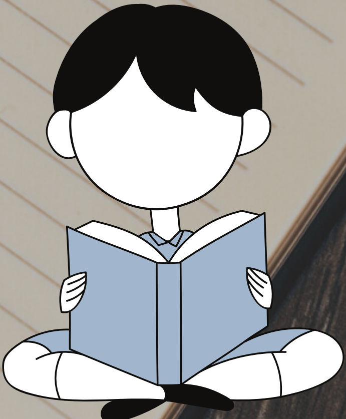
CODE OF GEEKS presents

C INTERVIEW QUESTIONS

MOST ASKED INTERVIEW QUESTIONS IN C PROGRAMMING



CODE OF GEEKS

C Interview Questions

This e-book contains **most frequently asked questions** on **C – Programming language**.

Prepared by **CODE OF GEEKS**

In case of bug-reporting, please mail us at

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SET 1 – Q1 – Q5

Q. Who developed C Programming Language ?

A. Dennis Ritchie at AT & T's Bell Laboratories in 1972.

Q. What is the meaning of **constant** in C ?

A. Constant is an entity whose value remains fixed.

Q. What is a variable in C ?

A. Variable is an entity that acts as storage place for a value.

For ex. int a = 20;

here, a is variable

Q. What are **Keywords** ?

A. Keywords are the special words that provide specific meaning to the language compiler. There are 32 keywords in C language.

Q. Can we use a **keyword** as a **variable-name** ?

A. No.

SET 2 – Q6 – Q10

Q. Explain **comments** in C ?

A. Comments are the user defined statements that ensures the better readability and makes code more understandable. Comments are ignored by compiler. Comments can be single line or even multi line.

Q. Can we do nesting of comments in C ?

A. No, not allowed.

Q. What are **escape sequence** ?

A. Escape sequences are basically control characters used for formatting the output. These are combinations of a backslash and a character in lowercase.

We use '**\n**' for **newline**.

Q. Can a program be **compiled** without **main()** ?

A. Yes, but it will not run.

Q. Is **main** a **keyword** ?

A. No.

SET 3 – Q11 – Q15

Q. Can you differentiate between **variable declaration & variable definition** ?

A. **Variable declaration :** assigning data type to a variable. For ex. : int x;

Variable definition : assigning a value to a variable. For ex. : int x = 10;

Q. What is **modular** programming ?

A. It is an approach in which we divide a program into subprograms where each subprogram has its own set of statements for a task.

Q. What are **Tokens** ?

A. Token refers to the smallest lexical unit of a program. It may be a identifier,keyword, constant etc.

Q. Explain **Identifiers** ?

A. Identifiers refers to the legal name given to a variable or a function. It cannot be a keyword and cannot start with a number.

Q. What could be **maximum length of an identifier** in C ?

A. 32 characters.

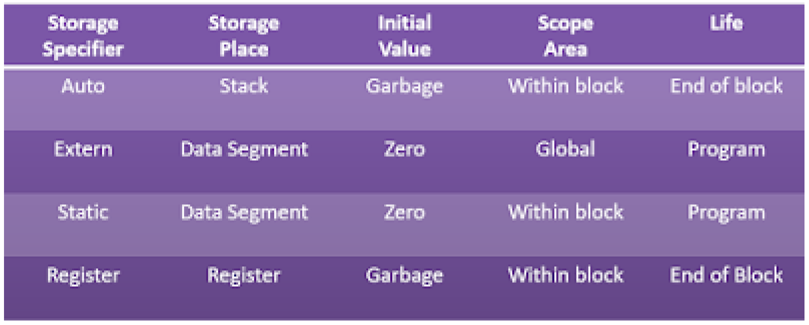
SET 4 – Q16 – Q20

Q. What do you know by **scope** of a variable ?

A. Scope defines the area over which the variable's declaration has an effect.

Q. Explain the use of **auto, extern, static, register** storage class ?

A.



Storage Specifier	Storage Place	Initial Value	Scope Area	Life
Auto	Stack	Garbage	Within block	End of block
Extern	Data Segment	Zero	Global	Program
Static	Data Segment	Zero	Within block	Program
Register	Register	Garbage	Within block	End of Block

Q. What are **Data Segments** ?

A. Data Segments contains initialized data.

Q. Why header files are enclosed inside **< >** while some are enclosed under **" "** ?

A. If any file is enclosed under < >, then compiler searches it in **built-in path**.

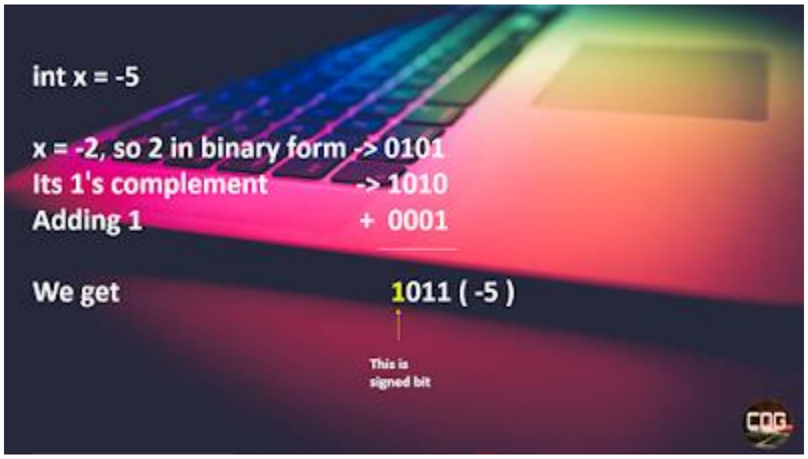
If any file is enclosed under " ", then given file is user defined and hence current working space is checked.

Q. How an **integer** with **negative sign** is **stored** in memory ?

A. Let us assume that we have to store x = -5 to the memory, so :

1. Find **1's** complement of that number.

2. Add 1 to it.



SET 5 – Q21 – Q25

Q. What is a **Pointer** ?

A. Pointer is a special type of variable that holds the memory address of another variable.

It is denoted as *** (var_name)**.

Q. What is a **NULL pointer** ?

A. Null pointer is a type of pointer that points to nothing.

For ex : char *p = NULL;

Q. What are **Dangling pointers** ?

A. A pointer pointing to a memory address that has been deleted or not available. To solve this, allocate it to NULL.

Q. When we use **void** pointers ?

A. When we don’t the know the type of value that has to be stored in a variable, in that case we go for void pointers.

Q. Explain **printf**, **sprintf**, **fprintf** ?

A. **printf :** standard output stream (stdout)

fprintf : prints content in file

sprintf : prints formatted output onto char array.

SET 6 – Q26 – Q30

Q. t++ or t=t+1, which one is recommended more ?

A. t++, as it is a single machine instruction (INS), hence it is faster.

Q. What is the purpose of using **typedef** ?

A. It is used to define alternative names to existing datatype.

Example : **typedef** long long int ll;

Q. What is a **function** ?

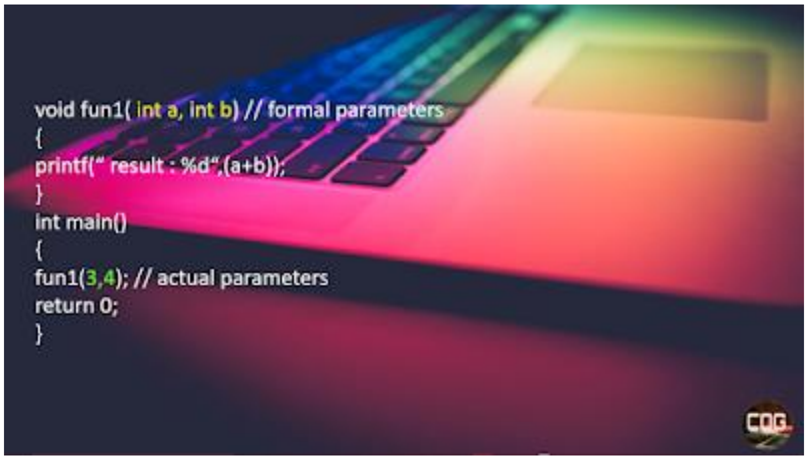
A. Function represents the block of statements that perform a specific task.

Syntax : return-type function-name(parameters)

Q. What are **actual & formal** parameters ?

A. Actual parameters : Parameters sent at calling end.

Formal Parameters : Parameters at the recieving end.



```
void fun1( int a, int b) // formal parameters
{
printf(" result : %d",(a+b));
}
int main()
{
fun1(3,4); // actual parameters
return 0;
}
```

Q. When we mention the prototype of a function, are we defining it or declaring it ?

A. We are declaring it.

SET 7 – Q31 – Q35

Q. What is **size_t** ?

A. It is the result of **sizeof() operator**. sizeof() operator returns the size of a variable that belongs to a particular type.

Q. What will happen if we include same header file **twice** ?

A. Error.

Q. Explain **Recursion** ?

A. **Recursion** is the technique in which a function is called by itself again and again.

Q. Which data structure is used during the process of recursion ?

A. Stack for proper function scheduling.

Q. What is **Preprocessor** ?

A. It processes the source code, before compilation, by adding external libraries, unzipping macros etc.

SET 8 – Q36 – Q40

Q. What are **macros** ?

A. Macro is a name given to a block of C statements as a pre-processor directive. Being a pre-processor, the block of code is communicated to the compiler before entering into the actual coding (main () function). A macro is defined with the preprocessor directive, #define.

Q. What is the basic difference between a **function** and a **macro** ?

A. The basic difference is that function is compiled and macro is preprocessed.

Q. How to define **multiline macros** ?

A. Using ‘ \ ‘ (backslash).

Q. **Function vs Macros** – which is better ?

A. It **depends**. Usually macros make the program run faster but increases the program size, whereas function makes program compact and smaller.

Q. What is an **Array** ?

A. Array is a linear data structure having collection of homogenous data items.

SET 9 – Q41 – Q45

Q. What is the **base address of an array** ?

A. Base address represents the address of first element of an array.

Q. What will be the equivalent pointer expression for following : a[i][j] ?

A. *(*(a+i)+j)

Q. Highlight the difference between **Structures** and **Union** ?

A.

- Structure is a user defined data type containing heterogenous type of data. Union is also a user defined data type containing heterogenous type of data.
- Structure is achieved using **struct** keyword.Union is achieved using **union** keyword.
- Memory size of structure is equal to the sum of memory taken by its data members individually. Memory size of union is equal to the size of largest data member.

Q. What is **Self Referential structure** ?

A. A Structure is recognized as self-referential structure, if it has one or more pointers pointing to itself.

Q. What are **Command Line Arguments** ?

A. The arguments which we pass to the main() function during the execution of a program are command line arguments.

Syntax : int main(int argc, char *argv[])

argc = argument count

argv = argument value

SET 10 – Q46 – Q50

Q. What is a String ?

A. String represents a sequence of characters, ending with '\0' (null).

Q. Explain the utility of **stricmp()** ?

A. It compares two strings by ignoring their case.

Q. Explain **goto statements** ?

A. It is used for unconditional branching within a program.

Q. What is **FILE** in FILE *fp; ?

A. FILE is a structure in stdio.h, where as fp is a file pointer.

Q. What is a **NULL** statement ?

A. It is a **non-executable statement**.

SET 11 – Q51 – Q55

Q. What are static function ?

A. Functions having static as **keyword** are static function. We make static function, when we want to restrict access to function.

By default, all functions are static.

Q. Explain the utility of **ellipses operator** ?

A. It is used to recieve the variable number of arguments for a function.

It is denoted as ‘ **…** ‘ .

Syntax : void func(int k, …)

Q. What is Enumeration ?

A. It is the user defined data type. It assigns names to integer constants. It is achieved through keyword **enum**. Enum names can have same values. But no two enums can have same values. Enums are automatically assigned to 0.

Q. Explain the use of **fseek()** in File Handling ?

A. It is used for moving the file pointer internally.

Q. What is **dynamic memory allocation** ?

A. It is the process in which memory is allocated during runtime or execution of a program.

SET 12 – Q56 – Q60

Q. How we achieve **dynamic memory allocation** in C ?

A. We achieve **dynamic memory allocation** using functions like **malloc(), calloc(), free(), realloc()**.

Q. Explain **malloc()** ?

A. **malloc()** is one of the functions used for **dynamic memory allocation**. It takes up single arguments, which denotes the number of bytes to be allocated.

malloc() is **faster** than **calloc()**.

Syntax : int *p = (int *)malloc(sizeof(int))

Q. Explain **calloc()** ?

A. **calloc()** is one of the functions used for **contiguous dynamic memory allocation**. It takes up two arguments, in which first argument denotes the number of bytes to be allocated, and second argument denotes size of each block. It initializes allocated memory by 0.

Syntax : int *p = (int *)calloc(10,sizeof(int))

Q. **malloc() vs calloc() – which is faster ?**

A. **malloc()** is **faster** than **calloc()**, because of one extra step of initializing the allocated memory by 0, in case of **calloc()**.

Q. Explain the functionality of **realloc()** ?

A. It resizes the memory block that was previously allocated with a call to malloc or calloc. It takes two arguments : first parameter is a pointer to a memory block that was previously allocated with malloc, or calloc, second parameter represents the size of new memory block.

SET 13 – Q61 – Q65

Q. When we use **free()** ?

A. It is use to free the memory block that had been allocated dynamically.

Q. What are **wild pointers** ?

A. Wild pointers are uninitialized pointers.

Q. Are **null pointers** and **wild pointers** same ?

A. No.

Q. What are **Bit Fields** ?

A. Bit Fields are used to save space in structures having several binary flags or other small fields.

Q. Can we define an array of **bit field** ?

A. No.

SET 14 – Q66 – Q70

Q. What are the **valid operations** that can be performed on pointers ?

A. 1. Comparison

2. Addition

3. Subtraction

Q. Explain the concept of **#undef** ?

A. #undef is used to undefine the existing macro.

Q. What you can tell me about **far pointers** and **near pointers** ?

A. Near pointers can access upto 2^{16} memory space.

Far pointers can access upto 2^{32} memory space.

Q. Can we have nested comments in C ?

A. No.

Q. Can we left **main() function empty** ?

A. Yes.

SET 15 – Q71 – Q75

Q. Name some **entry** and **exit control** loops ?

A. **Entry control loops :** for, while

Exit control loops : do

Q. What if we insert ‘ **; ‘ (semi colon)** after a header file ?

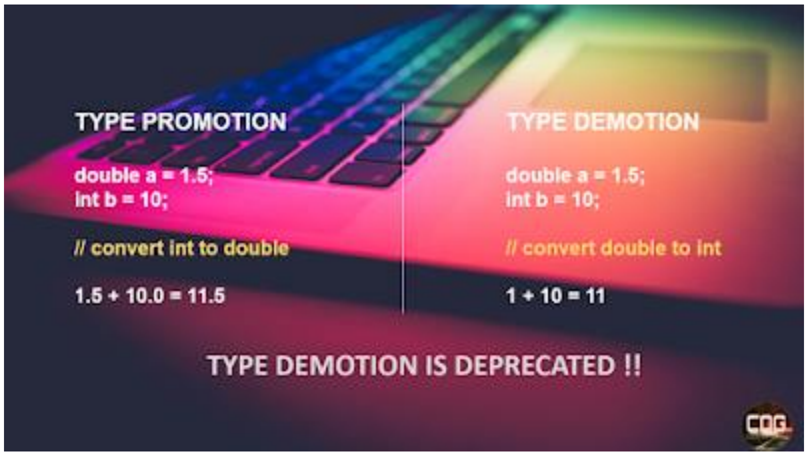
A. Program will compile and run with a **warning**.

Q. Why **preprocessors** does not have ‘ **;** ‘ at the last ?

A. Semicolon is needed by compiler, for compiling a program. As the name itself suggests that preprocessor directives are processed before compilation of a program, hence it is not needed.

Q. Give the example of **type promotion & type demotion** ?

A.



TYPE PROMOTION

```
double a = 1.5;
int b = 10;

// convert int to double

1.5 + 10.0 = 11.5
```

TYPE DEMOTION

```
double a = 1.5;
int b = 10;

// convert double to int

1 + 10 = 11
```

TYPE DEMOTION IS DEPRECATED !!

Q. Explain the various phases in the process of **recursion** ?

A. Recursion has two phases :

1. **Winding Phase :** This phase runs until desired condition is fulfilled.

2. **Unwinding Phase :** Once winding phase gets over, control is transferred back to original call, this is unwinding phase.

SET 16 – Q76 – Q80

Q. What is the basic difference between **getch() & getche()** ?

A. **getch() :** reads single character from keyboard.

getche() : reads single character but output is displayed on screen.

Q. Can we call **main() function recursively** ?

A. Yes.

Q. Is **main()** function a user defined function ?

A. Yes.

Q. When we use ‘ **%p** ‘ inside printf() ?

A. For printing **address location** of a variable.

Q. What is __**STDC**__ ?

A. It is a predefined macro which is used to determine whether your compiler is **ANSI STANDARD** or not.

SET 17 – Q81 – Q85

Q. What are the different types of streams in C File Handling ?

A. Basically, there are two types of file handling streams : Text and Binary.

Q. Can a function in C return more than 1 values ?

A. No, not possible.

Q. Name some predefined macros in C ?

A. __LINE__ , __STDC__ , __FILE__ , __DATE__ , __TIME__ .

Q. What is **#include<pragma.h>** ?

A. The **#pragma** directive is the method specified by the C standard for providing additional information to the compiler, beyond what is conveyed in the language itself.

Q. How to compile & run your C code on **Linux** ?

A.
```
$ gcc filename.c

$ ./a.out
```

1. **What does static variable mean?**

Ans: Static variables are the variables which retain their values between the function calls. They are initialized only once their scope is within the function in which they are defined.

2. **What is a pointer?**

Ans: Pointers are variables which stores the address of another variable. That variable may be a scalar (including another pointer), or an aggregate (array or structure). The pointed-to object may be part of a larger object, such as a field of a structure or an element in an array.

3. **What are the uses of a pointer?**

Ans: Pointer is used in the following cases
i)It is used to access array elements
ii)It is used for dynamic memory allocation.
iii)It is used in Call by reference
iv)It is used in data structures like trees, graph, linked list etc

4. **What is a structure?**

Ans: Structure constitutes a super data type which represents several different data types in a single unit. A structure can be initialized if it is static or global.

5. **What is a union?**

Ans: Union is a collection of heterogeneous data type but it uses efficient memory utilization technique by allocating enough memory to hold the largest member. Here a single area of memory contains values of different types at different time. A union can never be initialized.

6. **What are the differences between structures and union?**

Ans: A structure variable contains each of the named members, and its size is large enough to hold all the members. Structure elements are of same size.
A union contains one of the named members at a given time and is large enough to hold the largest member. Union element can be of different sizes.

7. What are the differences between structures and arrays?

Ans: Structure is a collection of heterogeneous data type but array is a collection of homogeneous data types.
Array
1-It is a collection of data items of same data type. 2-It has declaration only
3-.There is no keyword.
4- array name represent the address of the starting element.
Structure
1-It is a collection of data items of different data type. 2- It has declaration and definition
3-keyword struct is used
4-Structure name is known as tag it is the short hand notation of the declaration.

8. In header files whether functions are declared or defined?

Ans: Functions are declared within header file. That is function prototypes exist in a header file,not function bodies. They are defined in library (lib).

9. What are the differences between malloc () and calloc ()?

Ans: Malloc Calloc 1-Malloc takes one argument Malloc(a);where a number of bytes 2-memory allocated contains garbage values
1-Calloc takes two arguments Calloc(b,c) where b no of object and c size of objeIt initializes the contains of block of memory to zerosMalloc takes one argument, memory allocated contains garbage values.
It allocates contiguous memory locations. Calloc takes two arguments, memory allocated contains all zeros, and the memory allocated is not contiguous.

10. What are macros? What are its advantages and disadvantages?

Ans: Macros are abbreviations for lengthy and frequently used statements. When a macro is called the entire code is substituted by a single line though the macro definition is of several lines.

The advantage of macro is that it reduces the time taken for control transfer as in case of function. The disadvantage of it is here the entire code is substituted so the program becomes lengthy if a macro is called several times.

11. Difference between pass by reference and pass by value?

Ans: Pass by reference passes a pointer to the value. This allows the callee to modify the variable directly.Pass by value gives a copy of the value to the callee. This allows the callee to modify the value without modifying the variable. (In other words, the callee simply cannot modify the variable, since it lacks a reference to it.)

12. What is static identifier?

Ans: A file-scope variable that is declared static is visible only to functions within that file. A function-scope or block-scope variable that is declared as static is visible only within that scope. Furthermore, static variables only have a single instance. In the case of function- or block-scope variables, this means that the variable is not ―automatic‖ and thus retains its value across function invocations.

13. Where is the auto variables stored?

Ans: Auto variables can be stored anywhere, so long as recursion works. Practically, they‗re stored on the stack. It is not necessary that always a stack exist. You could theoretically allocate function invocation records from the heap.

14. Where does global, static, and local, register variables, free memory and C Program instructions get stored?

Ans: Global: Wherever the linker puts them. Typically the ―BSS segment‖ on many platforms. Static: Again, wherever the linker puts them. Often, they‗re intermixed with the globals. The only difference between globals and statics is whether the linker will resolve the symbols across compilation units.Local: Typically on the stack, unless the variable gets register allocated and never spills.Register: Nowadays, these are equivalent to ―Local‖ variables. They live on the stack unless they get register-allocated.

15. Difference between arrays and linked list?

Ans: An array is a repeated pattern of variables in contiguous storage. A linked list is a set of structures scattered through memory, held together by pointers in each element that point to the next element. With an array, we can (on most architectures) move from one element to the next by adding a fixed constant to the integer value of the pointer. With a linked list, there is a ―next‖ pointer in each structure which says what element comes next.

16. What are enumerations?

Ans: They are a list of named integer-valued constants. Example:enum color { black , orange=4,yellow, green, blue, violet };This declaration defines the symbols ―black‖, ―orange‖, ―yellow‖, etc. to have the values ―1,‖ ―4,‖ ―5,‖ … etc. The difference between an enumeration and a macro is that the enum actually declares a type, and therefore can be type checked.

17. Describe about storage allocation and scope of global, extern, static, local and register variables?

Ans:
Globals have application-scope. They‘re available in any compilation unit that includes an appropriate declaration (usually brought from a header file). They‘re stored wherever the linker puts them, usually a place called the ―BSS segment.‖
Extern? This is essentially ―global.‖
Static: Stored the same place as globals, typically, but only available to the compilation unit that contains them. If they are block-scope global, only available within that block and its subblocks. Local: Stored on the stack, typically. Only available in that block and its subblocks.
(Although pointers to locals can be passed to functions invoked from within a scope where that local is valid.)
Register: See tirade above on ―local‖ vs. ―register.‖ The only difference is that
the C compiler will not let you take the address of something you‘ve declared as ―register.‖

18. What are register variables? What are the advantages of using register variables?

Ans: 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.

19. What is the use of typedef?

Ans: 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.

20. Can we specify variable field width in a scanf() format string? If possible how?

Ans: All field widths are variable with scanf(). You can specify a maximum field width for a given field by placing an integer value between the ‗%‘ and the field type specifier. (e.g. %64s). Such a specifier will still accept a narrower field width.

The one exception is %#c (where # is an integer). This reads EXACTLY # characters, and it is the only way to specify a fixed field width with scanf().

21. **Out of fgets() and gets() which function is safe to use and why**?

Ans: fgets() is safer than gets(), because we can specify a maximum input length. Neither one is completely safe, because the compiler can‘t prove that programmer won‘t overflow the buffer he pass to fgets ().

22. Difference between strdup and strcpy?

Ans: Both copy a string. strcpy wants a buffer to copy into. strdup allocates a buffer using malloc().Unlike strcpy(), strdup() is not specified by ANSI .

23. What is recursion?

Ans: A recursion function is one which calls itself either directly or indirectly it must halt at a definite point to avoid infinite recursion.

24. Differentiate between for loop and a while loop? What are it uses?

Ans: For executing a set of statements fixed number of times we use for loop while when the number of iterations to be performed is not known in advance we use while loop.

25. What is storage class? What are the different storage classes in

C?

Ans: Storage class is an attribute that changes the behavior of a variable. It controls the lifetime, scope and linkage. The storage classes in c are auto, register, and extern, static, typedef.

26. What the advantages of using Unions?

Ans: When the C compiler is allocating memory for unions it will always reserve enough room for the largest member.

27. What is the difference between Strings and Arrays?

Ans: String is a sequence of characters ending with NULL .it can be treated as a one dimensional array of characters terminated by a NULL character.

28. What is a far pointer? Where we use it?

Ans: In large data model (compact, large, huge) the address B0008000 is acceptable because in these model all pointers to data are 32bits long. If we use small data model(tiny, small, medium) the above address won‘t work since in these model each pointer is 16bits long. If we are working in a small data model and want to access the address B0008000 then we use far pointer. Far pointer is always treated as a 32bit pointer and contains a segment address and offset address both of 16bits each. Thus the address is represented using segment : offset format B000h:8000h. For any given memory address there are many possible far address segment : offset pair. The segment register contains the address where the segment begins and offset register contains the offset of data/code from where segment begins.

29. What is a huge pointer?

Ans: Huge pointer is 32bit long containing segment address and offset address. Huge pointers are normalized pointers so for any given memory address there is only one possible huge address segment: offset pair. Huge pointer arithmetic is doe with calls to special subroutines so its arithmetic slower than any other pointers.

30.What is a normalized pointer, how do we normalize a pointer?
Ans: It is a 32bit pointer, which has as much of its value in the segment

register as possible.
Since a segment can start every 16bytes so the offset will have a value from 0 to F. for normalization convert the address into 20bit address then use the 16bit for segment address and 4bit for the offset address. Given a pointer 500D: 9407,we convert it to a 20bitabsolute address 549D7,Which then normalized to 549D:0007.

30. What is near pointer?

Ans: A near pointer is 16 bits long. It uses the current content of the CS (code segment) register (if
the pointer is pointing to code) or current contents of DS (data segment) register (if the pointer is pointing to data) for the segment part, the offset part is stored in a 16 bit near pointer. Using near pointer limits the data/code to 64kb segment.

31. In C, why is the void pointer useful? When would you use it?

Ans: The void pointer is useful because it is a generic pointer that any pointer can be cast into and back again without loss of information.

32. What is a NULL Pointer? Whether it is same as an uninitialized pointer?

Ans: Null pointer is a pointer which points to nothing but uninitialized pointer may point to anywhere.

33. Are pointers integer?

Ans: No, pointers are not integers. A pointer is an address. It is a positive number.

34. What does the error 'Null Pointer Assignment' means and what causes this error?

Ans: As null pointer points to nothing so accessing a uninitialized pointer or invalid location may cause an error.

35. What is generic pointer in C?

Ans: In C void* acts as a generic pointer. When other pointer types are assigned to generic pointer,conversions are applied automatically (implicit conversion).

36. Are the expressions arr and &arr same for an array of integers?
Ans: Yes for array of integers they are same.

37. IMP>How pointer variables are initialized?

Ans: Pointer variables are initialized by one of the following ways.
I.Static memory allocation
II.Dynamic memory allocation

38. What is static memory allocation?

Ans: Compiler allocates memory space for a declared variable. By using the address of operator, the reserved address is obtained and this address is assigned to a pointer variable. This way of assigning pointer value to a pointer variable at compilation time is known as static memory allocation.

39. What is dynamic memory allocation?

Ans: A dynamic memory allocation uses functions such as malloc() or calloc() to get memory dynamically. If these functions are used to get memory dynamically and the values returned by these function are assigned to pointer variables, such a way of allocating memory at run time is known as dynamic memory allocation.

41.What is the purpose of realloc?
Ans: It increases or decreases the size of dynamically allocated array. The function realloc (ptr,n) uses two arguments. The first argument ptr is a pointer to a block of memory for which the size is to be altered. The second argument specifies the new size. The size may be increased or decreased. If sufficient space is not available to the old region the function may create a new region.

42. What is pointer to a pointer?

Ans: If a pointer variable points another pointer value. Such a situation is known as a pointer to a pointer.
Example:
int *p1,**p2,v=10; P1=&v; p2=&p1;

Here p2 is a pointer to a pointer.

43. What is an array of pointers?

Ans: if the elements of an array are addresses, such an array is called an array of pointers.

44. Difference between linker and linkage?

Ans: Linker converts an object code into an executable code by linking together the necessary
built in functions. The form and place of declaration where the variable is declared in a program determine the linkage of variable.

45. Is it possible to have negative index in an array?

Ans: Yes it is possible to index with negative value provided there are data stored in this location. Even if it is illegal to refer to the elements that are out of array bounds, the compiler will not produce error because C has no check on the bounds of an array.

46. Why is it necessary to give the size of an array in an array declaration?

Ans: When an array is declared, the compiler allocates a base address and reserves enough space in memory for all the elements of the array. The size is required to allocate the required space and hence size must be mentioned.

47. What modular programming?

Ans: If a program is large, it is subdivided into a number of smaller programs that are called modules or subprograms. If a complex problem is solved using more modules, this approach is known as modular programming.

48. What is a function?

Ans: A large program is subdivided into a number of smaller programs or subprograms. Each subprogram specifies one or more actions to be performed for the larger program. Such sub programs are called functions.

49. What is an argument?

Ans: An argument is an entity used to pass data from the calling to a called function.

50. What are built in functions?

Ans: The functions that are predefined and supplied along with the compiler are known as builtin functions. They are also known as library functions

.

51. Difference between formal argument and actual argument?

Ans: Formal arguments are the arguments available in the function definition. They are preceded by their own data type. Actual arguments are available in the function call. These arguments are given as constants or variables or expressions to pass the values to the function.

52. Is it possible to have more than one main() function in a C program ?

Ans: The function main() can appear only once. The program execution starts from main.

53. What is the difference between an enumeration and a set of pre-processor # defines?

Ans: There is hardly any difference between the two, except that #defines has a global effect (throughout the file) whereas an enumeration can have an effect local to the block if desired. Some advantages of enumeration are that the numeric values are automatically assigned whereas in #define we have to explicitly define them. A disadvantage is that we have no control over the size of enumeration variables.

54. How are Structure passing and returning implemented by the complier?

Ans: When structures are passed as argument to functions, the entire structure is typically pushed on the stack. To avoid this overhead many programmer often prefer to pass pointers to structure instead of actual structures. Structures are often returned from functions in a location pointed to by an extra, compiler-supported ‗hidden' argument to the function.

55. IMP>what is the similarity between a Structure, Union and enumeration?

Ans: All of them let the programmer to define new data type.

56. Can a Structure contain a Pointer to itself?

Ans: Yes such structures are called self-referential structures.

57. How can we read/write Structures from/to data files?

Ans: To write out a structure we can use fwrite() as Fwrite(&e, sizeof(e),1,fp);Where e is a structure variable. A corresponding fread() invocation can read the structure back from file. calling fwrite() it writes out sizeof(e) bytes from the address &e. Data files written as memory images with fwrite(),however ,will not be portable, particularly if they contain floating point fields or Pointers. This is because memory layout of structures is machine and compiler
dependent. Therefore, structures written as memory images cannot necessarily be read back by programs running on other machine, and this is the important concern if the data files you‘re writing will ever be interchanged between machines.

58. Write a program which employs Recursion?

Ans: int fact(int n) { return n > 1 ? n * fact(n – 1) : 1; }

59. Write a program which uses Command Line Arguments?

Ans:
```
#include
void main(int argc,char *argv[])
{
int i; clrscr(); for(i=0;i
printf(―\n%d‖,argv[i]);
}
```

60. Difference between array and pointer?
Ans:
Array
1- Array allocates space automatically 2- It cannot be resized
3-It cannot be reassigned
4-sizeof (arrayname) gives the number of bytes occupied by the array.

Pointer
1-Explicitly assigned to point to an allocated space. 2-It can be sized using realloc()
3-pointer can be reassigned.
4-sizeof (p) returns the number of bytes used to store the pointer variable p.

61. What do the ‘c’ and ‘v’ in argc and argv stand for?

Ans: The c in argc(argument count) stands for the number of command line argument the program is invoked with and v in argv(argument vector) is a pointer to an array of character string that contain the arguments.

62. what are C tokens?

Ans: There are six classes of tokens: identifier, keywords, constants, string literals, operators andother separators.

63. What are C identifiers?

Ans: These are names given to various programming element such as variables, function, arrays.It is a combination of letter, digit and underscore.It should begin with letter. Backspace is not allowed.

64. Difference between syntax vs logical error?

Ans:
Syntax Error
1-These involves validation of syntax of language. 2-compiler prints diagnostic message.
Logical Error
1-logical error are caused by an incorrect algorithm or by a statement mistyped in such a way that it doesn‘t violet syntax of language.
2-difficult to find.

65. What is preincrement and post increment?

Ans: ++n (pre increment) increments n before its value is used in an assignment operation or any expression containing it. n++ (post increment) does increment after the value of n is used.

66. **Write a program to interchange 2 variables without using the third one**.
Ans:
a ^= b; ie a=a^b b ^= a; ie b=b^a; a ^= b ie a=a^b;
here the numbers are converted into binary and then xor operation is performed.
You know, you‗re just asking ―have you seen this overly clever trick that‗s not worth applying on modern architectures and only really applies to integer variables?‖

67. What is the maximum combined length of command line arguments including the space between adjacent arguments?

Ans: It depends on the operating system.

68. What are bit fields? What is the use of bit fields in a Structure declaration?

Ans: A bit field is a set of adjacent bits within a single implementation based storage unit that we will call a ―word‖.
The syntax of field definition and access is based on structure. Struct { unsigned int k :1; unsigned int l :1; unsigned int m :1;
}flags; the number following the colon represents the field width in bits.Flag is a variable that contains three bit fields.

69. What is a preprocessor, what are the advantages of preprocessor?

Ans: A preprocessor processes the source code program before it passes through the compiler. 1- a preprocessor involves the readability of program
2-It facilitates easier modification
3-It helps in writing portable programs 4- It enables easier debugging

5-It enables testing a part of program
6-It helps in developing generalized program

70. What are the facilities provided by preprocessor?
Ans:
1-file inclusion
2-substitution facility

3-conditional compilation

71. **What are the two forms of #include directive?**

Ans:
1.#include‖filename‖ 2.#include
the first form is used to search the directory that contains the source file.If the search fails in the home directory it searches the implementation defined locations.In the second form ,the preprocessor searches the file only in the implementation defined locations.

72. How would you use the functions randomize() and random()?

Ans:
Randomize() initiates random number generation with a random value.
Random() generates random number between 0 and n-1;

73. What do the functions atoi(), itoa() and gcvt() do?

Ans:
atoi() is a macro that converts integer to character. itoa() It converts an integer to string
gcvt() It converts a floating point number to string

74. How would you use the functions fseek(), freed(), fwrite() and ftell()?

Ans:
fseek(f,1,i) Move the pointer for file f a distance 1 byte from location i.
fread(s,i1,i2,f) Enter i2 dataitems,each of size i1 bytes,from file f to string s. fwrite(s,i1,i2,f) send i2 data items,each of size i1 bytes from string s to file f. ftell(f) Return the current pointer position within file f. The data type returned for functions fread,fseek and fwrite is int and ftell is long int.

75. What is the difference between the functions memmove() and memcpy()?

Ans: The arguments of memmove() can overlap in memory. The arguments of memcpy() cannot.

76.What is a file?
Ans: A file is a region of storage in hard disks or in auxiliary storage

devices.It contains bytes of information .It is not a data type.

76. IMP>what are the types of file? Ans: Files are of two types

1-high level files (stream oriented files) :These files are accessed using library functions 2-low level files(system oriented files) :These files are accessed using system calls

77. IMP>what is a stream?

Ans: A stream is a source of data or destination of data that may be associated with a disk or other I/O device. The source stream provides data to a program and it is known as input stream. The destination stream eceives the output from the program and is known as output stream.

79.What is meant by file opening?

Ans: The action of connecting a program to a file is called opening of a file. This requires creating an I/O stream before reading or writing the data.

80.What is FILE?
Ans: FILE is a predefined data type. It is defined in stdio.h file.

81.What is a file pointer?
Ans: The pointer to a FILE data type is called as a stream pointer or a file pointer. A file pointer points to the block of information of the stream that had just been opened
.
82. How is fopen()used ?

Ans: The function fopen() returns a file pointer. Hence a file pointer is declared and it is assigned as
FILE *fp;
fp= fopen(filename,mode);
filename is a string representing the name of the file and the mode represents:
—r‖ for read operation
—w‖ for write operation
—a‖ for append operation
—r+‖,‖w+‖,‖a+‖ for update operation

83How is a file closed ?
Ans: A file is closed using fclose() function Eg. fclose(fp);
Where fp is a file pointer.

84.What is a random access file? Ans:
A file can be accessed at random using fseek() function
fseek(fp,position,origin);
fp file pointer
position number of bytes offset from origin
origin 0,1 or 2 denote the beginning ,current position or end of file respectively.

85.What is the purpose of ftell ?
Ans: The function ftell() is used to get the current file represented by the file pointer. ftell(fp);
returns a long integer value representing the current file position of the file pointed by the file pointer fp.If an error occurs ,-1 is returned.

86.What is the purpose of rewind() ?
Ans: The function rewind is used to bring the file pointer to the beginning of the file. Rewind(fp);
Where fp is a file pointer.Also we can get the same effect by feek(fp,0,0);

87.Difference between a array name and a pointer variable?
Ans: A pointer variable is a variable where as an array name is a fixed address and is not a variable. A
pointer variable must be initialized but an array name cannot be initialized. An array name being a constant value , ++ and — operators cannot be applied to it.

88.Represent a two-dimensional array using pointer?
Ans:
Address of a[I][j] Value of a[I][j] &a[I][j]
or
a[I] + j or
*(a+I) + j
*&a[I][j] or a[I][j] or
*(a[I] + j) or
*(* (a+I) +j)

89. Difference between an array of pointers and a pointer to an

array?

Ans:
Array of pointers
1- Declaration is: data_type *array_name[size]; 2-Size represents the row size.
3- The space for columns may be dynamically
Pointers to an array
1-Declaration is data_type (*array_name)[size]; 2-Size represents the column size.

90.Can we use any name in place of argv and argc as command line arguments ? Ans: yes we can use any user defined name in place of argc and argv;
91.What are the pointer declarations used in C?
Ans:
1- Array of pointers, e.g , int *a[10]; Array of pointers to integer 2-Pointers to an array,e.g , int (*a)[10]; Pointer to an array of into 3-Function returning a pointer,e.g, float *f( ) ; Function returning a pointer to float 4-Pointer to a pointer ,e.g, int **x; Pointer to apointer to int 5-pointer to a data type ,e.g, char *p; pointer to char

92. **Differentiate between a constant pointer and pointer to a constant?**
Ans:
const char *p; //pointer to a const character. char const *p; //pointer to a const character. char * const p; //const pointer to a char variable.
const char * const p; // const pointer to a const character.

93.Is the allocated space within a function automatically deallocated when the function returns?
Ans: No pointer is different from what it points to .Local variables including local pointers variables in a function are deallocated automatically when function returns.,But in case of a local pointer variable ,deallocation means that the pointer is deallocated and not the block of memory allocated to it. Memory dynamically allocated always persists until the allocation is freed
or the program terminates.

94.Discuss on pointer arithmetic? Ans:

1- Assignment of pointers to the same type of pointers. 2- Adding or subtracting a pointer and an integer.
3-subtracting or comparing two pointer.
4-incrementing or decrementing the pointers pointing to the elements of an array. When a pointer to an integer is incremented by one , the address is incremented by two. It is done automatically by the compiler.
5-Assigning the value 0 to the pointer variable and comparing 0 with the pointer. The pointer having address 0 points to nowhere at all.

95.What is the invalid pointer arithmetic? Ans:
i)adding ,multiplying and dividing two pointers.
ii)Shifting or masking pointer.
iii)Addition of float or double to pointer.
iv)Assignment of a pointer of one type to a pointer of another type ?

96.What are the advantages of using array of pointers to string instead of an array of strings?
Ans:
i)Efficient use of memory.
ii)Easier to exchange the strings by moving their pointers while sorting.

97. Are the expressions *ptr ++ and ++ *ptr same?

Ans: No,*ptr ++ increments pointer and not the value pointed by it. Whereas ++ *ptr increments the value being pointed to by ptr.

98. What would be the equivalent pointer expression foe referring the same element as a[p][q][r][s] ?

Ans : *(* (* (* (a+p) + q) + r) + s)

99. Are the variables argc and argv are always local to main?

Ans: Yes they are local to main.

100. Can main () be called recursively?

Ans: Yes any function including main () can be called recursively.

101. IMP>Can we initialize unions?

Ans: ANSI Standard C allows an initializer for the first member of a union. There is no standard way of initializing any other member (nor, under a pre-ANSI compiler, is there generally any way of initializing a union at all).

102. **What's the difference between these two declarations?**

Ans: struct x1 { … };
typedef struct { … } x2;
The first form declares a structure tag; the second declares a typedef. The main difference is that the second declaration is of a slightly more abstract type.its users don‘t necessarily know that it is a structure, and the keyword struct is not used when declaring instances of it.

103. Why doesn't this code: a[i] = i++; work?

Ans: The sub expression i++ causes a side effect. it modifies i‘s value. which leads to undefined behavior since i is also referenced elsewhere in the same expression.

104.WHy doesn't struct x { … }; x thestruct; work?
Ans:
C is not C++. Typedef names are not automatically generated for structure tags.
105.Why can't we compare structures? Ans:
There is no single, good way for a compiler to implement structure comparison which is consistent with C‘s low-level flavor. A simple byte-by-byte comparison could founder on random bits present in unused
―holes‖ in the structure (such padding is used to keep the alignment of later fields correct). A field-by-field comparison might require unacceptable amounts of repetitive code for large structures.

106. How are structure passing and returning implemented?

Ans: When structures are passed as arguments to functions, the entire structure is typically pushed on the stack, using as many words as are required. Some compilers merely pass a pointer to the structure, though they may have to make a local copy to preserve pass-by-value semantics. Structures are often returned from functions in a location pointed to by an extra,compilersupplied
―hidden‖ argument to the function. Some older compilers used a special,static location
for structure returns, although this made structure-valued functions non-reentrant, which ANSI C disallows.