Unit-2 (Introduction to C)

❖ Explain Character set in C programming.

- A character set is a set of alphabets, letters and some special characters that are valid in C language.
- **Alphabets:**
  - Uppercase: A B C ..... X Y Z
  - Lowercase: a b c ..... x y z
- **Digits:**
  - 0 1 2 3 4 5 6 7 8 9
- **Special Characters:**
  - newline, tab, space, < > . _ ( ) ; □ : % [ ] # □ ' & { } "

❖ What is keywords in C?

- A keyword is a **reserved word**.
- You cannot use it as a variable name, constant name, etc.
- There are only 32 reserved words (keywords) in the C language.
- **Ex:** Few keywords are listed below as:

auto	break	case	char	const	continue	default	do
double	else	enum	extern	float	for	goto	if
int	long	case	return	switch	if	sizeof	break

❖ Define Identifiers and write down its rules.

- An identifier is a collection of alphanumeric characters that begins either with an alphabetical character or an underscore
- C identifiers represent the name in the C program.
- For example, variables, functions, arrays, structures, unions, labels, etc.
- All C variables must be identified with unique names.
- **Rules for an Identifiers:**
  - The first character of an identifier should be either an alphabet or an underscore.
  - Names can contain letters, digits and underscores
  - Names must begin with a letter or an underscore (_)
  - Names are case sensitive (myVar and myvar are different variables)
  - Names cannot contain whitespaces or special characters like !, #, %, etc.
  - Reserved words (like C keywords, such as int) cannot be used as names
  - The length of the identifiers should not be more than 31 characters.

❖ What do you mean by Comment in c?

- Comment can be used to explain C Prog code and to make it more readable.
- There are 2 types:

- **Single Line comment**
  - Single-line comments start with two forward slashes (//).
  - Ex:

```
// This is a comment
printf( "Hello World!");
```

- **Multi-Line comment**
  - Multi-line comments start with /* and ends with */.
  - Ex:

```
/* the code below will print the words Hello World!
to the screen, and it is amazing */
printf( "Hello World!");
```

❖ What are the data-types used in c?

➢ A data type specifies the type of data that a variable can store such as integer, floating, character, etc.

- There are many data types used in c as follow:
  - **int:**
    - ♦ Stores whole numbers, without decimals and
    - ♦ Required 4 bytes in size.
      - ➢ Ex:

```
int myNum = 1000;
printf("%d",myNum);
```

  - **float:**
    - ♦ Stores fractional numbers, containing one or more decimals.
    - ♦ Sufficient for storing 7 decimal digits.
    - ♦ Required 4 bytes in size.
    - ♦ Ex:

```
float myFloatNum = 5.99;
printf("%f",myFloatNum)
```

  - **double:**
    - ♦ Stores fractional numbers, containing one or more decimals.
    - ♦ Sufficient for storing 15 decimal digits.
    - ♦ Required 8 bytes in size.
    - ♦ Ex:

```
double myDoubleNum= 89.556;
printf("%lf", myDoubleNum)
```

  - **char:**
    - ♦ Stores single characters, such as 'a' or 'B'.
    - ♦ Char values are surrounded by single quotes [' '].
    - ♦ Required 1 bytes in size.
    - ♦ Ex:

```
char myGrade = 'B';
printf("%c", myGrade) //B
```

- **bool:**
  - A boolean data type is declared with the bool keyword.
  - It can only take the values **true** or **false**.
  - Ex:

```
bool isCodingFun = true;
bool isFishTasty = false;
printf("%d", isCodingFun) // Outputs 1 (true)
printf("%d", isFishTasty) // Outputs 0 (false)
```

❖ What is Variable in C? Write down its syntax and Example

- Variables are containers for storing data values.
- In C, there are different **types** of variables (defined with different keywords),
- for example:
  - int - stores integers (whole numbers), without decimals, such as 123 or -123
  - float - stores floating point numbers, with decimals, such as 19.99 or -19.99
  - char - stores single characters, such as 'a' or 'B'. Char values are surrounded by single quotes
  - bool - stores values with two states: true or false
- **Syntax**
- *data_type variable_name = value;*
- Example

```
int myNum = 5;
double myFloatNum = 5.99;
char myLetter = 'D';
string myText = "Hello";
bool myBoolean = true;
```

❖ What are operator used in C?

- Operators are used to perform operations on variables and values.
- C divides the operators into the following groups:
  - **Arithmetic Operator**
  - **Comparison Operator**
  - **Assignment Operator**
  - **Logical Operator**
- **Arithmetic Operator:**
  - Arithmetic operators are used to perform common mathematical operations.

Operator	Name	Description	Example
+	Addition	Adds together two values	x + y
-	Subtraction	Subtracts one value from another	x - y
*	Multiplication	Multiplies two values	x * y

/	Division	Divides one value by another	x / y
%	Modulus	Returns the division remainder	x % y
++	Increment	Increases the value of a variable by 1	++x
--	Decrement	Decreases the value of a variable by 1	--x

- **Comparison Operator:**
  - Comparison operators are used to compare two values.
- **Note**: The return value of a comparison is either true (1) or false (0).
  - Example:

```
int x = 5;
int y = 3;
printf("%d",x > y);  // 1
```

- A list of all comparison operators:

Operator	Name	Example
==	Equal to	x == y
!=	Not equal	x != y
>	Greater than	x > y
<	Less than	x < y
>=	Greater than or equal to	x >= y

- **Assignment Operator:**
  - Assignment operators are used to assign values to variables.
  - A list of all assignment operators:

Operator	Example	Same As
=	x = 5	x = 5
+=	x += 3	x = x + 3
-=	x -= 3	x = x - 3
*=	x *= 3	x = x * 3
/=	x /= 3	x = x / 3
%=	x %= 3	x = x % 3

- **Logical Operator:**
  - Logical operators are used to determine the logic between variables or values:

Operator	Name	Description	Example
&&	Logical and	Returns true if both statements are true	x < 5 && x < 10
||	Logical or	Returns true if one of the statements is true	x < 5 || x < 4
!	Logical not	Reverse the result, returns false if the result is true	!(x < 5 && x < 10)

❖ Explain Escape Sequence in C.

- An escape sequence is a sequence of characters that does not represent itself when used inside a character or string literal,
- In C, all escape sequences consist of two or more characters, the first of which is the backslash, **** (called the "Escape character").

- For example:

Escape Sequence	Meaning
\n	New Line
\t	Tab (Horizontal)
\\	Backslash
\'	Single Quote
\"	Double Quote
\?	Question Mark
\0	Null

❖ What do you mean by Constant C?

- A constant is a value or variable that can't be changed in the program.
- const keyword is used to declared constant variable.
- List of constants in c as follow :
  - Integer Constant (Ex: 10, 20, 30)
  - Float Constant (Ex: 10.5, 3.14, 30.5)
  - Double Constant (Ex: 10.67, 20.55, 30.77)
  - String Constant (Ex: "C", "Programming")
  - Character Constant (Ex: 'A', 'B', 'Z')
- **Syntax:** ***const data_type variable_name = values;***
  - const float pi = 3.14;
  - const int num1 = 20;
  - const char c='A';

❖ What is Tokens in C?

- It is the building block or the basic component for creating a program in C language.
- Tokens in C language can be divided into the following categories:
  - Keywords in c
  - Identifiers in c
  - Strings in c
  - Operators in c
  - Constant in c
  - Special Characters in c