CHAPTER -4

CONSTANTS ,VARIABLES AND DATA TYPES

C Character set

- It denotes any alphabet, digit or special symbol used to represent information.

Source character set

a. Alphabets
b. Digits
c. Special Characters
d. White Spaces

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ALPHABETS

Uppercase letters	A-Z
Lowercase letters	a-z

DIGITS 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

- **SPECIAL CHARACTERS**

  ~ ` ! @ # % ^ & “ ‘ ( ) [ ] { } + - * / \ _
  = ; :

  , . < > ? |

White spaces

Includes space ,tab (\t,\v)

New line (\n)

C TOKENS

- The smallest individual elements or units in a program are called as Tokens. C has following tokens.
- Identifiers
- Keywords
- Constants
- Operators
- Special characters

Keywords

- There are some reserved words in C, called keywords.
- All the keywords have some pre-defined meaning and can be used only for the purpose intended.
- All the keywords must be written in lower case letters.

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

Identifiers

- Identifier refers to name given to entities such as variables, functions, structures etc.
- The rules for writing identifiers are

A valid identifier can have letters (both uppercase and lowercase letters), digits and underscores.

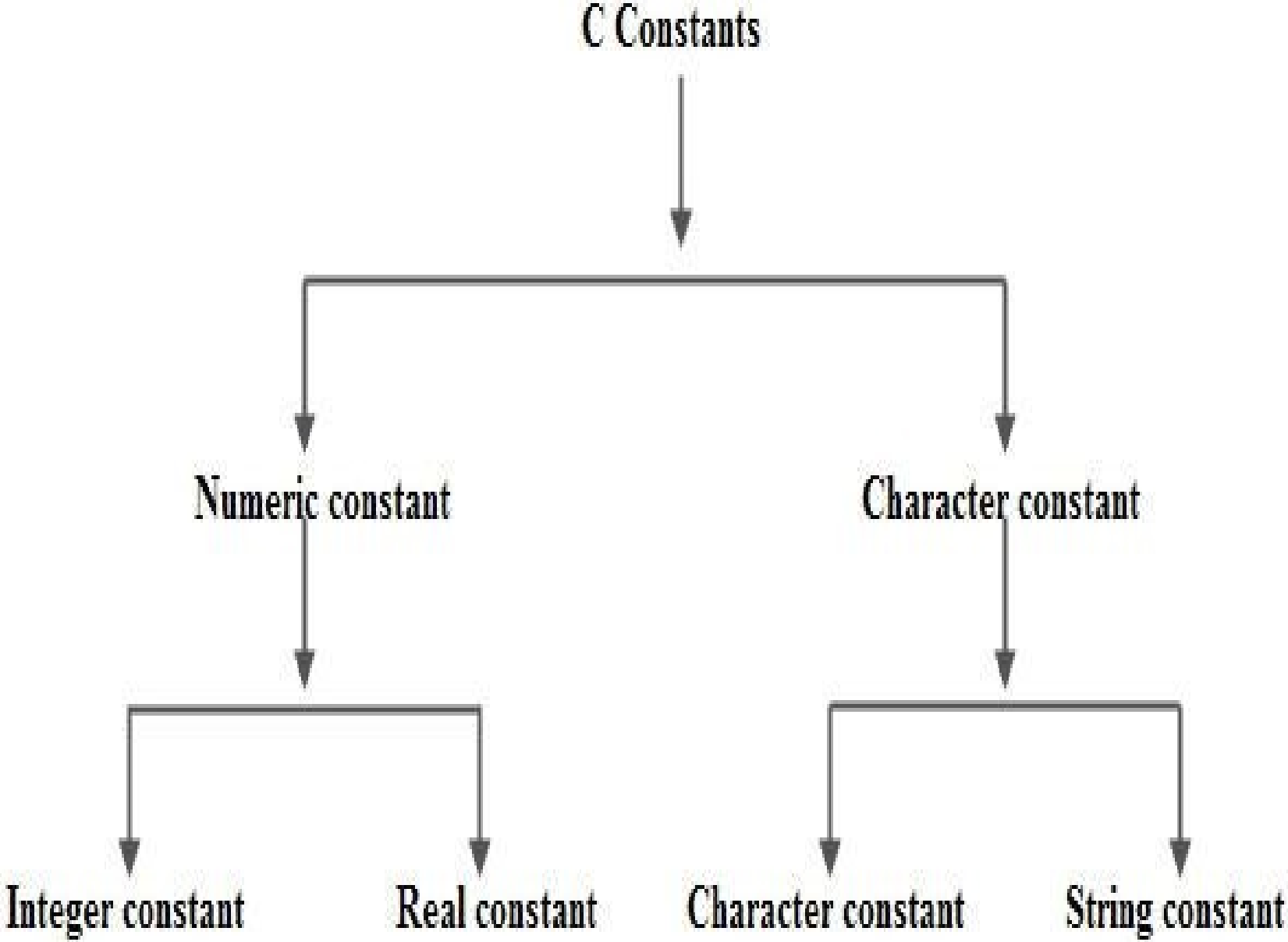
The underscore symbol is used in middle of the variable.

example

- Sum
- Average
- Total_marks
- X1
- Y1
- pincode

Constants

- The value of a constant cannot be changed during execution of the program, neither by the programmer nor by the computer.


C Constants
Numeric constant
Character constant
Integer constant
Real constant
Character constant
String constant

Integer Constant

- An Integer constant consists of sequence of digits.
- Three types of integer constants

  Decimal (0-9) (e-x) 345,890

  Octal (0-7) (e-x) 051,044

  Hexadecimal(0-9,A,B,C,D,E,F)

  (e-x) oABC,oA1

Real Constants

- Quantities which are represented by numbers with fractional part are called real constants.

Rules for real constant

1) It must have decimal point.
2) It can be either positive or negative.
3) No commas or blanks are allowed with in real constant.

E-x 0.98. 9.876

Character constant

Character constant is a single character within single quotes

E-x

‘a’, ‘b’, ’c’

String Constant

- A string constant consists of zero or more number of characters enclosed within double quotes.

E-x

“red”, “phone”

Escape sequence

- These are special backslash character constants.
- It is denoted by backslash followed by a particular character.

- E-x
- \n - new line,
- \t - horizontal tab
- \v - vertical tab

Variables

- A variable is an identifier used to store a single data item.

The rules for naming a variable are

- Variable name starts with letter followed by letters, digits or combination of both.
- No special character except the underscore symbol.
- Maximum length of a variable name should not exceed 32 characters.

Data types

- Integer (int)
- Character (char)
- Floating point (float)
- Double precision floating point (double)

Data type	**Size in bytes**
int	2 bytes
Char	1 byte
Float	4 bytes

Integers

- Integer is used to store whole numbers

Signed int	2 bytes
unsigned int	2 bytes
signed short int	1 byte
unsigned short int	1 byte
signed long int	4 bytes
unsigned long int	4 bytes

Floating point data types

- Single precision floating point data types are declared by using the keyword **float**.
- Floating point numbers occupy 4 bytes.

Double precision data types

- The double specification allows storage in 8 bytes.
- The keyword double is used.

Character data type

- It store a single character and are declared by the keyword char.
- The size of the character data type is one byte.

Declaring variables

- A variable declaration consists of a data type followed by one or more data names and ending with semicolon.
- This declaration informs the compiler about the name of the variable and the type of data it will store.

data type v1,v2,…vn;

E-x int a,b,c;

float avg;

Assigning values to the variables

- In the declaration part
- In executable part by using assignment statement.
- Through input from keyboard

ASSIGNMENT STATEMENT

- Variables can be assigned values by using assignment operator = . The syntax is

variable name = constant/variable/expression;

E-x

a=0;

K= total1+total2;

MACROS

- A *macro* is a fragment of code which has been given a name. Whenever the name is used, it is replaced by the contents of the macro.
- #define is a preprocessor directive used to define the macro.

- The general form of macro definition is

  #define name replacement-string

E-x

#define max_marks 100

#define pi 3.14

#define college “new horizon”

Rules for macros

- They are usually defined at the beginning of the program.
- #define statement must not terminated with ;
- When the program is compiled, every occurrence of the macro name is replaced with its value.

Advantages of macro

- Macros make the program more clear.
- Macros enhance the understandability of the program.
- They make the program easily modifiable.