

### 1. Who invented C Language?

**Dennis Ritchie** in 1972 developed a new language by inheriting the features of both BCPL and B and adding additional features. He named the language as just C.

### 2. Who invented B Language?

**Ken Thomson** at AT&T Bell Labs developed a language and named it B. Even the B language was found to have some shortcomings to support development of both business applications and system software.

### 3. Who invented BCPL Language?

Basic Combined Programming Language (BCPL) was developed by **Martin Richards**, Cambridge University.

### Why C Language?

C is one of the high level languages. It is a general purpose language, which means it can be used to write programs of any sort.

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### 5. What are the features of C Languages?

- In C one can write programs like that of high level languages as in COBOL, BASIC, FORTRAN etc. as well as it permits very close interaction with the inner workings of the computer.
- It is a general purpose programming language. It is usually called **system programming language** but equally suited to writing a variety of applications.
- It supports various data types
- It follows the programming style based on fundamental control flow constructions for structured programming
- Functions may be pre-defined or user defined and they may return values of basic types, structures, unions or pointers.

### What are the advantages of c language?

- Easy to write
- Rich set of operators and functions that are built-in
- Support for bit-wise operation
- Flexible use of pointers
- Direct control over the hardware
- Ability to access BIOS/DOS routines
- Interacting using Interrupts
- Ability to write TSR programs
- Ability to create .COM files
- Ability to create library files (.LIB)
- Ability to write interface programs
- Incorporating assembly language in C program

### **7. What are the disadvantages of c language?**

- C is considered difficult to learn
- Because of its conciseness, the code can be difficult to follow
- It is not suited to applications that require a lot of report formatting and data file manipulation

### **8. What are the salient features of c languages?**

The following are the salient features of C language are :

- C is called a middle level language
- C supports structured design approach
- C is extensible
- C is rich in data types and operators
- C is portable

### **9. What is a header file?**

Header files provide the definitions and declarations for the library functions. Thus, each header file contains the library functions along with the necessary definitions and declarations. For example, **stdio.h**, **math.h**, **stdlib.h**, **string.h** etc.

### **10. What is character set?**

Character set is the set of characters allowed and supported in the programming language. Generally a program is a collection of instructions, which contain groups of characters. Only a limited set of characters is allowed to write instructions in the program.

### **11. What is C token?**

The smallest individual units of a C program are known as tokens.

### **12. List the different types of C tokens?**

- Constants
- Identifiers
- Keywords
- Operators
- Special symbols
- Strings

### **13. What is a string?**

A string is a sequence of characters ending with NUL. It can be treated as a one-dimensional array of characters terminated by a NUL character.

**14. What are qualifiers?**

Qualifiers or modifiers are identifiers that may precede the scalar data types (except float) to specify the number of bits used for representing the respective type of data in memory. The qualifiers in C are short, long, signed, and unsigned.

**16. What is a constant?**

A constant is a value that does not change during the program execution. A constant used in C does not occupy memory.

**17. What are the different types of constants?**

There are five types of constants. They are :

- Integer constants
- Floating point constants
- Character constants
- String literals
- Enumeration constants

**18. What is variable?**

An identifier is used to identify and store some value. If the value of the identifier is changed during the execution of the program, then the identifier is known as variable.

Posted by Anil. (Mar 04, 2014)

Variable is a memory location, we can change its value at run time.

Posted by Pavani. (Oct 03, 2013)

Variable is a Datatype, used to store the data values.

Posted by Ghanshyam. (May 02, 2013)

Variable is a memory area/block where the value can be stored.

**19. What are the rules for the identifier?**

- The first character must be an alphabet or underscore ( \_ )
- Digits may be included in the variable
- The maximum number of characters in a word are 32 (It may vary depending upon the platform)
- No other special characters are allowed.

**20. What are global variables?**

Global Variables are those, which are required to be accessed by all the functions defined after their declaration. So, the variables declared before the main { } can be accessed by all the functions, which follow their declaration.

**21. What is a keyword?**

Keywords are those words of C which have predefined meaning assigned by the C language. They form a part of the database required by the C compiler.

## **22. What are the different types of c instructions?**

There are basically three types of instructions in C are :

- Type Declaration Instruction
- Arithmetic Instruction
- Control Instruction

## **23. What is an expression?**

Expression is defined as a combination of operands and operators to obtain some computation. Operands represent variables or values and The operator tells is what operation to be performed.

## **24. What are the types of data files?**

There are two types of data files :

- stream oriented or standard data files
- system oriented or low level data files

## **25. Why C is called a middle level language?**

C combines the features of both Assembly Level Languages (Low Level Languages) and Higher Level Languages. For this reason, C is referred to as a Middle Level Language. The feature of ALLs is that of enabling us to develop system level programs and the features of HLLs are those of higher degree of readability and machine independence.

## **26. How can variables be characterized?**

The variables can be categorized by storage class as well as by data type. The storage class specifies the portion of the program within which the variables are recognized.

## **27. Give the rules for variable declaration?**

The rules for variable declaration in C are given below :

- A variable name consists of alphabets, digits and the underscore ( \_ ) character
- The length of variable should be kept upto 8 characters though your system may allow upto 40 characters
- They must begin with an alphabet
- Some systems also recognize an underscore as the first character
- White space and commas are not allowed
- Any reserved word (keyword) cannot be used as a variable name.

Posted by mathankumar. (Nov 21, 2013)

The length of variable should be kept upto 8 characters in ansi c. But other c softwares have allow upto 31 characters

### 28. What is the purpose of type declarations?

The type declaration allow to create a synonym for other data types. Its syntax is typedef type identifier; The declaration **typedef unsigned long int INTEGER**

### 29. What is recursion?

C language a function may call another function. When a function calls itself, it is referred to as recursive call and the process is known as recursion. C provides very good facilities for recursion.

Posted by Dastagirsab Bagwwan. (Oct 11, 2013)

Recursion is a technique which calls and recalls of interm of itself is called recursion.

### 30. What is data types?

Data types refer to the classes of data that can be manipulated by C programs. The three fundamental data types supported by C are **character, integer and real type**.

### 31. What are the types of macro formats?

There are two types of macro formats. There are

- Simple
- Parameterized

### 32. What are the different types of errors?

- Compile-Time Errors
- Linker Errors
- Runtime Errors
- Logical Errors

### 33. What is meant by errors and debugging?

**Errors** may be made during program creation even by experienced programmers. Such type of errors are detected by the compiler.

**Debugging** means removing the errors.

### 34. What is the purpose of main() function?

The function main() invokes other functions within it. It is the first function to be called when the program starts execution.

- It is the starting function.
- It returns an int value to the environment that called the program.
- Recursive call is allowed for main() also.
- It is a user-defined function.

**35 What is meant by type casting?**

It is the explicit type conversion required for a number before carrying out processing or assigning to another variable.

**36. What are the primitive data types in c?**

There are five different kinds of data types in C.

- Char
- Int
- Float
- Double
- Void

**37. 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.

**38. What is meant by type specifiers?**

Type specifiers decide the amount of memory space occupied by a variable. In the ease of integral types; it also explicitly states the range of values that the object can hold.

**39. What are the types of type specifiers?**

The available data type specifiers are :

- Short
- Long
- Signed
- Unsigned

**40. What is masking?**

Masking is a process in which a given bit pattern is partly extracted into another bit pattern by means of a logical bitwise operation.

**41. What is the difference between single character constant and string constant?**

- A single character constant consists of only one character and it is enclosed within a pair of single quotes.
- A string constant consists of one or more characters and it is enclosed within a pair of double quotes.

**. What is signed and unsigned?**

A numeric value, may have a positive or a negative sign. In the memory, for a variable, one bit is used exclusively to maintain the sign of the data. If we don't have sign, the sign bit also

may be used for data. If the value is negative, the sign bit is 1, and if it is positive, it will be 0.

#### **43. What is zero based addressing?**

The array subscripts always start at zero. The compiler makes use of subscript values to identify the elements in the array. Since subscripts start at 0, it is said that array uses zero-based addressing.

#### **44. What are the different categories of functions in C?**

In C, the functions can be divided into the following categories :

- Functions with no arguments and no return values
- Functions having arguments but no return values
- Functions having arguments and return values also

#### **45. What is this pointer?**

It is a pointer that points to the current object. This can be used to access the members of the current object with the help of the arrow operator.

#### **46. What is a loop?**

A loop is a process to do a job repeatedly with possibly different data each time. The statements executed each time constitute the loop body, and each pass is called iteration. A condition must be present to terminate the loop.

Posted by Anil. (Dec 29, 2013)

Loop is a iteration statements.

#### **47. What are the types of data types and explain?**

There are five basic Data types in C. These are :

- **void** : means nothing i.e. no data involvement in an action
- **char** : to work with all types of characters used in computer operations
- **int** : to work with an integer type of data in any computational work
- **float** : to work with the real type of data or scientific numbers in the exponential form
- **double** : to work with double precision of numbers when the approximation is very crucial.

#### **48. What is friend function?**

The function declaration should be preceded by the keyword friend. The function definitions does not use either the keyword or the scope operator ::. The functions that are declared with the keyword friend as friend function. Thus, a friend function is an ordinary function or a member of another class.

#### **49. What is break statement?**

When a break is encountered inside a loop, the loop is terminated and the control passes to the statement following the body of the loop.

#### **50. What is the use of getchar() function?**

It returns a character just entered from the standard input unit, that is, keyboard. The entered character can be either assigned to a character variable or echoed to the computer screen.

#### **52. How to declare pointer variables?**

If a variable is going to be a pointer, it must be declared as such. A pointer declaration consists of a base type, an \*, and the variable name. The general form for declaring a pointer variable is **data \_type \* var\_ name;**

#### **53. What is the difference between fread buffer() and fwrite buffer()?**

Fread(), buffer is a pointer to an area of memory that will receive the data from the file. For fwrite(), buffer is a pointer to the information that will be written to the file. The value of count determines how many items are read or written, with each item being num\_byte bytes in length. The size\_t in both the formats is defined as some kind of unsigned integer. Finally, fp is a file pointer to a previously opened file.

#### **54. What is macro?**

The second preprocessor function is macro definition. A macro is formal syntax that can be used to generate statements for use in a program. For the C language, the macro generates C statements.

#### **55. What are the types of I/O functions?**

I/O functions are grouped into two categories :

- Unformatted I/O functions
- Formatted I/O functions

#### **56. What is the difference b/w formatted&unformatted I/O functions?**

The formatted I/O functions allow programmers to specify the type of data and the way in which it should be read in or written out. On the other hand, unformatted I/O functions do not specify the type of data and the way it should be read or written.

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#### **58. What is the difference between c &c++?**

c++ is an object oriented programming but c is a procedure oriented programming. c is a super set of c++. c can't support inheritance, function overloading, method overloading etc. but c++ can

do this. In c-program the main function could not return a value but in the c++ the main function should return a value.

### 59. What is the use of putchar function?

The putchar function displays one character on the display monitor. The character to be displayed is of type char. The syntax for putchar function is as given below : **putchar (ch\_var);**

Where ch\_var is a previously declared character variable.

### 60. What is the use of getchar functions?

The getchar function accepts a single character from the keyboard. The function does not require any arguments, though a pair of empty parentheses must follow the word getchar as a syntax. It returns a single character from a standard input device (typically a keyboard ) and it can be assigned to predeclared character variable.

### 61. What is character constants?

A character constant is a single character, enclosed within the pair of single quotation mark (apostrophes).

### 62. What is string constants?

A string constant or literal contains a sequence of zero or more characters or escape sequences enclosed in double Quotation marks.

### 63. What is integer constants?

An integer constant is an integer-valued number. It can represent decimal, octal, or hexadecimal values.

### 64. What is floating point constants?

Floating-point constants are numbers with decimal parts. A floating-point constants consists of :

- An integral part
- A decimal point
- A fractional part
- An exponent part
- An optional suffix

### 65. What is the difference between fread and fwrite function?

The **fread()** function returns the number of items read. This value may be less than count if the end of the file is reached or an error occurs. The **fwrite()** function returns the number of items written. This value will equal count unless an error occurs.

### 66. What are the uses of a pointer?

Pointer is used in the following cases

- It is used to access array elements
- It is used for dynamic memory allocation
- It is used in Call by reference
- It is used in data structures like trees, graph, linked list etc.

**67. What are linker error?**

The Linker Errors occur during the linking process when the external symbols referred to by the program are not resolved.

**68. What are runtime error?**

The Runtime Errors occur while a program is being run and hence the name. They occur due to both program internal and external factors.

**69. When do we get logical errors?**

- The Logical Errors occur if the solution procedure for the given problem itself is wrong.
- In this case, the outputs produced by the programs would be incorrect.
- Correcting the solution procedure itself by better understanding of the problem eliminates these errors.
- The Logical Errors (if any) are to be figured out by ourselves by verifying the outputs that are produced by the program.

**70. Do character constants represent numerical values?**

Yes, each character constant associates an integer value with it.

**71. What is the purpose of scanf() and printf() functions?**

- The function scanf() is used for formatted input from the standard input and provides many of the conversion facilities.
- It is used for formatted output to standard output device, that is, screen. The format specification string and the data to be output, are the arguments (parameters) to the printf() function.

**72. What is type qualifiers?**

Type qualifier adds properties to an identifier. Type qualifiers describe the manner in which the object will be modified. The application of qualifiers to an object does not affect the range or the arithmetic properties of the object.

**73. What are the types of type qualifiers in c?**

The two type qualifiers provided by C are :

- const

- volatile

**74. What is meant by inheritance?**

Inheritance is the process by which objects of one class acquire properties of objects of another class.

**75. Do string constants represent numerical values?**

No, the string constants do not have a corresponding numerical value.

**76. What is meant by operator precedence?**

Operator precedence describes the order in which C evaluates different operators in a complex expression.

**77. What is an Operator?**

An operator is a symbol, which instructs the computer to perform the specified manipulation over some data. The rich set of operators available in C enable us to write efficient and concise programs and this fact serves to set C apart from any other programming languages.

**78. What are the types of operators in c?**

- Assignment operator
- Arithmetic operators
- Relational operators
- Logical operators
- Increment/Decrement operators
- Shorthand arithmetic assignment operators
- Conditional operator
- Bitwise operators
- Sizeof() operator
- Comma operator

**79. What is a ternary operator in C?**

Perhaps the most unusual operator in C language is one called the conditional expression operator. Unlike all other operators in C which are either unary or binary operators the conditional expression operator is a ternary operator; that is, it takes three operands. The two symbols that are used to denote this operator are the question mark (?) and the colon (:). The first operand is placed before the ?, the second between the ? and the and the third after the .:

**80. What is assignment operator?**

An operator is a symbol that operates on a certain data type. In C, the '=' symbol is known as the assignment operator. It sets the value of the variable on the left hand side of it to that of the right hand side of it.

**81. What are the types of assignment statements?**

C supports a variety of assignment statements. These are given below :

- Simple assignment statement
- Multiple assignment statement
- Arithmetic assignment statement

### 82. What is the sizeof () operator?

Even though it looks like a keyword, sizeof ( ) is an operator which is used to know the memory size of the data types and variables. This operator returns the number of bytes allocated for the variable (or) data type. The format of the sizeof() operator is as follows.

**sizeof (v);**

where v is a variable name / data type / value.

### 83. What is the use of bitwise operator?

The bitwise operator performs the operation on bits (i.e. bit by bit). Using the bitwise operators we can set / reset / check any bit in the value of the variable.

### 84. What is the Difference between = and == Operators?

The two operators = and == are used for assignment and checking respectively. If not properly used, it causes many problems. The following program illustrates what will happen if we use = instead of ==.

### 85. What is unary operator?

The operators that act upon a single operand to produce a new value are known as **unary operators**.

### 86. What are the types of unary operators?

C support unary operators are :

- minus operator -
- increment operator + +
- decrement operator –
- size operator
- (type) operator

### 87. What is the difference between break and continue?

The break statement is used to exit from all the loop constructs (while, do while and for) and switch.case statements, whereas the continue statement is used to skip all subsequent instructions and can control back to the loop control. The continue statement can be used for any loop construct.

### 88. What is storage class?

The storage class in C provides the complete information about the location and visibility of variables. Scope of a variable means the portion of the program within which it can be referenced and lifetime means the time of its existence in the memory.

### 89. What are the different storage classes in C?

There are four types of storage classes.

- **Automatic** : Variable used as a local variable. This is the default one. Initial value of variable is garbage value without initialization.
- **Extern** : Variable used as a local variable. Retains its value during next function call.
- **Register** : Variable used as a local variable. May be stored in register if possible. Default initial value is garbage value.
- **Static** : Variable used as a global variable.

### 90. What are the types of bitwise operator?

There are three types of bitwise operator.

- Bitwise AND(&)
- Bitwise OR(|)
- Bitwise Exclusive OR(^)

### 91. What is difference between function overloading and operator overloading?

A function is overloaded when same name is given to different function. While overloading a function, the return type of the functions need to be the same.

### 92. What is getch() function?

It returns a character just entered from the standard input unit. The entered character is echoed (displayed) to the computer screen. It reads a single character the moment it is typed without waiting for the Enter key to be hit.

### 93. What is getch() function?

It returns a character just entered from the standard input unit. The entered character is not echoed on the screen. It reads a single character the moment it is typed without waiting for the Enter key to be hit.

### 94. What is putchar() function?

It prints the character constant or the character variable to the standard output device. The function putchar( ) has the following form :

putchar (var name)

### 95. What is an arrays?

Arrays can be defined as a collection of variables of the same type that are referred through a common name.

**96. What are the advantages of the functions?**

- It reduces the complexity in a program by reducing the code
- Function are easily understanding and reliability and execution is faster
- It also reduces the time to run a program. In other way, Its directly proportional to complexity
- Its easy to find-out the errors due to the blocks made as function definition outside the main function.

**97. What are the characteristics of arrays in C?**

- An array holds elements that have the same data type
- Array elements are stored in subsequent memory locations
- Two-dimensional array elements are stored row by row in subsequent memory locations
- Array name represents the address of the starting element
- Array size should be mentioned in the declaration. Array size must be a constant expression and not a variable.

**98. What is the difference between arrays and pointers?**

Array is collection of similar datatype. it is a static memory allocation means we can not increment and decrement the array size once we allocated. and we can not increment the base address, reassign address.

Pointer is a dynamic memory allocation. we can allocate the size as we want, assigning into another variable and base address incrementation is allowed.

**99. What is else if ladder?**

The else if ladder helps select one out of many alternative blocks of statements for execution depending on the mutually exclusive conditions.

**100. What is class?**

A class represents description of objects that share same attributes and actions. It defines the characteristics of the objects such as attributes and actions or behaviors. It is the blueprint that describes objects.

**101. How are the two dimensional array elements stored in memory?**

Two dimensional arrays follow row major order storage representation .The elements are stored in row by row in the subsequent memory locations.

**102. What is the value of sizeof (char)?**

The value returned by sizeof (char) is always 1 since char uses only one byte in any machine. For other data types, the number of bytes used to represent a data type depends on the implementation of a compiler.

**103. What is an operands?**

The operators can be defined as symbols which specify operations to be performed. The C language includes a number of operators. These operators are used in different combinations to form expressions. The data items on which the operators act upon are known as operands.

**104. What is the difference between switch and if else?**

The switch expression may be any integral type only but the condition in. if–else–if ladder may be designed with arithmetic, boolean or user defined data items.

**105. What are the types of looping structures?**

C provides three looping structures. They are

- The While loop
- The do while loop
- The for loop

**106. What is the difference between for and do while loops?**

This difference is the place where the condition is tested. The for tests the condition before executing any of the statements within the body of the for loop. As against this, the do while tests the condition after having executed the statements within the loop.

**107. What are the types of control structures?**

**Sequence control structure :** may consist of a single statement or a sequence of statements with a single entry and single exit.

**Selection control structure :** performs one out of two or more statements depending upon the condition.

**Looping control structure :** has one condition and a sequence structure which is executed a number of times depending upon the condition.

**108. What is the difference between malloc and calloc?**

**Malloc** is use for memory allocation and initialize garbage values.malloc () for allocating the single block of memory.

**Calloc** is same as malloc but it initialize 0 value.calloc () for allocating multiple blocks of memory.

**109. What are the types of constants in c?**

C has four basic types of constants. They are :

- Integer constants
- Floating point constants
- Character constants
- String constants

**110. What is the difference between call by value and call by reference?**

The value of each of the actual parameters in the calling function is copied into corresponding formal arguments of the called function. So, variables in the caller function (actual parameters) are distinct from variables in the called function (formal parameters) even though they may have same names and their values are not affected in the called function, since they have different memory locations.

**111. What is structures?**

In C, a structure is a derived data type consisting of a collection of member elements and their data types. Thus, a variable of a structure type is the name of a group of one or more members which may or may not be of the same data type. In programming terminology, a structure data type is referred to as a record data type and the members are called fields.

**112. What are register variables?**

If a variable is declared with a register storage class, it is known as register variable. The register variable is stored in the cpu register instead of main memory. Frequently used variables are declared as register variable as it's access time is faster.

**113. What is a symbolic constant?**

- A symbolic constant is a name that substitutes for a sequence of characters. The characters may be a numeric constant, a character constant or a string constant.
- A symbolic constant allows a name to appear in place of a numeric constant, a character constant or a string.
- Symbolic constants are usually defined at the beginning of a C program. The symbolic constants may then appear later in the program in place of the numeric constants, character constants, and so on.

**114. What are the types of keywords supported by ANSI C?**

There are 32 keywords supported by ANSI C :

- Auto
- Double
- Int
- Struct
- Break
- Else
- Long
- Switch

**115. What is an union?**

The union is a construct that allows memory to be shared by different types of data. It can store objects of different types at different times; however at any given moment it stores an object of only one of the specified types.

### 117. What are the use of bit field?

The Bit field are useful for number of reasons, such as :

- When storage is limited, we can store several Boolean variables in one byte
- Certain devices transmit status information encoded into one or more bits within a byte
- Certain encryption routines need to access the bits within a byte

### 118. What is stream?

A stream is a sequence of elements in time. Only one stream element, the current one, is available at a time. In other words, the computer looks at input and output data, whether from a physical device such as keyboard or from file stored on a secondary storage, as a stream of characters or bytes. In this way, the programmer does not have to worry about the different properties of input/output devices, since every device sends or receives time sequenced bytes. All of C's file structures are byte streams.

### 119. What are Cpreprocessor?

The preprocessor uses programmer supplied commands to prepare the source program for compilation. The translator then accepts source program and converts it into machine code and generates the object module. Depending on the compiler design, the preprocessor and translator can work together, or the preprocessor can create a separate version of the source program, which is then read by the translator.

### 120. Difference between character constants and numeric type constants?

- Each character constant has some integer value associated with it, while numeric type constants can be exact quantities or even approximations.
- The value of a character constant may vary from one computer to another but the constants themselves are independent of the character set.
- A character constant cannot be of length more than 1, but a numeric type constant has no such restriction.

### 121. Difference between string constants and character constants?

The **string constants** are always enclosed in double quotes, while character constants are enclosed in apostrophes (single quotation marks).

A **character constant** has an equivalent integer value, whereas a single-character string constant does not have an equivalent integer value.

### 122. What are built in functions?

The functions that are predefined and supplied along with the compiler are known as built in functions. They are also known as library functions.

### 123. What is an abstract base class?

An abstract class is a class that is designed to be specifically used as a base class. An abstract class contains at least one pure virtual function.

**124. What is escape sequences?**

An escape sequence is a set of characters, when taken together, represent one character which may have a special significance. Escape sequences help to format the outputs properly or create appropriate signals.

**125. What is the difference between formal and actual parameters?**

The formal parameters are the parameters that are used to collect values or addresses from the calling function to a function being called, whereas the actual parameters are used for passing values or addresses from the calling function to a function being called. In call by value method, it is the value of actual parameter that is copied into the formal parameter of the function. In call by reference, it is the address of the actual parameter that is assigned to the formal parameter, i.e., both the formal and actual parameters have same address. If any change is made to the actual (or formal) parameter, the corresponding formal (or actual) parameter will be affected.

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**122. What are built in functions?**

The functions that are predefined and supplied along with the compiler are known as built in functions. They are also known as library functions.

**123. What is an abstract base class?**

An abstract class is a class that is designed to be specifically used as a base class. An abstract class contains at least one pure virtual function.

**124. What is escape sequences?**

An escape sequence is a set of characters, when taken together, represent one character which may have a special significance. Escape sequences help to format the outputs properly or create appropriate signals.

**125. What is the difference between formal and actual parameters?**

The formal parameters are the parameters that are used to collect values or addresses from the calling function to a function being called, whereas the actual parameters are used for passing values or addresses from the calling function to a function being called. In call by value method, it is the value of actual parameter that is copied into the formal parameter of the function. In call by reference, it is the address of the actual parameter that is assigned to the formal parameter, i.e., both the formal and actual parameters have same address. If any change is made to the actual (or formal) parameter, the corresponding formal (or actual) parameter will be affected.

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#### **1. What is C++?**

C++ is an object oriented programming language. It was developed by **Bjame Stroustrup** in 1983 at the AT & T Bell Laboratories, Now Jersey, USA. It is basically a super set of C, which provided low level features.

#### **2. What are the basic concepts of OOP?**

- Objects
- Classes
- Data Abstraction and Encapsulation
- Inheritance
- Polymorphism
- Dynamic Binding

- Message Passing

### **3.What is oops?**

An object oriented program is a collection of discrete objects, which are self contained collections of both data structures and functions that interact with other objects.

### **4.What are the characteristic of C++ language?**

It has the following characteristics :

- Reduces complexity while solving problems
- Correctness of results is ensured
- Affordable in terms of hardware and other resources
- Easier and cheaper for integrating existing software facilities and libraries
- Portable i.e. can be used on different types of computers with little or no change in the programs.

### **5.What are the types of character set?**

We have two character sets in C++. These are :

- Source characters
- Escape sequences /Execution characters

### **6.What are the elements of OBJECT ORIENTED PROGRAMMING?**

The main concepts of object oriented programming are :

- Data Abstraction
- Encapsulation
- Inheritance
- Polymorphism

### **7.What are the components of a class?**

A class consists of two components **data members** and **methods**.

### **8.What are methods?**

Methods are functions associated with the class. They are able to access even private data members.

### **9.What is the significance of class keyword in C++/Java?**

The keyword class (in C++ and Java) specifies an Abstract Data Type (ADT). ADTs expose operations that provide a higher level functionality, and the lower level implementation details are isolated and hidden from the users of the class.

### **10.What is the difference between source and escape sequences?**

The source text is created with the help of source characters. These are interpreted at execution time. The values of these characters are implementation defined.

### **11. What are tokens?**

The smallest individual units in a program are called tokens.

### **12. What are the types of tokens?**

C++ has the following tokens are :

- Keywords
- Identifiers
- Constants (literals)
- Punctuators (Separators)
- Operators

### **13. What is an object?**

An object is an instance of a class. It can be uniquely identified by its name and it defines a state, which is represented by the values of its attributes at a particular point in time.

### **14. What is class?**

A class is a collection of objects. A class may be defined as a group of objects with same operations and attributes. The **class** is a key word in C++ programming. The user deals with classes instead of dealing with various individual objects.

### **15. What is the difference between private and public class?**

The **Private** access means that only associated functions can only access the data.

The **Public** access means that data can be accessed by other objects of the program.

### **16. What is a function?**

A function is a subprogram that acts on data and returns a value. A function can be invoked from the other parts of the program.

### **17. What are the types of function?**

Functions are of two types are :

- Built in functions
- User defined functions

### **18. What are class members?**

A class has members which consist of data members, the constructor, function, destructor functions and member functions.

### **19. What are the advantages of OOPs?**

Object Oriented Programming has the following advantages over conventional approaches :

- OOP provides a clear modular structure for programs which makes it good for defining abstract data types where implementation details are hidden and the unit has a clearly defined interface.
- OOP makes it easy to maintain and modify existing code as new objects can be created with small differences to existing ones.
- OOP provides a good framework for code libraries where supplied software components can be easily adapted and modified by the programmer. This is particularly useful for developing graphical user interfaces.

## **20. What are the application of OOP?**

- Real time system
- Object oriented databases
- Neural network and parallel processing

## **21. What is the difference between class and objects?**

Classes and objects are separate but related concepts. Every object belongs to a class and every class contains one or more related objects.

A Class is static. All of the attributes of a class are fixed before, during, and after the execution of a program. The attributes of a class don't change.

## **22. What is static class member?**

A static data member has a property that all instances of the containing class share this one data member.

## **23. What are methods and fields?**

A class can have members. Methods and fields are two important members of classes. Member functions are known as methods and data members are known as fields.

## **24. What is an array?**

An array is a collection of identical data objects which are stored in consecutive memory locations under a common heading or a variable name. In other words, an array is a group or a table of values referred to by the same variable name. The individual values in an array are called elements. Array elements are also variables.

## **25. What is a character array?**

The procedure for declaring character array is almost the same as for other data types such as integer or floating point. One can declare the character array by means of alphanumeric characters.

## **26. Define Encapsulation?**

The wrapping up of data and functions into a single unit is known as data encapsulation.

**Encapsulation** means combining data and related functions that use that data together and providing it as a logical entity.

## **27. What are access specifiers?**

Access specifiers determine the accessibility of a class member. In general, there are three important access specifiers :

- Public
- Private
- Protected

### **28.What is inheritance?**

The mechanism of deriving a new class (derived) from an old class (base class) is called inheritance. It allows the extension and reuse of existing code without having to rewrite the code from scratch. Inheritance is the process by which objects of one class acquire properties of objects of another class.

### **29.What is polymorphism?**

Polymorphism means one name, multiple forms. It allows us to have more than one function with the same name in a program.It allows us to have overloading of operators so that an operation can exhibit different behaviours in different instances.

### **30.What is abstraction?**

Abstraction means hiding internal implementation details.

### **31.What is function overloading?**

Function Overloading more than one method with the same name but different type of parameters and/or number of parameters can be defined. Depending on the actual number and/or static type of the parameters used, the compiler will resolve the call to the correct method.

### **32.What are the types of polymorphism?**

Polymorphism can be broadly classified as

- Compile time polymorphism
- Run time polymorphism

### **33.What is the difference between compile time and run time polymorphism?**

Function overloading, operator overloading,and parametric types (templates in C++ or generics in Java) are done at compile time.

Dynamic binding (virtual functions) is runtime polymorphism.

### **34.What is the difference between an identifier and a keyword?**

**Identifier :**

- These are the fundamental building blocks of a program and are used to give names to variables, functions, arrays, objects, classes etc.

**Keyword :**

- These words are reserved to do specific tasks and must not be used as normal identifier names.

### **35. What is meant by type conversion?**

The process in which one pre defined type of expressions is converted into another type is called conversion.

### **36. What is difference between C++ and Java?**

- C++ has pointers Java does not
- Java is the platform independent as it works on any type of operating systems
- Java has no pointers where c ++ has pointers
- Java has garbage collection C++ does not.

### **37. What is the difference between division and modulus?**

**Division(/)** operator is used to divide the value and return the quotient value whereas **Modulus(%)** return the remainder value.

### **38. What is object composition?**

In composition, one class has an instance of another class as a data member. In OOP, this relationship is also known as a object composition.

### **39. What are frameworks?**

Frameworks provide domain specific inheritance hierarchies that are meant for rapid application development in that domain.

### **40. Define Message Passing?**

Objects communicate between each other by sending and receiving information known as messages. A message to an object is a request for execution of a procedure. Message passing involves specifying the name of the object, the name of the function and the information to be sent.

### **41. What are concrete classes?**

Concrete classes can be instantiated (in other words, objects can be created from concrete classes). These classes have no abstract methods. Concrete classes are a logical complement of abstract classes.

### **42. What is the use of scope resolution operator?**

A variable declared in an inner block cannot be accessed outside the block. To resolve this problem the scope resolution operator is used. It can be used to uncover a hidden variable. This operator allows access to the global version of the variable.

### **43. What are adaptor class?**

Adaptor classes modify the existing interface of an existing class and provide a new interface. In other words, an adapter class adapts a class for a specific purpose.

#### **44. What are monomorphic and polymorphic classes?**

Classes that do not have any virtual functions (runtime polymorphism) are known as **monomorphic classes**.

The classes that have virtual functions (or virtual base classes) and are designed for making use of runtime polymorphism are known as **polymorphic classes**.

#### **45. What is namespace?**

The C++ language provides a single global namespace. Namespaces allow to group entities like classes, objects and functions under a name.

#### **46. What is the use of default constructor?**

A constructor that accepts no parameters is called the default constructor. If no user-defined constructor exists for a class A and one is needed, the compiler implicitly declares a default parameterless constructor A::A(). This constructor is an inline public member of its class. The compiler will implicitly define A::A() when the compiler uses this constructor to create an object of type A. The constructor will have no constructor initializer and a null body.

#### **47. What is the difference between c & c++?**

- c++ is an object oriented programming but c is a procedure oriented programming.
- c is super set of c++.
- c can't support inheritance, function overloading, method overloading etc. but c++ can do this.
- In c program the main function could not return a value but in the c++ the main function should return a value.

#### **48. What are class libraries?**

A class library is a set of reusable classes meant for providing a specific functionality (such as utility, networking, or user-interface related classes) that can be readily used by the application.

#### **49. What is a dangling pointer?**

A dangling pointer arises when we use the address of an object after its lifetime is over. This may occur in situations like returning addresses of the automatic variables from a function or using the address of the dynamically allocated memory block after it is freed.

#### **50. What is the difference between shallow and deep copy?**

**Shallow** copy involves bit wise copy of the contents of one object into another object of the same type. A copy constructor and assignment operator provided by the compiler by default does shallow copy. Shallow copies create a problem when there are fields of pointer or reference type. In this case, the addresses are directly copied to another object and thus two different objects have fields pointing to the same objects. When one object is destroyed, the pointers/references in the other object become dangling pointers/references, which is dangerous.

**Deep** copy involves using the contents of one object to create another instance of the same class. In a deep copy, the two objects may contain the same information but the target object

will have its own buffers and resources. The destruction of one object will not affect the other object. Typically, we provide our own copy constructor and assignment operator implementations for doing deep copy of objects.

### **51. What is a pointer?**

- A pointer is a variable which holds a memory address within.
- Each variable is located at a particular position in the memory which is known as Address.
- The address can be stored in a pointer.
- A program accesses the value in the address stored in the pointer by using indirection operator.

### **52. What is an expression?**

An expression is any statement which is composed of one or more operands and returns a value. It may be combination of operators, variables and constants.

### **53. What are the types of expressions?**

There are three types of expressions are :

- Constant Expressions
- Integral Expressions
- Logical Expressions

### **54. What are the types of conversion?**

There are two types of conversion are :

- Implicit (Automatic) Conversion
- Explicit Conversion

### **55. What is the difference between implicit and explicit conversion?**

When data types are mixed in an expression, the conversion is performed automatically. This process of automatic conversion is called **implicit conversion**.

**Explicit Expressions** are user defined expressions. C++ provides type casting facility. The expression can be converted into a specific type.

### **56. What are the advantages of pointer?**

The pointer has the following advantages.

- It allows to pass variables, arrays, functions, strings and structures as function arguments.
- A pointer allows to return structured variables from functions.
- It provides functions which can modify their calling arguments.
- It supports dynamic allocation and deallocation of memory segments.
- With the help of a pointer, variables can be swapped without physically moving them.

- It allows to establish links between data elements or objects for some complex data structures such as linked lists, stacks, queues, binary trees and graphs.
- A pointer improves the efficiency of certain routines.

### **57.What is pointer operator?**

A pointer operator can be represented by a combination of \* (asterisk) with a variable.

### **58.What is meant by conditional expression?**

The conditional expressions are mainly used for decision making. In the subsequent sections, the various structures of the control statements and their expressions are explained. The following statements are used to perform the task of the conditional operations.

- if statement
- if else statement
- switch case statement

### **59.What are the types of comments?**

C++ allows us to add two types of comments are :

- Single line comments
- Multi line comments

### **60.What is the difference between single line and multiple line comments?**

A **single line comment** starts with the character sequence ("//"), i.e. the two forward slashes and ends with a newline character.

A **multi line comment** starts with the character sequence ("/\*"), i.e. a forward slash followed by an asterisk and ends with the character sequence ("\*/"), i.e. an asterisk followed by a forward slash.

### **61.What is meant by two dimensional array?**

A two dimensional array may be visualized as a table consisting of rows and columns. Each cell of the table will denote an array element.

### **62.What is meant by multi dimensional array?**

Multidimensional arrays are arrays with more than one dimension. An array may consist of any number of dimensions, of course, subject to the restrictions put by a compiler implementation within the scope of language specifications.

### **63.What are the types of built in data types?**

The built in data types available in C++ are :

- Integral type

- Floating type
- Void

#### **64. Define literals?**

Literals are often referred to as constants. A constant is an entity with a fixed value. Literals can be divided into characters, string, integer numbers and floating point numbers.

#### **65. What are the types of literals in c++?**

C++ there are several types of literals :

- Integer constants
- Character constants
- Floating Point constants
- String constants

#### **66. What is the use of sizeof() operator?**

The sizeof () operator is used to find the size of a variable or the sizeof a data type in terms of the number of bytes.

#### **67. What is copy constructor?**

Copy constructor is a constructor function with the same name as the class and used to make deep copy of objects.

#### **68. What is default constructor?**

A default constructor is a constructor that either has no parameters, or if it has parameters, all the parameters have default values.

#### **69. What is static variable?**

Static variables are defined within a function and they have the same scope rules of the automatic variables but in the case of static variables, the contents of the variables will be retained throughout the program.

#### **70. What is register variable?**

Automatic variables are stored in the memory. As accessing a memory location takes time (much more time than accessing one of the machine's registers), one can make the computer to keep only a limited number of variables in their registers for fast processing. Whenever some variables are to be read or repeatedly used, they can be assigned as register variables.

#### **71. What is the use of keyword register?**

The keyword register is used to declare that the storage class of the variable is a register type.

#### **72. What is the difference between break and continue statement?**

The **break statement** is used to terminate the control from the loop statements of the case-switch structure. The break statement is normally used in the switch case loop and in each case condition, the break statement must be used. If not, the control will be transferred to the subsequent case condition also.

The **continue statement** is used to repeat the same operations once again even checks the error.

**73. What are the types of errors in c++?**

There are four types of errors are :

- Compiler errors
- Linker errors
- Runtime errors
- Logical errors

**74. What is string?**

String is a series of characters. The string is enclosed within double quotes. A string is used to write or store messages.

"HELLO"

**75. What is the difference between errors and debugging?**

**Errors** may be made during program creation even by experienced programmers also. Such type of errors are detected by the Compiler.

**Debugging** means removing the errors.

- 

**76. What is a scope resolution operator?**

The scope resolution operator permits a program to reference an identifier in the global scope that has been hidden by another identifier with the same name in the local scope.

**77. What is multiple inheritance?**

A class can inherit properties from more than one class which is known as multiple inheritance.

**78. What is cast operator()??**

The cast operator helps to force an expression to be of a specific type by using ( ) cast operator.

**79. What is conditional operator( ?:)?**

The conditional operator evaluates an expression returning a value if that expression is true and a different one if the expression is evaluated as false.

**80. What is comma operator(,)?**

The comma operator (,) is used to separate two or more expressions that are included where only one expression is expected.

**81. What is recursive function?**

A function which calls itself directly or indirectly again and again is known as the recursive function. Recursive functions are very useful while constructing the data structures like linked lists, double linked lists and trees. There is a distinct difference between normal and recursive functions.

**82.What is the difference between goto and unconditional goto?**

The goto statement is used to alter the program execution sequence by transferring the control to some other part of the program.

The unconditional goto statement is used just to transfer the control from one part of the program to the other part without checking any condition. Normally, a good programmer will not prefer to use the unconditional goto statement in his program as it may lead to a very complicated problem like a never ending process.

**83.What is the difference between class and structure?**

- By default, the members of structures are public while that for class is private.
- Structures doesn't provide something like data hiding which is provided by the classes.
- Structures contains only data while class bind both data and member functions.

**84.What are design patterns?**

Design patterns are reusable, extensible solutions to common design problems faced by designers of object-oriented systems. Design patterns are language neutral and are of a higher level of abstraction than code.

**85.What is the difference between the terms overloading and overriding?**

The term overriding refers to providing an alternative function definition of a virtual function in a derived class. Overriding is useful for runtime polymorphism. With overloading, more than one method definition with the same name (but with different types/number of arguments) are provided, whereas in overriding, the methods with the same name are provided with alternative definition in derived class.

**86.What is friend function?**

The function declaration should be preceded by the keyword friend. The function definitions does not use either the keyword or the scope operator ::. The functions that are declared with the keyword friend as friend function. Thus, a friend function is an ordinary function or a member of another class.

**87.What is a call by reference?**

A function call mechanism that passes arguments to a function by passing the addresses of the arguments.

**88.What is the call by value?**

A function call mechanism that passes arguments to a function by passing a copy of the value of the arguments.

**89.What is inheritance?**

The mechanism of deriving a new class from an old one is called inheritance. The old class is referred to as the base class and the new one is called the derived class or the sub class.

**90. What are the types of inheritance?**

- Single inheritance
- Multiple inheritance
- Multi level inheritance
- Hierarchical inheritance
- Hybrid inheritance

**91. What is method overriding?**

Method overriding is a mechanism in which the sub class method overrides the base class method. If the same function name is present in both the base class and the sub class then the sub class method overrides the base class method.

**92. What is inline function?**

Inline function is defined as a function definition such that each call to the function is in effect, replaced by the statements that define the function. It is expanded in line when it is invoked.

**93. What are concrete classes?**

Concrete classes can be instantiated (in other words, objects can be created from concrete classes). These classes have no abstract methods. Concrete classes are a logical complement of abstract classes.

**94. What is class cohesion?**

Cohesion indicates how closely the members are related to each other or how strongly the members depend on each other in a class. Highly cohesive classes or modules indicate good design.

**95. What is class coupling?**

Coupling means how two (or more classes) are dependent or strongly related to each other. When two classes are tightly coupled, change in one class usually requires change in the other class. Therefore, tightly coupled classes are not recommended.

**96. What is the difference between local and global variable?**

Local variables Identifiers declared as label, const, type, variables and functions in a block are said to belong to a particular block or function and these identifiers are known as the local parameters or variables. Local variables are defined inside a function block or a compound statement.

Global variables are variables defined outside the main function block. These variables are referred by the same data type and by the same name through out the program in both the calling portion of a program and in the function block. Whenever some of the variables are treated as constants in both the main and the function block, it is advisable to use global variables.

**97.What are the types of type modifiers?**

There are four types of type modifiers are :

- Signed
- Long
- Unsigned
- Short

**98.What do you mean by pure virtual functions?**

A pure virtual member function is a member function that the base class forces derived classes to provide. Any class containing any pure virtual function cannot be used to create object of its own type.

**99.What is the types of storage class specifiers?**

There are four storage class specifiers supported by C++. They are :

- extern
- static
- register
- auto

**100.What is STL? what are the components of stl?**

A collection of generic classes and functions is called as Standard Template Library (STL).The stl components are

- Containers
- Algorithm
- Iterators