is stored in a single web server.
    - Dedicated servers provide guaranteed performance and fast access.
    - It is very expensive.
  3. **Virtual Private Server (VPS)**
    - A Virtual Private Server (VPS) is a physical server that is virtually partitioned into several servers using the virtualization technology.
    - VPS provides almost the same services at a lesser cost than that of dedicated hosting.
    - Some popular server virtualization softwares are VMware, FreeVPS, etc

### FTP Client software

- FTP client software establishes a connection with a remote server
- It is used to transfer files from our computer to the server computer.
- SFTP uses Secure Shell (SSH) protocol which provides facilities for secure file transfer.
- The popular FTP client software are FileZilla, CuteFTP, SmartFTP, etc.

### Free Hosting

- Free hosting provides web hosting services at free of charge.
- The size of the files that can be uploaded may be limited.
- Audio/video files may not be permitted.
- Sites.google.com, yola.com, etc. providing free web hosting services.

## Chapter 8

### Database Management System

Database is an organized collection of inter related data stored together with - minimum redundancy which can be retrieved as desirable , .

Database Management System DBMS is essentially a set of programs which ( ) facilitates storage retrieval and management of database , .

#### 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 date for their purpose . So data redundancy can control .
- b). Data consistency :- Data redundancy leads 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 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 duplication etc, , .
- f). Security :- Information inside a Database is very valuable for a company . 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). Sharing of data : The data stored in the database can be shared among several users or programs even simultaneously and each may use it for different purposes .
- h). Enforcement of Standards :- The database Administrator defines standards like display formats report structure update procedures access rules etc , , , .. for the DBMS It is helpful when data transfer occurs between systems . .
- i). Crash recovery : If the system crashes data in the database may become unusable DBMS provides some mechanism to recover data from the crashes. .

#### Components of DBMS

- a). Hardware : It include actual computer system used for storage and retrieval of Database It include computers storage devices network devices and other . , , , supporting devices .
- b). Software : It consists of DBMS application programs and utilities , . DBMS consists of different components that handles tasks like data definition data , manipulation,



c). Data : It is the most important component of DBMS The data base 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 Each field has a specific type eg Name.( , - Char Mark num etc, , - ).

2) Record : A record is a collection of related fields A record store an instant of the relation or the table .

3) File : A file is a collection of all occurrence of one type of record .

d). Users : The users of database can be classified depending on the mode of their interactions with DBMS The different categories of users are Database Administrator Application Programmer Sophisticated users and naïve users, , , .

e). Procedures : Procedures refers to the instructions and rules that govern the design and use of the database .

**Database users** Users of the database can be classified in to the following groups ,

1. Database Administrator DBA ( ) : The person who is responsible for the control of the centralized and shared database is the Database Administrator (DBA). 2. Application Programmers : Application programmers are computer professionals who interact with the DBMS through application programs

3. Sophisticated Users : Sophisticated users include engineers scientists business analysts and others who are thoroughly, , , familiar with the facilities of the D B M S .

4. Naive Users: Naive users interact with the system by invoking one of the application programs that were written previously . They are not even aware of the details of the DBMS .

### **RDBMS terminologies**

a). Entity : An entity is a person or a thing that can be distinguishable from others. Eg Student Book etc. , ..

b). Relation : Relation is a collection of data elements organized in rows and columns It is also called a table. .

c). Tuple : A row in a relation is called a tuple It consists of a complete set of values used to represent a particular entity Values of each attribute are taken from its domain .

d). Attribute : The columns of a relation are called attributes  
. Eg Ad no name age etc are the attributes of the relation Student.

e). Degree : The no of attributes columns in a relation is called degree of that ( )  
relation.

f). Cardinality : The no of rows tuples in a relation is called cardinality of that ( )  
relation

g). Domain Domain is a range of values from which a particular value of an :

attribute for a can be drawn .

Eg. 0 to 100 may be domain of values for the attribute mark in student relation

h). Instance : An instance of a relation is a set of tuples has the same number of fields as the  
relational scheme .

### **Relational operations**

The collection of operations that is used to manipulate the entire relations of a database is known as relational algebra These operations are performed with the help of a special language called query,

language. The fundamental operations in relational algebra are SELECT , PROJECT UNION,

INTERSECTION SET DIFFERENCE CARTESIAN PRODUCT etc The SELECT and, , , . PROJECT operations are unary operations because they operate on one relation . The remaining operations are binary operations as they operate on pairs of relations.

1) Select operation Select operation is a unary operation used to select tuples : in a relation those satisfy a selection predicate condition ( ). It is denoted by the symbol  $\sigma$

2) Project operation Project operation is a unary operation used to select from a : table to form a new relation It is denoted by the symbol  $\pi$

3) Union Operation : It is the concatenation operation between compactable (same type where all the tuples appearing in either or both the relations ) .. It is denoted by U . Duplication of tuples are eliminated .

4). Intersection Operation : This binary operation done between compactable relations It returns a relation consisting of all tuples appearing I both of the two. specified relations It is denoted by the symbol  $\cap$  .

5) Set Difference Operation This binary operation done between comparable : relations. It returns a relation consisting of all tuples appearing in the first relation and not in the second relation It is denoted by the symbol – . . . .

6) Cartesian Product Cross Product ( X ): This operation returns a relation consisting of all possible combinations of tuples from two relations It is a binary operation . on two relations which has degree equal to the sum of the degrees of the two relations and cardinality is the product of the cardinalities of the two relations . It is denoted by X .

## **Chapter- 9 Structured Query Language (SQL)**

**Structured Query Language (SQL)** is a language designed for managing data in RDBMS. It provides facilities to create a table, insert data into a table, retrieve information from a table, modify data in the table, delete the existing data from a table, modify the structure of a table, remove a table from a database, etc.

### **Components of SQL**

Data Definition Language (DDL), Data Manipulation language (DML) and Data Control Language (DCL).

**DDL** commands are used to create, modify and remove the database objects such as tables, views and keys. Eg: CREATE TABLE, ALTER TABLE, DROP TABLE, CREATE VIEW, DROP VIEW.

**DML** permits users to insert data into tables, retrieve existing data, delete data from tables and modify the stored data. Eg: INSERT INTO, SELECT, UPDATE, DELETE FROM .

**DCL** includes commands that control a database, including administering privileges and committing data. Eg: GRANT, REVOKE .

### **SQL Data Types**

**SQL Data types** are : INT or INTEGER, DEC or DECIMAL, CHAR or CHARACTER, VARCHAR , DATE , TIME.

**INT or INTEGER** is used to define columns contain integer data.

**DEC(5,2) or DECIMAL(5,2)** denotes that the column with this specification can store any value having a maximum of five digits, out of which two are after the decimal point.

**CHAR** is a fixed length character data type. It is mainly used when the data in a column are of the same fixed length and small in size. VARCHAR represents variable length strings. The space allocated for the data depends only on the actual size of the string, not on the declared size of the column.

### **Constraints**

**Constraints** are rules applied on data entered into the column of a table. They ensures the integrity of the relation . So they are known as integrity constraints.

Constraints may be table Constraints or Column Constraints. A table constraint is applied to a table where as a column constraint is applied to a column.

- 1) **NOT NULL** -This constraint ensures that a column can never have NULL(empty) values.
- 2) **AUTO\_INCREMENT** -The AUTO\_INCREMENT keyword perform an auto increment ie, it automatically assigns a series of number automatically and insert it to column. The default starting value is 1.The auto increment column must be defined as primary key of the table. Only one auto\_increment column is allowed in a table.
- 3) **UNIQUE** - This constraint ensures that no two rows have the same value in a specified column. This constraint can be applied to those columns that have been declared NOT NULL.
- 4) **PRIMARY KEY** - It declares a column as the primary key of a table. This column must not have null values and every value should be unique. So a PRIMARY KEY constraint is a combination of UNIQUE and NOT NULL constraints.
- 5) **DEFAULT** - This constraint is used to specify a default value for a column.
- 6) **CHECK** - This constraint limits the values that can be inserted into a column of a table.

### SQL commands

#### DDL commands

Command	Use	Syntax
CREATE TABLE	To create a table	CREATE TABLE tbl_name (col_name data type <constraint>, col_name data type <constraint>, ..... col_name data type <constraint>);
DROP TABLE	To remove a table	DROP TABLE <table_name>;

#### DML commands

Command	Use	Syntax
SELECT	To retrieve information from the table	SELECT col_name1, col_name2,... FROM tbl_name;
INSERT INTO	To insert a record	INSERT INTO table_name VALUES(value1,value2,value3);
UPDATE	To modify the column values	UPDATE table_name SET col_name=value [WHERE condition];
DELETE	To delete rows / records	DELETE FROM table_name [WHERE condition]

## Chapter- 10

### ERP (Enterprise Resource Planning)

ERP combines all the requirements of a company and integrated to a central database so that various departments can share information.

#### Functional units of ERP

**Financial Module:** This module collects financial data from various department and generate various reports like Balance sheet, Trial balance, General ledger etc.

**Manufacturing Module:** This module manages and provides information for the entire production process

**Production Planning Module:** This module is used for the utilization of resources in an optimized way so as to Maximize the production and minimize the loss. Optimization means to use resources effectively for the production.

**HR Module:** HR module maintain an updated and complete employee details database which consists of information like personal details, salary details, attendance and promotion.

**Inventory Control module:** This Module manages the stock requirement for an organization.

**Purchasing Module:** This module is responsible for the availability of raw material in the right time at the right price. This module generates purchase orders for the suppliers, billing etc.

**Marketing Module:** This module is used for monitoring customer orders, increasing customer satisfaction, eliminating credit risks etc...

**Sales and Distribution Module:** This module manages the sales and distribution activities. This module includes inquiries, order placement etc.. This module integrates with e-commerce web site.

**Quality Management Module:** This Module deals with Quality Planning, Quality Inspection and Quality Control.

#### Examples for ERP packages

**Oracle** - The ERP package from Oracle provides strong finance and accounting module. It also provides good customer and supplier interaction, effective production analysis, efficient human resource management and better pricing module.

**SAP** - SAP stands for Systems, Applications and Products for data processing. SAP also developed Customer Relationship Management (CRM), Supply Chain Management (SCM), and Product Life cycle Management (PLM) software.

**Odoo** – Open source ERP package. Formerly known as Open ERP.

**Microsoft Dynamics** - Microsoft Dynamics is part of Microsoft business solutions. It provides a group of enterprise resource planning products primarily aimed at mid-sized enterprises. This package can be installed and used easily and it provides good user interface.

**Tally ERP** - Tally ERP is a business accounting software for accounting, inventory and payroll.

#### Benefits of ERP

**1. Improved resource utilization:** Installing ERP can reduce the wastage of resources and resource utilization can be improved.

**2. Better Customer Satisfaction:** Customer satisfaction means meeting the max. Customers requirements for a product or a service. With the introduction of web based ERP, a customer can place orders and make payments from home.

**3. Provides Accurate Information:-**ERP software can provide accurate information to customers than that of manual systems.

**4. Decision Making Capability:-** Accurate and relevant information helps to make better decisions for a system.

**5. Increased Flexibility:-**ERP system can adapt new changes easily.

**6. Information Integrity:-**The entire information about enterprise is stored in central database so that any dept. can get the information.

# Chapter 11

## Trends and issues in ICT

### Mobile communication services

**Short Message Service (SMS)** is a text messaging service in mobile communication systems that allows exchanging short text messages containing up to 160 characters.

**Multimedia Messaging Service (MMS)** is a standard way to send and receive messages that consists of multimedia content using mobile phones. MMS does not specify a maximum size for a multimedia message and it supports contents such as text, graphics, music, video clips and more.

**Global Positioning System (GPS)** is a satellite based navigation system that is used to locate a geographical position anywhere on earth, using its longitude and latitude. GPS is used for vehicle fleet tracking by transporting companies to track the movement of their trucks.

### Mobile Operating System

The software that manages the hardware, multimedia functions, Internet connectivity, etc. in a mobile device. Eg: Android from Google, iOS from Apple, BlackBerry OS from BlackBerry and Windows Phone from Microsoft.

#### Android mobile OS

It is a Linux-based operating system designed mainly for touch screen mobile devices such as smart phones and tablet computers. It was originally developed by Android Inc. that was founded in Palo Alto, California in 2003 by Andy Rubin and his friends. In 2005, Google acquired Android Inc. making it a wholly owned subsidiary of Google.

### Cyber Crime

It is defined as a criminal activity in which computers or computer networks are used as a tool, target or a place of criminal activity. Cyber crimes include phishing, hacking, denial of service attacks, etc.

#### 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** - The Internet has provided a medium for the facilitation of crimes like pornography. The distribution and posting of obscene material is one of the important cyber crimes today.