Mts. DDB & KNG BBA BCA COLLEGE AMRAPUR

Subject code: CS-02

Subject Name: Problem Solving Methodologies And Programming in C

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UNIT 1 Introduction of C Language

SECTION A

1. **What is Flowchart?**
   -This diagrammatic representation illustrates a solution model to a given problem. **OR**
   -Flowchart is a graphical representation of an algorithm.

2. **What is Algorithm?**
   Algorithm is a procedure or step-by-step instruction for solving a problem.

3. **What is Variable?**
   A variable is a name of the memory location. It is used to store data. Its value can be changed, and it can be reused many times.

4. **What is Token?**
   Tokens in C are the most important element to be used in creating a program in C. We can define the token as the smallest individual element.

5. **What is type casting?**
   Type casting is a way to convert a variable from one data type to another data type.

6. **How many bits occupies by character data type?**
   Each character is stored using eight bits of information, giving a total number of 256 different characters (2**8 = 256).

7. **List out bitwise operator.**
   - & bitwise AND
   - | bitwise OR
   - ^ bitwise Ex-OR
   - ~ complement
   - >> right shift
   - << left shift

8. **C language is developed by** Dennish Ritchie**.**

9. **What is Program?**
   Program is set of instruction for computer**.**

10. **The stdio.h is stands for** Standard Input Output Header File.

11. **What is sizeof() in C?**
    It's an operator.

12. **What would be output of following C code?**

```
void main ( )
 {
    int x = 2;
Printf ("%s" , !(x%2)? "FYBCA" : SYBCA");
}
```

    Output = FYBCA

13. **BCPL Stands for** Basic Combined Programming Language.

14. **Which format symbol is used for scanning of string?**
    %S is used for scanning of string.

SECTION B

1. **Explain C-character set.**
   The C character set consists of upper and lowercase alphabets, digits, special characters and white spaces.

2. **Explain the typedef data type.**
   Users can define their own data type of identifier that represents an existing data type. The user defined data type identifier can later be used to declare variable.
   Syntax: typedef < data type > <identifier name >;

3. **Explain enumerated data type.**
   It is user defined data type. It is mainly used to assign names to integral constants, the names make a program easy to read and maintain. Which is defined as
   enum identifier name { value1, value2, ……value n};

4. **What is Constant in C?**
   A constant is a value or variable that can't be changed in the program, for example: 10, 20, 'a', 3.4, "c programming" etc. Constants are also called literals. Constants can be any of the data types.

5. **Explain History of C language.**

   C programming language was developed in 1972 by Dennis Ritchie at bell laboratories of AT&T (American Telephone & Telegraph), located in the U.S.A. Dennis Ritchie is known as the founder of the c language.

   It was developed to overcome the problems of previous languages such as B, BCPL, etc. C language was developed to be used in UNIX operating system. It inherits many features of previous languages such as B and BCPL.

6. **What is the use of typedef?**

   The typedef help in easier modification when the programs are ported to another machine. A descriptive new name given to the existing data type may be easier to understand the code.

7. **What is output of following code?**

```
 void main ( )
{
  int x=2;
  printf (“ %d %d %d %d “, ++x,x--,x++,--x);
}
```

   Output of following code is 2 2 1 1

8. **What is Constant? Types of Constant.**

   It means value cannot change during program execution. The const keyword is used to declare a constant. Just like…

```
  int const x = 50;
 cont int  x = 50;
```

   const keyword can be specified before or after a data type.

   Type of constant

   - Numeric Constant
   - Character Constant

9. **What is Data type?**

   During variable declaration it is required to mention that what type of data is stored in that variable and that specify type of data is known as data type. Example: int, Double, void, Character.

10.What are the modifiers available in C programming language?

There are 5 modifiers available in the C programming language as follows**:**

- Short
- Long
- Signed
- Unsigned
- long long

SECTION C

1. **Explain Preprocessor Directives.**

Directives	Function
#include	Specifies the file to be included
#define	Define the macro substitution
#undef	Undefines a macro
#if	Test a compile time condition
#else	Specifies alternative when #if test fails
#ifdef	Test definition

2. **Write naming rules for variable declaration.**
   - Variable name always start with alphabet.
   - White space is not allowed in variable name.
   - Variable name should be unique.
   - Keyword cannot be used as a variable name.
   - Variable name can be in form of uppercase or lowercase that contains letters, digits, and only underscore symbol.
   - Variable names are case-Sensitive **. i.e** sum,Sum,SUM these all three are different variable names.

3. **Explain Increment and Decrement Operator.**

   It is very useful operators also known as unary operators. The operator ++ means “add 1” value to variable and assign to same variable. Operator – means “subtract 1” variable and update value in same variable or “decrement by 1”.

   For example :

   a = a + 1 or a + =1 or a ++

   b = b – 1 or b - = 1 or b - -

4. Explain C Tokens.

Token	Meaning
Keyword	A variable is a meaningful name of data storage location in computer memory. When using a variable you refer to memory address of computer
Constant	Constants are expressions with a fixed value
Identifier	The term identifier is usually used for variable names
String	Sequence of characters
Special Symbol	Symbols other than the Alphabets and Digits and white-spaces
Operators	A symbol that represent a specific mathematical or non mathematical action

5. Explain String Constant.

- String is “Sequence of Characters“.
- String Constant is written in Pair of Double Quotes.
- String is declared as Array of Characters.
- In C , String data type is not available.
- Single Character String Does not have Equivalent Integer Value i.e ASCII Value.

6. **How to install C.**

   There are many compilers available for c and c++. You need to download any one. Here, we are going to use Turbo C++.

   It will work for both C and C++. To install the Turbo C software, you need to follow following steps.

1. Download Turbo C++
2. Create turboc directory inside c drive and extract the tc3.zip inside c:\turboc.
3. Double click on install.exe file.
4. Click on the tc application file located inside c:\TC\BIN to write the c program.

7. **What are the key features in the C programming language?**
   Features are as follows:
   Portability: It is a platform-independent language.
   Modularity: Possibility to break down large programs into small modules.
   Flexibility: The possibility of a programmer to control the language.
   Speed: C comes with support for system programming and hence it compiles and executes with high speed when compared with other high-level languages.
   Extensibility: Possibility to add new features by the programmer.

8. **What are the basic data types associated with C?**

   Int – Represent the number (integer)
   Float – Number with a fraction part.
   Double – Double-precision floating-point value
   Char – Single character
   Void – Special purpose type without any value.

SECTION D

1. **Explain features of C language.**

   C is the widely used language. It provides many features that are given below.

   - **Simple**

     C is a simple language in the sense that it provides a structured approach (to break the problem into parts), the rich set of library functions, data types, etc

   - **Machine Independent or Portable**

     c programs can be executed on different machines with some machine specific changes. Therefore, C is a machine independent language.

   - **Structured programming language**

     C is a structured programming language in the sense that we can break the program into parts using functions**.** So, it is easy to understand and modify. Functions also provide code reusability.

   - **Rich Library**

     C provides a lot of inbuilt functions that make the development fast.

   - **Memory Management**

     It supports the feature of dynamic memory allocation. In C language, we can free the allocated memory at any time by calling the free() function.

   - **Extensible**

     C language is extensible because it can easily adopt new features.

2. Explain various operators in C language.

C language supports a rich set of built-in operators. Operators are used in programs to manipulate data and variables.

C operators can be classified into following types:

- Arithmetic operators
- Relational operators
- Logical operators
- Bitwise operators
- Assignment operators
- Conditional operators

1. Arithmetic operators

C supports all the basic arithmetic operators. The following table shows all the basic arithmetic operators.

Operator	Description
+	adds two operands
-	subtract second operands from firs
*	multiply two operand
/	divide numerator by denominator
%	remainder of division
++	Increment operator - increases integer value by one
- -	Decrement operator - decreases integer value by one

2. Relational operators

The following table shows all relation operators supported by C.

Operator	Description
==	Check if two operand are equal
!=	Check if two operand are not equal.
>	Check if operand on the left is greater than operand on the right
<	Check operand on the left is smaller than right operand
>=	check left operand is greater than or equal to right operand
<=	Check if operand on left is smaller than or equal to right operand

3. Logical operators

C language supports following 3 logical operators. Suppose a = 1 and b = 0

Operator	Description	Example
&&	Logical AND	(a && b) is false
||	Logical OR	(a || b) is true
!	Logical NOT	(!a) is false

4. Bitwise operators

Bitwise operators perform manipulations of data at bit level. These operators also perform shifting of bits from right to left. Bitwise operators are not applied to float or double.

Operator	Description
&	Bitwise AND
|	Bitwise OR
^	Bitwise exclusive OR
<<	left shift

>>	right shift

5. **Conditional operator**

The conditional operators in C language are known by two more names

1. **Ternary Operator**
2. **? : Operator**

It is actually if condition that we use in C language decision making, but using conditional operator.

The syntax of a conditional operator is:

expression 1 ? expression 2: expression 3

3. **Explain various data types in C language.**

C data types are defined as the data storage format that a variable can store a data to perform a specific operation.
Data types are used to define a variable before to use in a program.

Types	Data Types
Basic data types	int, char, float, double
Enumeration data type	Enum
Derived data type	pointer, array, structure, union
Void data type	Void

1. INTEGER DATA TYPE:

- Integer data type allows a variable to store numeric values.
- "int" keyword is used to refer integer data type.
- The storage size of int data type is 2 or 4 or 8 byte.

- It varies depend upon the processor in the CPU that we use. If we are using 16 bit processor, 2 byte (16 bit) of memory will be allocated for int data type.
- 4 byte (32 bit) of memory for 32 bit processor and 8 byte (64 bit) of memory for 64 bit processor is allocated for int datatype.
- int (2 byte) can store values from -32,768 to +32,767
- int (4 byte) can store values from -2,147,483,648 to +2,147,483,647

2. CHARACTER DATA TYPE:

- Character data type allows a variable to store only one character.
- Storage size of character data type is 1. We can store only one character using character data type.
- "char" keyword is used to refer character data type.
- For example, 'A' can be stored using char datatype. You can't store more than one character using char data type.

3. FLOATING POINT DATA TYPE:

Floating point data type consists of 2 types. They are,

1.float
2.double

1. FLOAT:

- Float data type allows a variable to store decimal values.
- Storage size of float data type is 4. This also varies depend upon the processor in the CPU as "int" data type.
- We can use up-to 6 digits after decimal using float data type.
- For example, 10.456789 can be stored in a variable using float data type.

2.DOUBLE:

- Double data type is also same as float data type which allows up-to 10 digits after decimal.
- The range for double datatype is from 1E–37 to 1E+37.

4 ENUMERATION DATA TYPE:

Enumeration data type consists of named integer constants as a list.
It start with 0 (zero) by default and value is incremented by 1 for the sequential identifiers in the list.
Syntax:-
enum identifier [optional{ enumerator-list }]

5. DERIVED DATA TYPE :

Array, pointer, structure and union are called derived data type in C language.
To know more about derived data types, please visit "C – Array" , "C – Pointer" , "C – Structure" and "C – Union" later in next unit.

6. VOID DATA TYPE :

- Void is an empty data type that has no value.
- This can be used in functions and pointers.