≈ C Language :- The language were developed in 1970s at Bell laboratories by Dennis ritchie. It was design for programming in the operating system called unix.
After the advent of C the unix operating system was rewritting it.

≈ Characteristics of C :-
It is the middle level language. It has the simplicity of high level language as well as the low level language. This aspect of C ~~market~~ makes it suitable for writing both application programming and system programming. It is an excellent efficient and general purpose language for most of the application such as mathematical, scienstific, bussiness and system software application.

Programming language :-
Before learning any language it is it is important to know various types of languages and their features.
The programming language can be classified into two types :-

1. Low - level language
2. High - level language

Low - level language :-
The language in this catagory are the machine language and assembly language.

Machine level language :-
Computers can understand only digital signals which are in 0 and 1.
The instructions given to the computer can be only in binary codes. Computer can understand only machine language. The machine language consist of instructions that are in binary 0 and 1.

Assembly language :-
In assembly language instructions are given in English like words such as MOV, ADD, SUB etc. It is easy to write and understand assembly program since a computer can understand only machine language. The translator that is use for translating is called assembler.

High-level language :-

For translating a high level language program into machine language compiler or interpreter is used. Every language has its own compiler or interpreter. Some language in this catagory : FORRAN, COBOL, PASCAL etc.

Translators :-

① Compilers.
② Assembler
③ Interpreter

1. **Compiler :-** Compiler and Interpreter are used to covert the code of high level language into machine language. This high level language is known as source program and corresponding machine language program is known as object program both compiler and Interpreter perform the same task. But ~~their~~ there is a difference in their working. A Compiler search all the error of the program and list them and the Interpreter checks the error of program statement by statement.

✡ Structure of C Program :-

C program are a collection of one or more functions every function is a collection of statements and perform specific task.

```
Comments
preprocessors directives
  Global variables
main ( ) function
  {
local variables.
  Statements
  - - - - - -
  }
function 1 ( ).
  {
local variables
  Statements
  - - - - - - -
  }
function 2 ( ).
  {
local variables.
  Statements
  - - - - - - -
  }
```

Comments :- Comments can be place anywhere in a program and are inclosed b/w the delimeters /* and */. comments are generaly used for documentation purpose.

Preprocess directive :- The commonly used preprocessors directive are # include and # define. # include can be used for including header files. # define can be used for define symbolic constants and macros.

Every C program has one or more functions. If a program has only one function than it must be main function. Execution of C program start with main( ) function. It has two parts declaration of local variables and statements.

✡ Elements of C :-

Every language has some basic elements and grammatical rules. Before understanding programming it must know the basic elements of C language.

The Basic elements are. characterset, variables, data types, Constants, key words, variables declaration,

expressions, statements etc.
All of these are used to construct a C Program.

(1) C Character Set :-

Alphabets :- A B C D ------ Z.
a b c d ------ z

Digits :-

Digits :- 0, 1 ------ 9

✡ Special characters :→

Character	Meaning	Character	Meaning
+	Plus sign	-	Tilde.
*	Asterisk	%	Percentage sign.
\	Backward Slash	/	Forward slash
<	less than sign	=	equal to
>	greater than sign	_	under score
(	left Parent thesis	}	Right Braces
{	left Braces	)	Right Parent thesis
[	left Bracket	]	Right Bracket
,	Comma	.	Period
?	Question mark	"	Double quotes
&	Ampersand	;	Semi colon
@	At the rate	!	Exclamation
'	Single goutes	|	vertical Bar Sign
$	Dollar sign.	^	Caret sign
:	Colon	#	Hash sign

Delimeters :-

Delimeters are used for syntatic meaning. These are given below.

:	Colon	used for label
;	Semi Colon	End of statements
( )	Parenthesis	used in expressions
[ ]	Square bracket	used for array
{ }	Curly bracket	used for block of statements
#	Hash	Preprocessor Directive
,	Comma	Variable Delimeter

Reserved words / Key words :-

These are certain words that are reserve for doing specific task. These words are known as keywords. They are always written in lower case. There are only 32 keywords in C which are given below:

Auto	break	Case	Char.
Const.	Continue	Default	Do
Double	else	Enum	Extern
Float	for	Go to	if
int.	long	Register	Return
Short	Signed	Size of	Static
Struct	Switch	Type def.	union
unsigned	void	Volatile	while.

* Identifiers :- Keyword are the predefine and can't be changed by the user. While Identifier are user words and are used to give names to entities like variables, arrays, functions, structure etc. Rules for naming Identifiers are given below as :-

1. The name should consist of only alphabates (both upper and lower case) digit and under score sign (___).
2. First character should be an alphabate or underscore.
3. The name should not be a keyword.
4. Since C is case sensitive. The upper case and lower case letters consider different.

for example :- Code
code
CODE
are the three diff. identifire.

Some examples of valid identifires name given below :-

Value
a
net_play
rec1
_data
MARKS

Some of invalid identifiers are given below :-

5bc
int
rec#
reg no.

* Data types :-

C supports different types of data. There are four fundamental data types in C which are :-

Int
Chara
float
double

Int :- Int is used to share integer value.

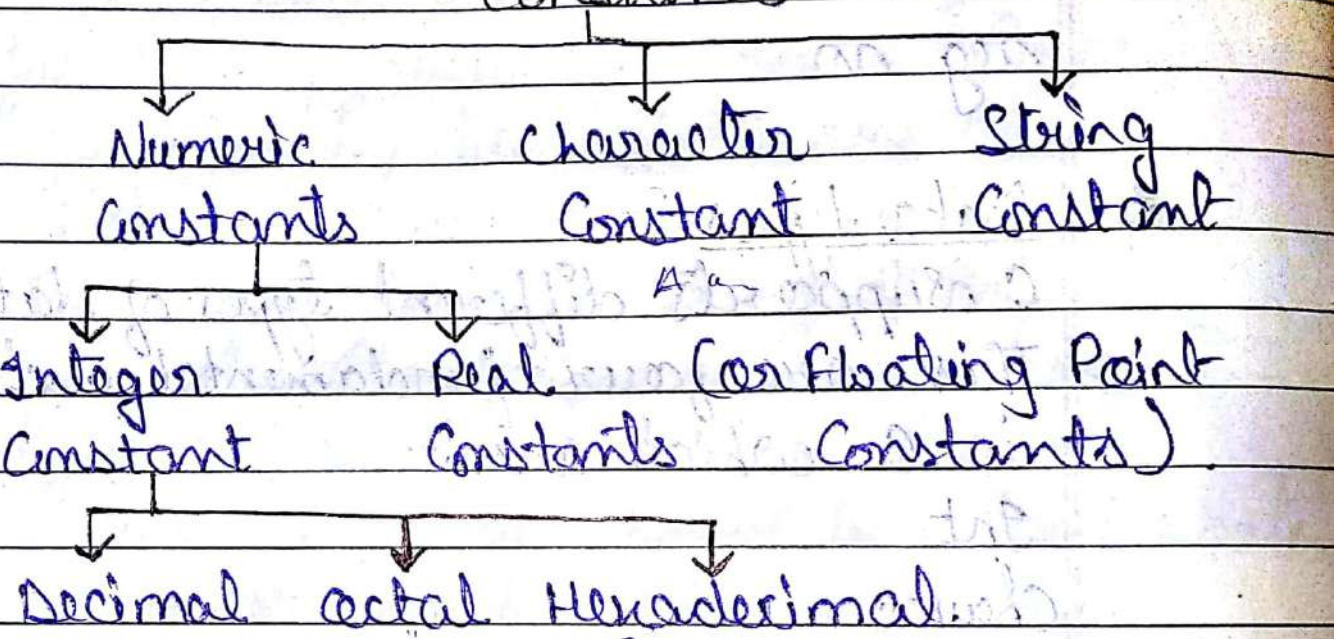
Charac :- Character is used to store any size single character.

Float :- Float is used for storing single precision floating point number.

Double :- Double is used for storing double precision floating point no.

Type	Storage size	Value range.
Char.	1 byte	-128 to 127
Int	2 byte	-32,768 to 32,767.
Float	4 byte	3.4E-38 to 3.4E+38
double	8 byte	1.7E-308 to 1.7E+308

☆ Constants :- Constant is a value that cannot be changed during execution of a program. There are three types of constants.



1. Numeric Constants :- Numeric constant consist of numeric digits that may or may not have decimal point. These are the rules for defining numeric constants.

i) Numeric constants should have atleast one digit.

ii) No comma or space is alow within the numeric constants.

iii) Numeric constants can either be positive or negative but default sign is always positive.

There are two types of Numeric constants.

a). Integer constants :- Integer constants are nos. which have no decimal points. These are three types of integer constants base on different no. system.

i) Decimal constant :- (0, 1, 2 ---9)
Base = 10.

ii) Octal Constant :- (0, 1, 2 ---7), Base = 8.

iii) Hexadecimal :- (0, 1, 2 ---9), (A, B, C, D, E, F), Base = 16.

Some valid decimal Integer constants are
123, 3705, 38467, 456896.

Some invalid decimal Integer constant are given below :-

2.5	Illegal character (.).
3#5	Illegal " (#).
98 5	No space alow.
0925	First digit cannot be Zero.
8,354	Comma is not alow.

- In octal Integer constant First digit must be 0.
example :- 05, 07, 088, 0789.

- In Hexadecimal Integer constant first two characters should be 0x or 0x
example :- 0x, 0X23, 0XFFF.

b. Real (Floating Point) Constant :-
Floating Point constants are Numeric constants that contains decimal point Some valid floating constants are :-
. 0.5 , 5.3.

2. Character :- Co character constant is a single character that is enclosed within single quotes.
Some valid character constant are:
'1' , '#'.

3. String Constant :- String constant has 0, 1 or more than 1 character. A string constant is enclose within double quotes.
Some valid string character Constant are:
"8", "Kumar", "593", " ", "A".

4. Variables :- Variable is a name that can be use to store value. Variable can take different value but one at time. These value can be changed during execution of program.
A data type is associated with each variables. The data type of the variable decide what value it can take.

✡. **Declaration of variables :-**

Declaration of variables specify its name and data type. The type and range of value that a variable can store depend upon its datatype. The syntax of declaration of variable is

datatype variable name ;

Here datatype may be int., float, char., double etc..

Some example of declaration of variable are :- Int x;

float salary;

char great;

Here x is a variable of type int., salary is a variable of type float, great is a variable of type character.

We can also declare more than one variable in a single declaration.

eg :- (Int. x, y, z, total;)

Here Int. x, y, z, total are all variables of type Int.