SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar **Nr. Amrapali Under Bridge** **Raiya Road** **Rajkot – 360001** **Ph.No–(0281)2440478**	**3 – Vaishalinagar** **Nr. Amrapali Under Bridge** **Raiya Road** **Rajkot - 360001** **Ph.No–(0281)2471645**

Lt. Shree Chimanbhai Shukla

B.C.A.,B.Sc.I.T.,P.G.D.C.A. - SEM-1- PROGRAMMING IN C

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.

(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

CS-02: PROBLEM SOLVING METHODOLOGIS AND PROGRAMMING IN C

B.C.A.,B.Sc.I.T.,P.G.D.C.A. - SEMESTER – 1

Unit No.	Topic	Detail

1	**Introduction of C Language**	❖ Introduction of Computer Languages
		❖ Introduction of Programming Concept
		❖ Introduction of C Language (History & Overview)
		❖ Difference between traditional and modern c.
		❖ C character set
		❖ C tokens
		    o Keywords
		    o Constants
		    o Strings
		    o Identifiers and variables
		    o Operators (all 8 operators)
		❖ Hierarchy of operators
		❖ Type casting
		❖ Data types in c
		❖ PRE-PROCESSORS IN C

	Introduction of Logic Development Tools	❖ Introduction of Logic. ❖ Necessary Instructions for Developing Logic ❖ Basics of Flow Chart ❖ Dry-run and its Use. ❖ Other Logic development techniques

2	**Control Structures**	❖ Selective control structure
		    o If statements
		    o Switch statement
		❖ Conditional ternary operator
		❖ Iterative (looping) control statements
		    o For loop
		    o Do…while loop
		    o While loop
		❖ Nesting of loops
		❖ Jumping statements
		    o Break statement ,
		    o Continue statement

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

		o Goto statements

3	**Functions (Inbuilt & User Defined)**	❖ Types of library functions
		  o String Function: Strcpy, strncpy, strcat, strncat, strchr,strrchr, strcmp, strncmp, strspn, strcspn, strlen, strpbrk, strstr, strtok
		  o Mathematical Functions: Acos, asin, atan, ceil, cos,
		  o div, exp, fabs, floor, fmod, log, modf, pow, sin, sqrt
		❖ Date & Time Functions: clock, difftime, mktime, time, asctime, ctime, gmtime, localtime, strftime
		❖ I/O Formatting Functions: printf, scanf, getc, getchar,gets,putc, putchar, puts, ungetc
		❖ Miscellaneous Functions: delay, clrscr, clearer, errno, isalnum, isalpha, iscntrl, isdigit, isgraph, islower, isprint, isspace, isupper, isxdigit, toupper, tolower
		❖ Standard Library functions: abs , atof , atol , exit , free,labs , qsort , rand , strtoul , srand
		❖ Memory Allocation Functions: malloc , realloc , calloc
		❖ Types of user defined functions
		❖ Pointers
		❖ Function call by value
		❖ Function call by reference
		❖ Recursion
		❖ Storage classes
		  o Passing and returning values

4	**Array**	❖ Types of arrays
		  o Single dimensional array
		  o Two dimensional array
		  o Multi-dimensional array
		  o String arrays
		❖ Use of Arrays in Programming
		❖ Arrays and Matrices

	Pointers	❖ Introduction of Pointers ❖ Use of pointers in Dynamic Programming ❖ Pointer to Variables ❖ Pointer to Array ❖ Pointer within Array ❖ Pointer To Structure

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

		❖ Pointers within structure ❖ Pointer to Pointer
5	**User Defined Data Type – Structure , Union & Enum**	❖ What is structure ❖ Initializations and declarations ❖ Memory allocation functions ❖ Pointers with structures ❖ Array with structures ❖ Udf with structures ❖ Nested structures ❖ Introduction to union ❖ Difference between Structure & Union
	File Handling	❖ Concept of data files ❖ File handling ❖ Use of file handling functions ❖ fopen, fclose, fprintf, fscanf, getw, putw, fseek, ❖ ftell, rewind ,freopen, remove, rename, feof, ferror, fflush, fgetpos, sprintf, snprintf, vsprintf, vsnprintf, fscanf, vfscanf,setbuf, setvbuf ❖ I/O operations ❖ Command line arguments

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

CHAPTER-1

INTRODUCTION OF C LANUGAGE &

INTRODUCTION OF LOGIC DEVELOPMENT TOOLS

- o Introduction of computer languages.
- o Introduction of programming concept.
- o Introduction of C language (History and Overview).
- o Difference between traditional and modern C.
- o C character set.
- o C tokens.
  - Keywords
  - Constants
  - Strings
  - Identifiers and variables
  - Operators (all 8 operators)
- o Hierarchy of operators
- o Type casting
- o Data types in C
- o Pre-Processors in C

- o Introduction of Logic.
- o Necessary Instructions for Developing Logic
- o Basics of Flow Chart
- o Dry-run and its Use.
- o Other Logic development techniques
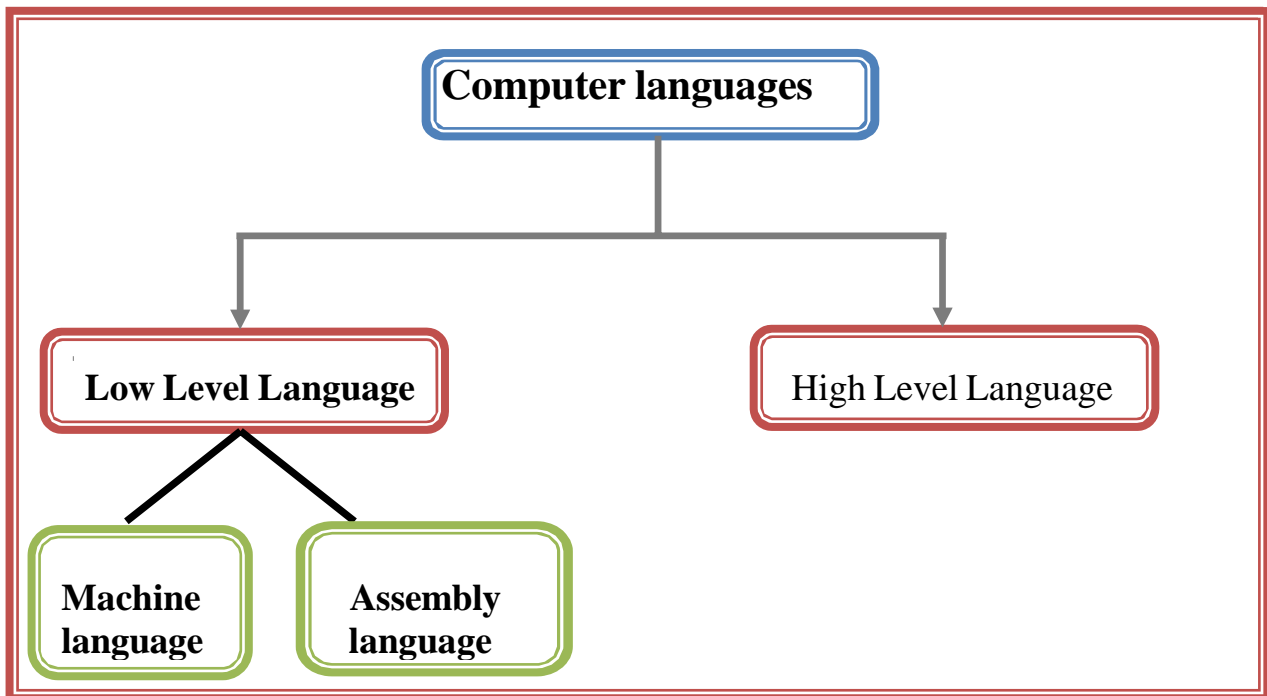
SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

Q-1 Introduction of computer languages:

Detail :-

- ❖ Computer languages are divided into two categories:

    - ❖ Low Level Languages
    - ❖ High Level Languages

- ❖ Low level languages can be of two types:

    - **2.1** Machine language
    - **2.2** Assembly language.

1. Machine language programming:
> Machine language is written using Binary Language (0 & 1).
> Computer can understand only low level language.
> So that computer need to convert it.

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

 2 – Vaishalinagar
 Nr. Amrapali Under Bridge
 Raiya Road
 Rajkot – 360001
 Ph.No–(0281)2440478

 3 – Vaishalinagar
 Nr. Amrapali Under Bridge
 Raiya Road
 Rajkot - 360001
 Ph.No–(0281)2471645

Advantages of Machine language programming:

It does not need to convert.

It need less memory.

Programs are small & easy.

Disadvantages of Machine language programming:

The programs are difficult to understand and debug.

Programs are not portable.

Programs are hard to describe.

2. Assembly language:

Assembly language is written using set of instructions.

We need assembler to convert the code.

Advantages of Assembly language:

The programs are easy to understand.

Instructions can be written using set of code.

It need less time to represent.

Disadvantages of Assembly language:

We need assembler to translate the code.

Programs are not portable.

3. High Level Languages or problem oriented languages:

High level languages are written using English Statements.

Computer have to convert high level language into low level language.

Advantages of High level language :

Programs are portable.

Programs are easy to understand.

We need less time to write the programs.

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

Disadvantages of High level language :

It require more memory.

We need translator to convert the code.

It is compulsory to understand structure of program.

1 Word Question – Answer

SR.NO.	QUESTION	ANSWER
1	How Many Types of Computer Languages Available?	2(Two)
2	Machine Language can be written using	0 and 1 (Binary)
3	_____ is used to convert Assembly Language into Machine Language	Assembler
4	High Level Languages are written using _____	English Statements
5	_____ is used to convert High Level Language into Machine Language	Interpreter or Compiler
6	_____ Language is not suitable for Large Application	Machine Language
7	Low Level Languages are further divide into_____ and _____	Machine Level Assembly

Q-2 History of C Language :

DEVELOPER OF C LANGUAGE ⟶ DENNIS M. RITCHIE

DEVELOPING YEAR ⟶ 1972

DEVELOPED AT ⟶ AT & T'S BELL LAB.

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

Detail :-

- ❖ C is one type of Programming Language.
- ❖ It was developed at "AT & T's Bell Laboratories".
- ❖ Dennis.M.Ritchie was the founder or father of C Language.
- ❖ In 1960 , There were many languages available but only for some specific purpose.

    For Example :- COBOL

- ❖ COBOL was used for commercial applications.

SR NO	YEAR	LANGUAGE	DEVELOPER
1	1960	ALGOL	INTERNATIONAL COMMITTEE
2	1963	CPL	CAMBRIDGE UNIVERSITY
3	1967	BPCL	MARTIN RICHARDS & CAMBRIDGE UNIVERSITY
4	1970	B	KENT THOMPSON AT AT & T LABORATORY
5	1972	C	DENIS RITHCHIE AT AT & T LABORATORIES
6	1978	K&R C	Kernighan and Ritchie
7	1989	ANSI C	ANSI Committee
8	1990	ISO C	ISO Committee

![HNS Logo]
SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

❖ At that time people decided to develop particular language that is used for all purpose.

❖ There are following languages available at that time for different types ofuse.

1 Word Question – Answer

SR.NO.	QUESTION	ANSWER
1	Who is Founder of C Language?	Dennis M.Ritchie
2	In Which year C Language was developed?	1972
3	Where C Language was developed?	At & T's Bell Laboratories
4	C Language is rich set of_____	Built – in Functions &Operators

Q-3 Character Set of C Language :
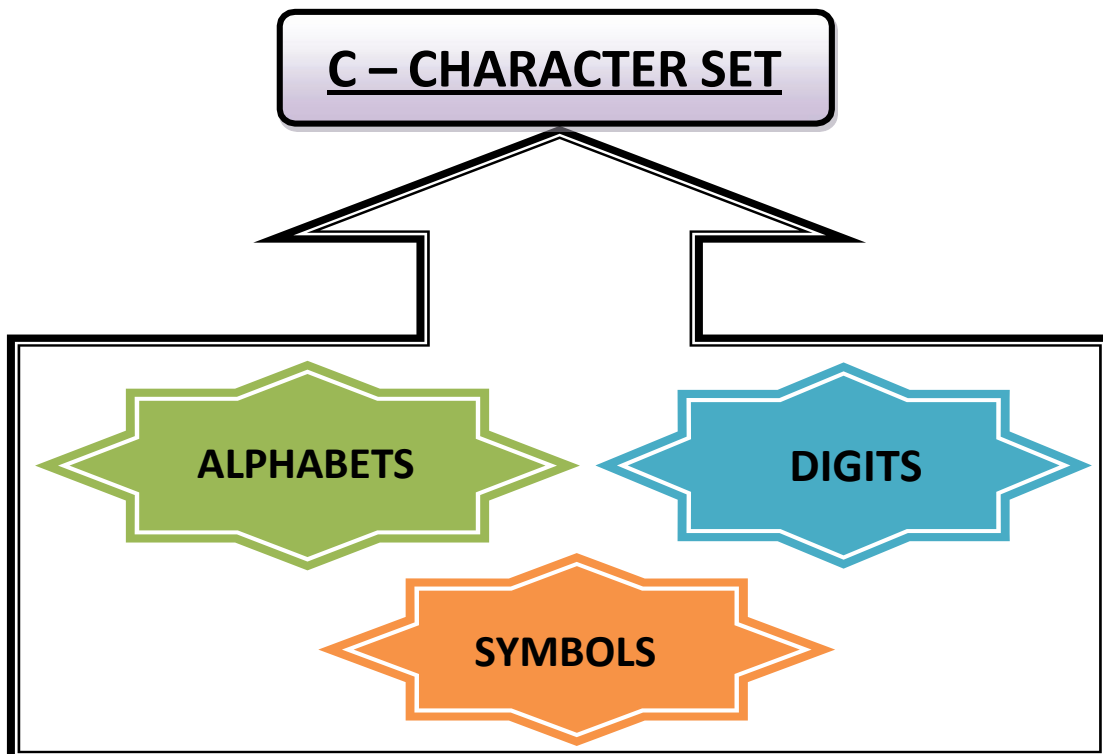
SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

Detail :-

❖ The Character set in c language always used to represent the information.

❖ The Character set in c language support unique value for each character.

❖ The Character set in c language also include white space character.

❖ The C Character set include mainly the following:

    (i) Alphabets

    (ii) Digits

    (iii) Symbols

Alphabets :-

❖ C language support different alphabets which can be A to Z (in capital letters) and a to z (in small letters).

Digits :-

❖ In C language we can input sequence of numbers which can be between 0 to 9.

Symbols :-

❖ We can also input some special symbols as information in Clanguage. The different symbols can have different meanings.

- **Special Symbols:**

Symbol	Meaning
+	Plus sign
|	Vertical bar
\	Backslash
'	Apostrophe
-	Minus sign
=	Equal to sign
{	Left brace
}	Right brace
[	Left bracket
]	Right bracket

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

1 Word Question – Answer

SR.NO.	QUESTION	ANSWER
1	Character Set includes mainly_____ , _____&_____	Alphabets , Digits &Symbols
2	Digits include mainly _____	0 to 9
3	Alphabets include mainly_____	A to Z and a to z
4	Is White Space a Character?(Yes/No)	Yes

Q-4 What is Token ? Explain different Tokens of C.

Detail :-

❖ In a C program, the smallest individual unit is known as C tokens.

❖ A token is a source program text which compiler does not break into furtherelements.

❖ This basic elements recognized by compilers are known as "tokens".

❖ Tokens are further classified into keywords, constants, strings, operatorsand special symbols.

1 Word Question – Answer

SR.NO.	QUESTION	ANSWER
1	Smallest individual units in c language is called?	Token
2	Tokens must be recognized by _____	Compiler

4.1 Keywords :-

Detail :-

❖ Predefined Words or Reserve Words are known as keywords.

❖ We cannot change the meaning of keywords.

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot – 360001
Ph.No–(0281)2440478

3 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot - 360001
Ph.No–(0281)2471645

- ❖ All keywords must be written in Lowercase.
- ❖ Keywords serve as basic building blocks for program statements.
- ❖ Keywords are the words that have specific meaning and this meaning has already been explained to compiler.

There are 32 keywords available in C language.

auto	double	int	struct
break	else	long	switch
case	enum	register	typedef
char	extern	return	union
continue	for	signed	void
do	if	static	while
default	goto	sizeof	Volatile
const	float	short	Unsigned

1 Word Question – Answer

SR.NO.	QUESTION	ANSWER
1	Keyword Means	Reserve Words
2	How many keywords available in c?	32
3	Can we use keyword as variable name?(Yes/No)	No

4.2 Constants :

- ❖ Constant means the fixed value.The value of constant can not be changed during execution of program.
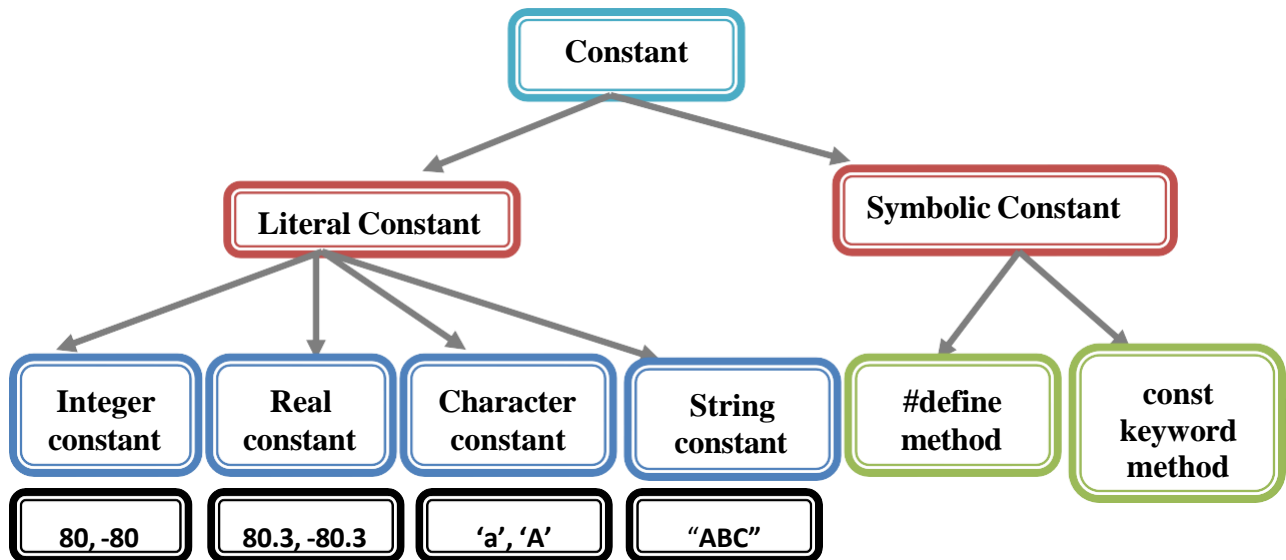- ❖ There are two types of constant available in c.

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar **Nr. Amrapali Under Bridge** **Raiya Road** **Rajkot – 360001** **Ph.No–(0281)2440478**	**3 – Vaishalinagar** **Nr. Amrapali Under Bridge** **Raiya Road** **Rajkot - 360001** **Ph.No–(0281)2471645**

Literal Constant:

- ❖ Literal constant is the value that is typed directly into your program wherever it is needed.

- ❖ Literal constant is divided further into 4 categories that is;

  - integer constant,
  - real constant,
  - character constant,
  - string constant.

Symbolic Constant:

- ❖ A symbolic constant is a constant that is represented by name,just as a variable is represented.

- ❖ The real value of symbolic constant must be entered only once when it is fist defined.

- ❖ C language has two methods of defining symbolic constant.

  - **#define method:**

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

❖ #define directive is one of C language preprocessor directive.

❖ There is no '=' sign while assigning a value to the variable while using #define.

Example: #define pi 3.14

#define X "hello hw r u"

• **const keyword method:**

❖ Const keyword is used for variable declaration.

❖ To declare any variable using const keyword we can use equalsign (=). **Example:** const x=5.5

1 Word Question – Answer

SR.NO.	QUESTION	ANSWER
1	Constant Means	"fixed Value"
2	Value of Constant can never change during execution of program?(True/False)	True
3	Types of Constant	2(two) Literal and Symbolic
4	Is following declaration true in case of literal constant ? Ex :- int i=90;	True
5	Symbolic constant can be represented by either _____method or_____keyword.	#define or Const
6	Write down statement to declare symbolic constant like pi=3.14 using define method.	#define pi 3.14

4.3 Strings:

Detail :-

❖ In C language "bunch of characters " is called string.

❖ In C language string can be represented by double quotes ("   ").

❖ To indicate end of the string '\0' (NULL) character can be used.

❖ C will automatically created array of characters.

14

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

❖ Each character in the array will occupies 1 byte in the memory.
❖ In C language we can declare string value like following :-
   Example: char string[]="hello".

h	e	l	l	o

2000 2001   2002   2003   2004

❖ While entering the string using scanf() following points should
   be keptin mind:
❖ The length of string can not be more than size of characterarray.
❖ The string can be fixed or dynamic.

1 Word Question – Answer

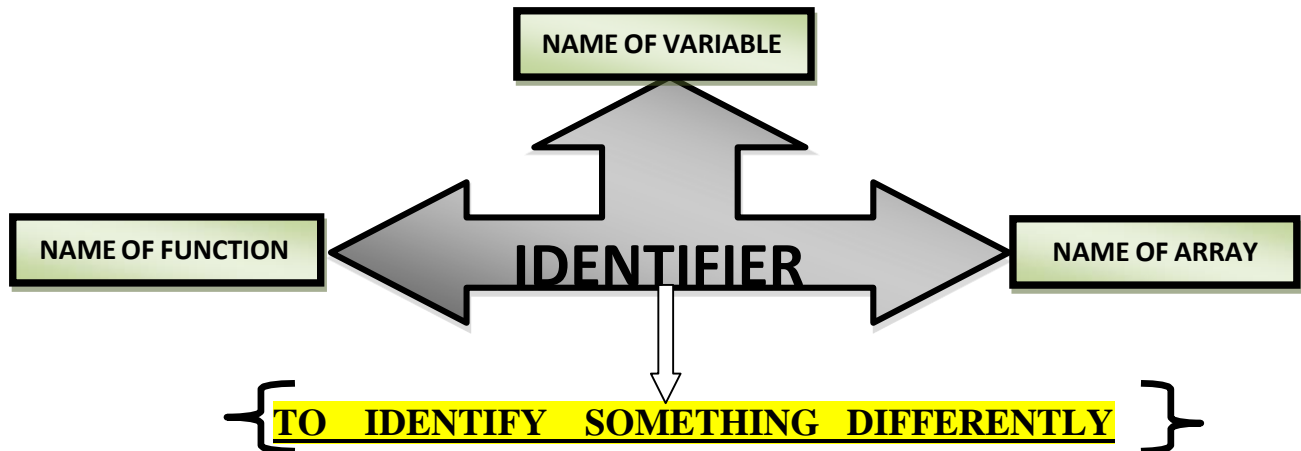| SR.NO.	QUESTION	ANSWER
1	String Means_____	"Array of Characters"
2	End of string can be represented by special character called????	Null character('\0')
3	In c language , string can be denoted by????	Double Quotes(" ")
4	Each character in String Array can occupy _____byte in memory.	One byte
5	How to declare String Array or Character Array?	Char a[ ] = "hello";

4.4 Identifiers and variables:

15

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

NAME OF VARIABLE

NAME OF FUNCTION

IDENTIFIER

NAME OF ARRAY

TO   IDENTIFY   SOMETHING   DIFFERENTLY

Detail :-

- ❖ Identifier is used to indicate name of variable , function and array.
- ❖ Variable is one type of identifier that used to store some value.
- ❖ Variable or Identifier can support different values of different types.
- ❖ Identifier can be recongnized by user defined name.
- ❖ There are some rules for declaring variable or identifier.

Namig Rules for identifiers:

- ✓ First character must be an alphabet.
- ✓ Identifier Must contains letters, digits and underscore.
- ✓ Identifier name can be maximum of 31 characters.
- ✓ Keyword can not be used as variable name.
- ✓ White space does not allow as variable name.

Example:

int age = 20;

Note :- Here , age is identifier

1 Word Question – Answer

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

SR.NO.	QUESTION	ANSWER
1	Identifier Means	"To Identify Something"
2	Identifier Consist of_____ & _____	Letters & digits
3	Identifier must not contains_____	White Space
4	Only Permitted symbol in identifier is_____	Underscore(_)

Variables:

Detail :-

- ❖ Variables is a container that used to store data or value.
- ❖ A variable may take different values at different times during execution.
- ❖ All the variables have three basic attributes:
    - • Name
    - • Value
    - • Address of memory location, where the value is stored.

1 Word Question – Answer

SR.NO.	QUESTION	ANSWER
1	Variable is used to store different types of _____	values
2	Variable can store on different _____	Memory Location
3	Variable can have _____	Unique Address

4.5 Operators:

2 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot – 360001
Ph.No–(0281)2440478

3 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot - 360001
Ph.No–(0281)2471645

Operator means to "Operate something".

Operator can have different Operand or Values

Detail :-

❖ Operators are used to indicate some operations on different values.

❖ Operator means to perform some operations on the data or values.

❖ C Languagesupport mainly the following operators…

- ▪ Arithmetic Operator
- ▪ Relational Operator
- ▪ Logical Operator
- ▪ Assignment Operator
- ▪ Bitwise Operator
- ▪ Conditional Operator
- ▪ Special Operator
- ▪ Increment / Decrement Operator

Arithmetic Operator :-

❖ The Arithmetic operator s are used to perform some operations on the value.

❖ There are following arithmetic operator available in c.

Operators	Meaning
+	Addition
-	Subtraction
*	Multiplication
/	Division
%	Modulus

Relational Operator :-

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

❖ Relatioal operators are also known as comparison operators.
❖ It returns only one output at a time.
❖ There are following relational operators available in c.

Operators	Meaning
>	Greater than
<	Less than
>=	Greater than & Equal t
<=	Less than & Equal to
==	Equal to
!=	Not Equal to

Logical Operator :-

❖ The logical operators are operators that return only one output at a time , that is true or false.
❖ There are following logical operator abailable in c.

Operators	Meaning
&&	Logical AND
||	Logical OR
!	Logical NOT

Assignment Operator :-

❖ The assignment operator is used to assign value to the variable.
❖ There is only one assignment operator available in c that is
=(Equalto)
Example :- int i=10;

Bitwise Operator :-

❖ Bitwise operator is used to store the data at bit level.
❖ The following are bitwise operators supported by C language.

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

Operators	Meaning
&	Bitwise AND
|	Bitwise OR
^	Bitwise Exclusive
<<	Shift Left
>>	Shift Right
~	One's Complement

Conditional Operator :-

❖ Conditional Operators are also known as ternary operators.

❖ There are only two contional operators available in c.

Operators	Meaning
?	Questiona Mark (True)
:	Colon (False)

Example :- (a>b) ? Printf("a is max") : ("b is max")

Special Operator :-

❖ The special operators in c language are used for some specialpurpose.

❖ There are following special operators available in c.

Comma Operator :- This operator is used to combine valuewith variable.

EX :- printf("a=%d",a);

Sizeof Operator :- This operator is used to find out howmany bytes ,value or variable can occupies.

EX :- sizeof(12);

## Increment / Decrement Operator :-

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot – 360001
Ph.No–(0281)2440478

3 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot - 360001
Ph.No–(0281)2471645

❖ The increment operator is used to increase the value and decrement operator is used to decrease the value.

❖ In C Language , ++ is called increment operator and - - is called decrement operator.

Operators	Meaning
++a	Prefix increment
a++	Postfix increment
--a	Prefix decrement
a--	Postfix decrement

1 Word Question – Answer

SR.NO.	QUESTION	ANSWER
1	Conditional Operator in c language can be _____ and _____	? and :
2	_____ operator can find how many bytes an operand can occupies	Sizeof
3	_____ operator can used to link related expression together.	Comma
4	_____operator is known as assignment operator	=(equal to)
5	If condition is false , logical operator can return	0
6	Precedence of operator is known as _____	Hierarchy

Q-5 Hierarchy of operators:

Hierarchy   means   "Precedence "

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

Hierarchy means "Precedence of Operators"
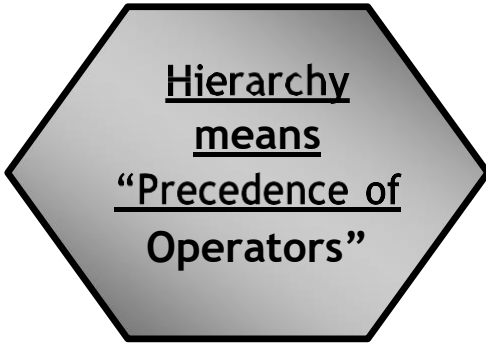
The operators that having same precedence is called associativity

Detail :-

- ❖ In C Language there are variety of operators.
- ❖ In C Language each operator having priority of operating.
- ❖ There can be low level and high level priority.
- ❖ High level operator will be execute first and low level operators will be execute last.
- ❖ The priority rules can be different for different operators.

Sr. No.	Operator	Meaning	Priority
1	( ) , [ ]	Function Brackets	1
2	/ , *	Division , Multiplication	2
3	%	Modulus	3
4	+ , -	Addition , Subtraction	4
5	<< , >>	Shilf left , Shift Right	5
6	> ,<,= =,!=	Relational Operator	6

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.

(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot – 360001
Ph.No–(0281)2440478

3 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot - 360001
Ph.No–(0281)2471645

7	=	Assignment Operator	7
8	&& , || , !	Logical Operator	8

❖ The hierarchy of operators are as follow.

==**1 Word Question – Answer**==

SR.NO.	QUESTION	ANSWER
1	The Precedence of operator is called?	Hierarchy
2	Associativity rules are applied when operators have _____	Same level
3	Operators of the same precedence can be evaluated from _____ as well as from _____	Left to RightRight to Left

Q-6 Type Casting (Type Conversion) :

TYPE CASTING MEANS ⟹ =="DATA TYPE CONVERSION"==

==**"Converting data from one datatype to another"**==
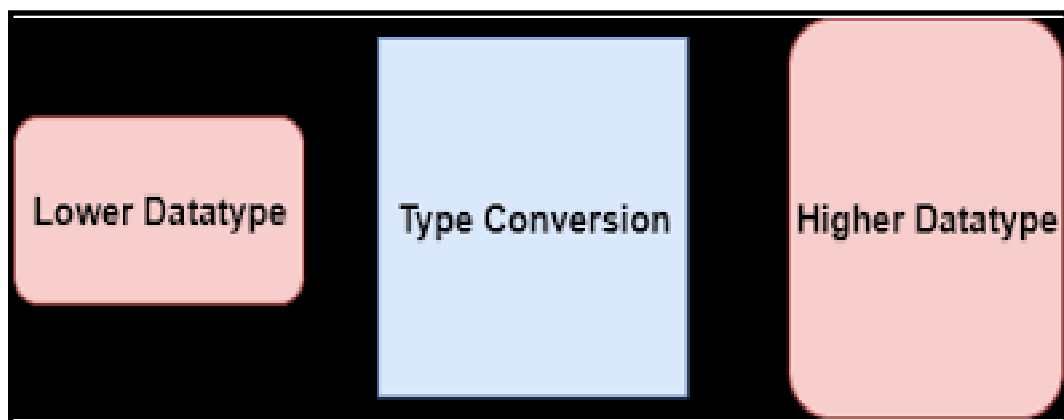
SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.

(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

Detail :-

❖ Type Casting is process of converting one data type into other data type.
❖ There are two types of type casting available.

Implicit	Explicit (Using
(Automatic Type	type cast operator)
Conversion)	

Type Casting

Implicit Type   **Explicit Type**
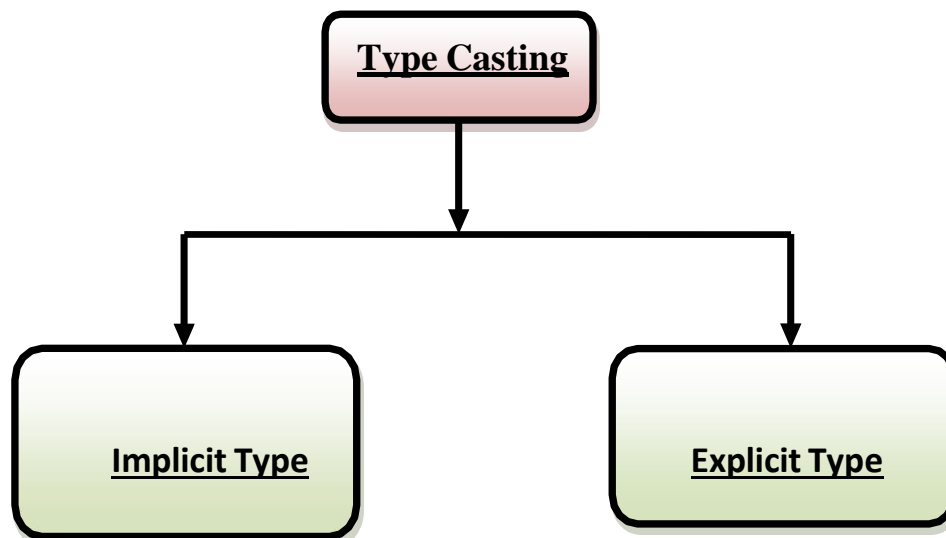
Implicit Type Conversion :
❖ The implicit type casing is also known as automatic conversion.
❖ The implicit conversion is used to convert original data type intoother data type.
❖ In this type of casting data should be converted from smaller datatype to larger data type.

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.

(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot – 360001
Ph.No–(0281)2440478

3 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot - 360001
Ph.No–(0281)2471645

Conversion Hierachy

Long double	
Double	
Float	
Unsigned long int	
Long int	
Unsigned int	
Int	
Short	char
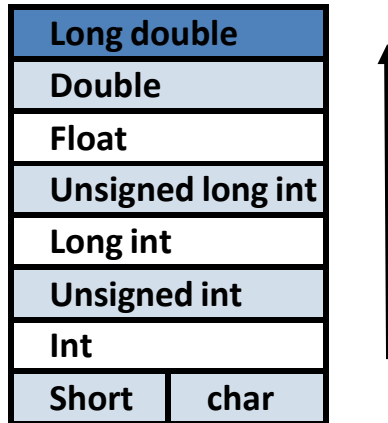
Explicit Type Conversion :

❖ Sometimes we have to convert different datatype into single datatype.
❖ But Explictit casting is not automatic conversion because we have to use type cast operator.
❖ We can change type of the data from smaller to larger and larger to smaller.

Ex :- b = (float) a;

1 Word Question – Answer

SR.NO.	QUESTION	ANSWER
1	Type casting also known as _____	Type Conversion
2	Type casting can be of_____ &_____types	Implicit & Explicit
3	Implicti Conversion also known as _____	Automatic Conversion
4	In Explicit Conversion , we have to use _____ operator to perform type casting	Type Cast

Q-7 Data types in C:

Data Type Means :- "Type of Data that you want to store"

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

Data Types in C
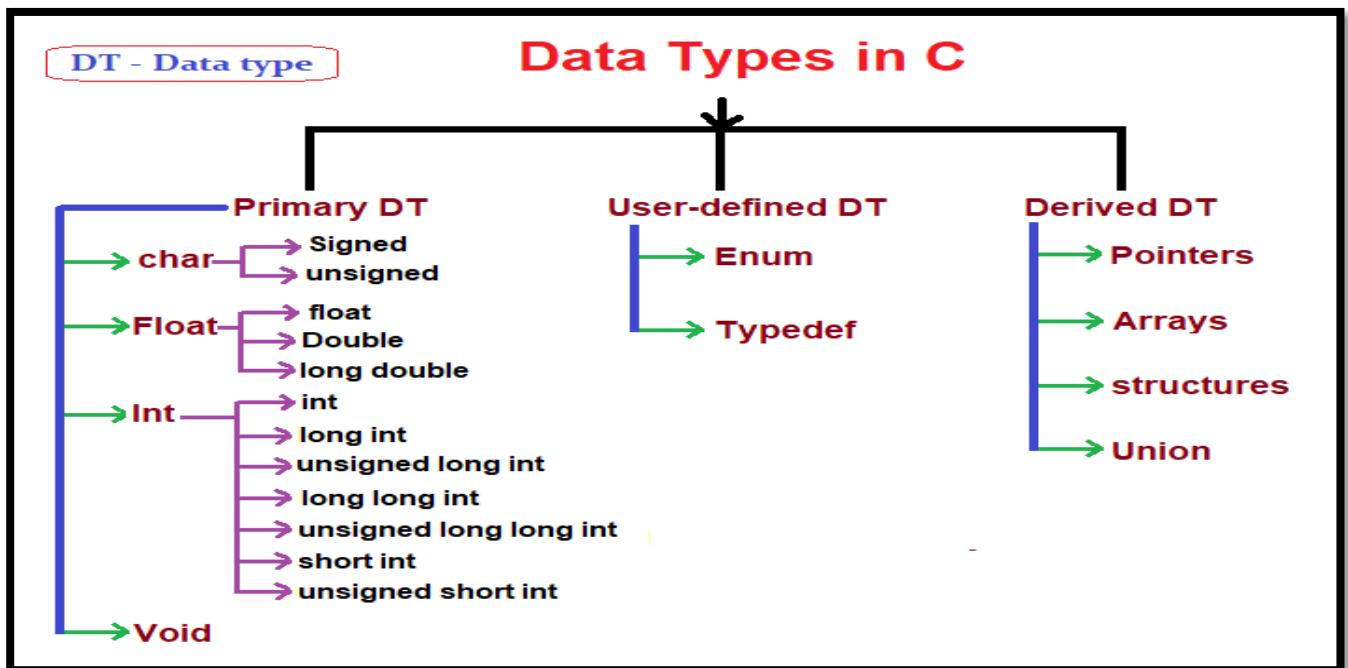
DT - Data type

Detail :-

❖ Data types are used to store different types of values in variable.
❖ In C language , there are three types of data types available.

✓ Primary/ Basic/ Fundamental Data types. (Integer, Character, Float, void)
✓ Derived Data types. (Array, Pointer)
✓ User Define Data types. (Structure, Union, enum, typedef)

Primary Data Type :

❖ The primary data types are also called fundamental or built-in orbasic
   data types.
❖ The primary data types include mainly following :

1   Integer :-
> This data type is used to store only integer value.
> It occupies 2 bytes of memory.

2   Float :- (Long)

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

This data type is used to store integer value & Decimal Value.
It occupies 4 bytes of memory.

3 Char :-
This data type is used to store single or multiple characters.
It occupies 1 byte of memory.

4 Double :-
This data type is used to store integer and decimal values.
It occupies 8 bytes of memory.

5 long double :-
This data type is used to store integer and decimal values
with highrange.
It occupies 10 bytes of memory.

User Defined Data Type :
- ❖ User defined data type is a type of data that decided by userself.
- ❖ User defined data type include mainly the following.

✓ **Typedef :-**
   ❖ It provide facility to represent identifier of particular data type.

✓ **Enum :-**
   ❖ It provide facility to declare multiple constant at the same time.

✓ **Structure:-**
   ❖ It is used to create member of different data type at the same time.

✓ **Union:-**
   ❖ It is used to create member of different data type at the same time.

SR.	DATA	MEMORY	RANGE

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

NO.	TYPE	SIZE	
1	Char	1 Byte	-128 to +127
2	Int	2 Byte	-32768 to +32767
3	Long	4 Byte	-2,147,483,648 to +2,147,483,647
4	Float	4 Byte	1.2 e -38 to 3.4 e +308
5	Double	8 Byte	2.3 e -308 to 1.7 e +308
6	Long Double	10 Bytes	3.4 e -4932 to 1.1 e +4932

1 Word Question – Answer

SR.NO.	QUESTION	ANSWER
1	Data types are used to decide type of _____ _	Data or Value
2	C Language support_____,_____ & _____categories of Data Type.	Primary User defined Derived
3	Typedef means _____	Type Definition
4	List our User defined Data types in C.	Structur eUnion Enum
5	Integer datatype occupies_____bytes ofMemory	2
6	Float datatype occupies_____byptes ofMemory	4
7	Character Datatype occupies____byte ofMemory	1

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

Q-8   **Pre-Processor in C:-**

Pre - Processor Directives in C:

Define
(To define constant value)#
Include
(To include Files)
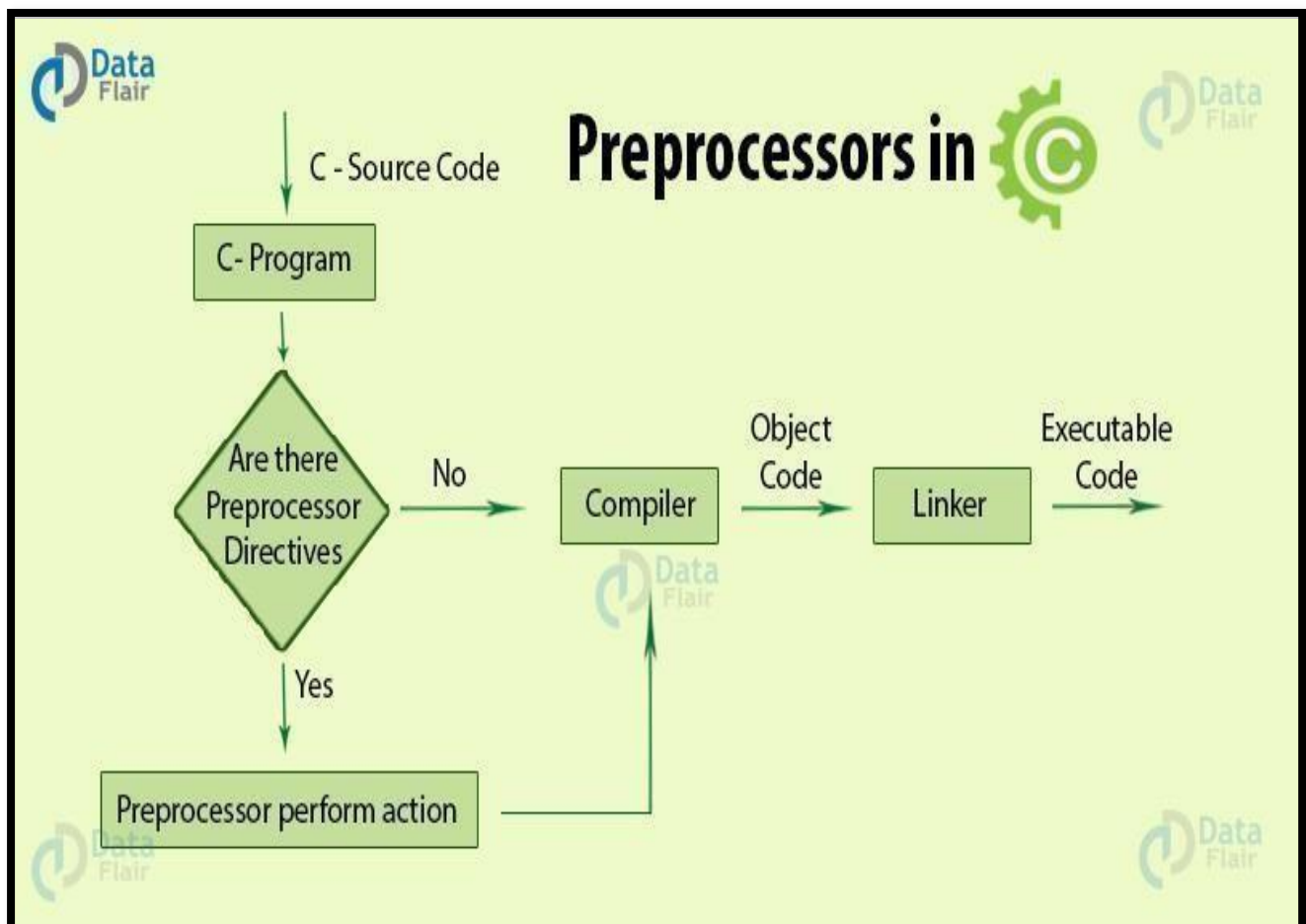
SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar   3 – Vaishalinagar
Nr. Amrapali Under Bridge   Nr. Amrapali Under Bridge
Raiya Road   Raiya Road
Rajkot – 360001   Rajkot - 360001
Ph.No–(0281)2440478   Ph.No–(0281)2471645

Detail :-

- ❖ Pre – Processor directives are executed directly by compiler.
- ❖ Any pre-processor in C language always begins with #(Hash) Sign.
- ❖ C language support following pre-processor directives.

include :

- ▪ # include is pre-processor that use to include header files in ourprogram.
- ▪ If we not include particular header file then compiler give error relatedto "prototype".
- ▪ **Example :-** #include<stdio.h>

To declare any header file you have to use angular brackets (< >).
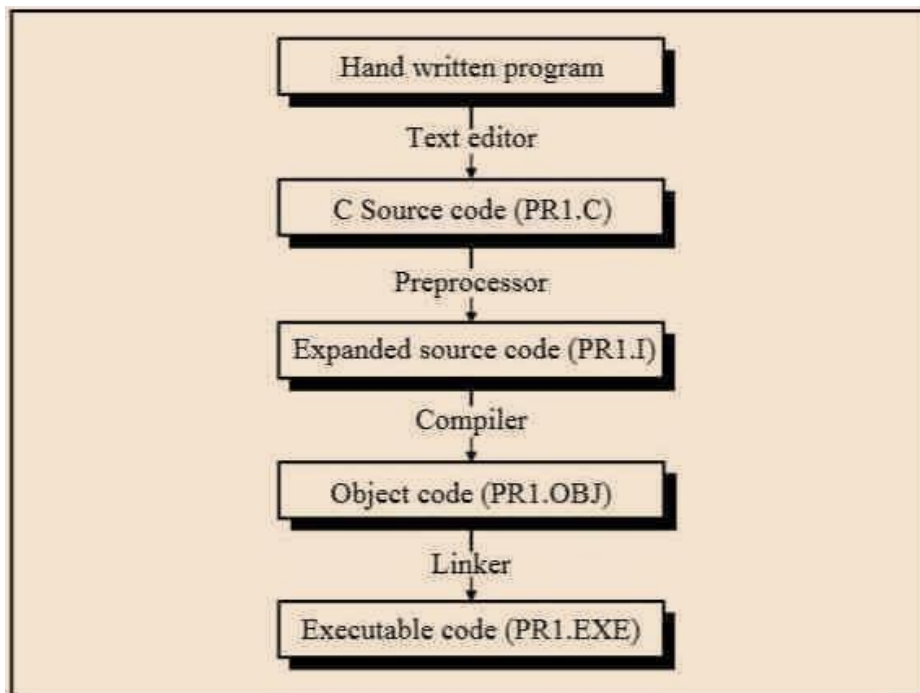
❖ # define :

- ▪ # define pre – processor is used to create symbolic constant.

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.

(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

- You can not change value of constant once it is defined.
- You can not re-define the value of constant using # define.
- **Example :-** # define pi 3.14
- **Note :-** If you use # define then statement will not ends with ;

1 Word Question – Answer

SR.NO.	QUESTION	ANSWER
1	Pre-Processor of C language are :	# define , # include
2	Any pre-processor always begins with____Sign	#(Hash)
3	_____Pre-Processor is used to add Header File.	# include
4	_____ Pre-Processor is used to declare any contant or fixed value.	# define

❖ INTRODUCTION OF LOGIC DEVELOPMENT TOOLS

WHAT IS LOGIC ??????

Logic is a tool to develop reasonable conclusions based on a given set of data. **OR**

"Way of thinking about something"
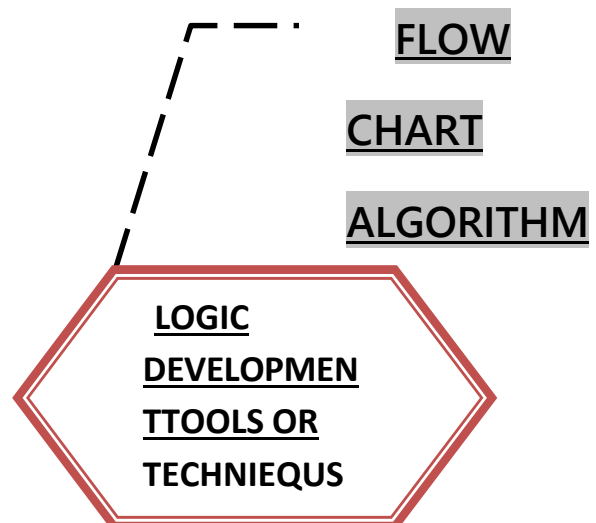
FLOW

CHART

ALGORITHM

LOGIC DEVELOPMENTTOOLS OR TECHNIEQUS

![HNS Logo]

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645
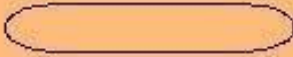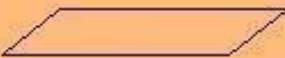
Q-9 Basics of Flowchart:

Symbols	Name	Functions
▭	Compute/Process	instructions or internal operations inside the processor or memory
▱	Input/Output	Indicating the process of input and output of data
◇	Dicision	Indicates a question at which decision has to be made and answered in the format of (Yes/No , True/False)
⬭	Connector(Inspection)	This symbol is typically small and used as a connector to show a jump from one point in the process flow to another.
▭	Predefined Process	Shows named process which is defined elsewhere
⬭	Terminal(Start/End)	It indicates the beginning and end of the program and process.
↑↓ ←	Flow Lines	Shows the Process's order of operation or sequence of instruction

Detail :-

Q   Flow chart is graphical representation of our data.

R   It also give idea about sequence of flow.

S   Flow chart can represent logic flow and process of data.

✚ Flowchart Symbols:

1.	⬭	→	Terminator
2.	▱	→	Input/Output
3.	▭	→	Process Symbol
4.	◇	→	Decision Symbol
5.	○	→	Connector Symbol
6.	✛	→	Data Flow Symbol

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.

(AFFILIATED TO SAURASHTRA UNIVERSITY)

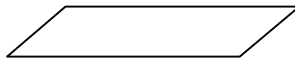| 2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

❖ Flow chart support following symbols to represent the logic.
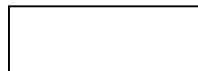
Terminator:

This symbol represents beginning and ending point in the program.
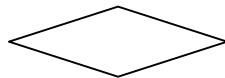
Input/Output :

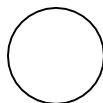It is used to represent input and output of the data.

Process :

This symbol is used to represent different process of operations.
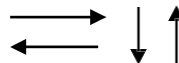
Decision Symbol:

This symbol is used to give condition and take decision.

Connector Symbol:

It is used to represent logic flow of out data.

Data Flow Symbol / Flow Direction:

It is used to represent direction flow of our data.

Advantages of flow chart :-
 ✓ Using flow chart we can easily understand logic of code.
 ✓ It represent clear view of the program.
 ✓ It represent graphical behavior of the data.

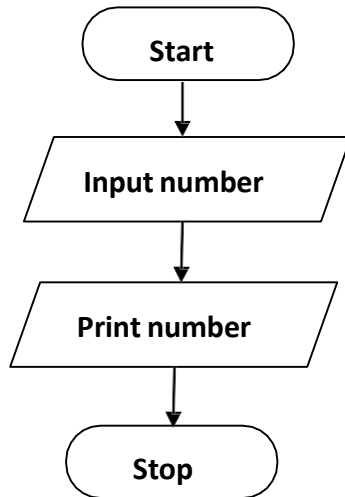**Example:**

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

A flowchart to print the number.

```
        ( Start )
            |
            v
     / Input number /
            |
            v
     / Print number /
            |
            v
        ( Stop )
```

1 Word Question – Answer

SR.NO.	QUESTION	ANSWER
1	List out logic development tools or techniques	Flowchart ,Algorithm
2	_____is graphical representation of the code.	Flow Chart
3	Which Symbol is used to represent process in Flow chart.	

Q-10 Explain Dry Run

DRY RUN :

" PROCESS OF APPLYING PROGRAMMING LOGIC

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.

(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot – 360001
Ph.No–(0281)2440478

3 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot - 360001
Ph.No–(0281)2471645

Detail :-

❖ Dry run is nothing but manual compilation of code.

❖ You can test your program without using a computer by *dry running* it onpaper.

❖ You act as the computer – following the instructions of the program,recording the valves of the variables at each stage.

❖ You can do this with a *table* .

❖ The table with have column headed with the names of the *variables* in theprogram.

❖ Each row in the table will be labelled with a line number form the program.

❖ In this table you can record all relevant changes to the variables as theprogram progresses, thereby test the logic of the program / algorithm.

❖ Do a dry run before you code your program on computer this way any logicerrors will come to light during the dry run.

▪ **Example :-**

▪ L1 Declare two variables , first num second num
▪ L2 Initialise both variables to 0
▪ L3 first num = 0 second num = 0
▪ L4 Ask user to enter first number
▪ L5 Assign user input to first num variable
▪ L6 Ask user to enter second number
▪ L7 Assign user input to second num variable
▪ L8 Add first num to second num
▪ L9 Print result

1 Word Question – Answer

SR.NO.	QUESTION	ANSWER

2 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot – 360001
Ph.No–(0281)2440478

3 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot - 360001
Ph.No–(0281)2471645

1	What is Dry run?	"Manual Compilation ofCode."
2	In Dry run , you can test your program by performing steps on paper.(Yes/No)	Yes

Q-11 Explain Algorithm.

ALGORITHM :-

" DETAIL SEQUENCE OF SIMPLE STEPS" OR"IT CONSIST SET OF FINITE STEPS"

Characteristics of an Algorithm
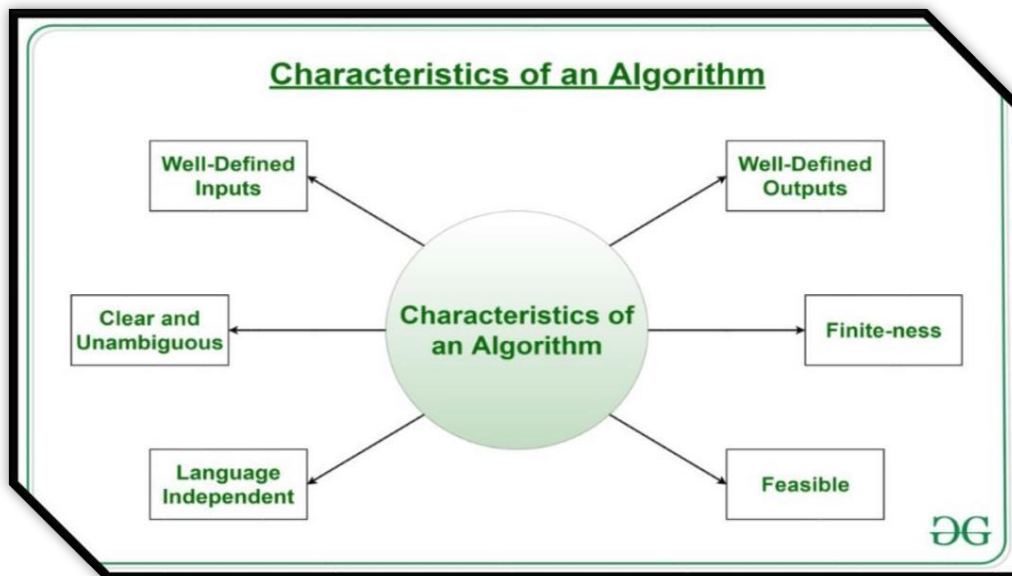
Detail :-

- Algorithm is one of the best logic development technique.
- It is detail sequence of solving the problem.

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar	3 – Vaishalinagar
Nr. Amrapali Under Bridge	Nr. Amrapali Under Bridge
Raiya Road	Raiya Road
Rajkot – 360001	Rajkot - 360001
Ph.No–(0281)2440478	Ph.No–(0281)2471645

- In algorithm we can manage input and output as well as any condition.

Features of Algorithm :-

    a. Input :- There must be atleast one input.
    b. Output :- There must be atleast one output.
    c. Effectiveness :- Each step of algorithm must be effective.

Example: An algorithm for multiplication of two values.

Step 1: Start
Step 2: Input value -1
Step 3: Input value -2
Step 4: Calculate ans = value -1 * value -2Step
Step 5: Print ans
Step 6: Stop

1 Word Question – Answer

SR.NO.	QUESTION	ANSWER
1	What is Algorithm?	"sequence of simple steps"
2	Algorithm must _____ after finite steps.	terminate

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot – 360001
Ph.No–(0281)2440478

3 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot - 360001
Ph.No–(0281)2471645

SUMMARY QUESTIONS OF CHAPTER -1

ONE - MARK QUESTIONS

- ✓ Who is known as Father of C Language?
- ✓ How Many Keywords Available in C Language?
- ✓ What is Dry Run?
- ✓ List out Different Tokens.
- ✓ Character Set includes___,_____&_____.
- ✓ What is Variable?
- ✓ What is Constant?
- ✓ In C Language String can be represented by___.
- ✓ Integer Datatype Occupies_Bytes in Memory.
- ✓ What is Use of SizeOf Operator?
- ✓ Conditional Operators are_____&___.
- ✓ What is Signed Interger and What is Unsigned Integer?
- ✓ Void Datatype returns_____.

TWO - MARK QUESTIONS

- ✓ Explain Pre-Processor in C.
- ✓ What is Type Casting?Explain with Types.
- ✓ List out different Advantages of FlowChart.
- ✓ Explain Keywords in Brief.
- ✓ Explain String with Example.
- ✓ Explain Different symbols of FlowChart.

THREE - MARK QUESTIONS

- ✓ Explain Hierarchy of Operators in C.
- ✓ Write down Algorithm for Swapping of Two Numbers.
- ✓ Write note on Structure of C Program.

SHREE H. N. SHUKLA COLLEGE OF I.T. & MGMT.
(AFFILIATED TO SAURASHTRA UNIVERSITY)

2 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot – 360001
Ph.No–(0281)2440478

3 – Vaishalinagar
Nr. Amrapali Under Bridge
Raiya Road
Rajkot - 360001
Ph.No–(0281)2471645

- ✓ Explain History of C Language.
- ✓ List out different Logic Development Tools/Techniques and
- ✓ Explain any one in brief.

FIVE - MARK QUESTIONS

- ✓ Explain DataTypes of C.
- ✓ Write note on Computer Languages.
- ✓ Give Difference between Assembly and Machine Level Language.
- ✓ Write note on different Operators available in C.