

C Tutorial







**From** Kamaraju <kamarajuch@mirafra.com>  
**To** <dineshchouhan@mirafra.com>  
**Cc** Himangshu <himangshuagarwala@mirafra.com>, Gaurav <gauravagrawal@mirafra.com>, Zaheer <zaheerm@mirafra.com>  
**Date** 2023-04-03 12:14

HI Dinesh,

Welcome to mirafra.

C Topics

SN	Topic	Question	Your Answer
1	Array	What happens when array is passed as a pointer in a function. Print the array from the function.	
2	Array	What will happen if you try to access a value which <u>is out of array boundary</u>	Array Index outof bound exception
3	Array	What happens if you try to add an element to array which falls outside the boundary. Example - int A[10], int A[21]=11;	Array Index outof bound exception
4	Array	Write a program to get maximum repeating element in an array	use IDE and demonstrate.
5	Array	Demonstrate the addition and multiplication of 2X2, 2X3,3X3 matrix	use IDE and demonstrate.
6	Array, Pointers, Dynamic Memory Allocation, Functions	Write a program using arrays, DMA, functions, pointers to take subjects and marks from an user and print the subjects and marks as below I/P Enter number of subjects - 3 Subject Name - Science Subject Marks - 61 Subject Name - Maths Subject Marks - 91 Subject Name - Social Studies Subject Marks - 60 O/P Science 61(Prime) Maths 91(Prime) Social Studies 60(Non Prime)	use IDE and demonstrate.
7	Arrays	<pre>#include &lt;stdio.h&gt; int main() { int x[4]={1,3,5,7}; int i; int *ptr; for(i = 0; i &lt; 4; ++i) { ptr=&amp;x[i]; printf("x[%d] is %d\n",i,*(ptr+i)); }  return 0; }</pre> What would be the printed?	
8	Bitwise operator	What are different bitwise operators.	
9	Bitwise operator	Which bitwise operator is suitable for checking whether a particular bit is on or off	
10	Bitwise operator	How to set/unset 17 and 18 bit of a given number?	use IDE and demonstrate.
11	Bitwise operator	How to convert little to big endian and vice versa?	use IDE and demonstrate.
12	Bitwise operator	How to ascertain if the machine is little or big endian?	use IDE and demonstrate.
13	Bitwise operator	c program to get parity corrected byte from the user input	use IDE and demonstrate.

14	Bitwise operator	Reverse the bits position in a number	use IDE and demonstrate.
15	Bitwise operator	Swap the 7th & 8th bits position in a number	use IDE and demonstrate.
16	Bitwise operator	Validate if a IP address is valid	use IDE and demonstrate.
17	Bitwise operator	Count the number of 1's in a 32 bit number by two ways viz Using For Loop and without using For Loop	use IDE and demonstrate.
18	Bitwise operator	Toggle bits in a number within a Range	use IDE and demonstrate.
19	Command Line Arguments	When do we use command line arguments in a program?	
20	Compilation	Explain the different Stages of compilation	
21	Compilation	When do you get compilation error	
22	Compilation	When do you get linking error	
23	Compilation	What is the difference between Segmentation fault and Bus error	
24	Compilation	What happens if the same external variable is declared in multiple c file	
25	Compilation	Why makefile is used?	
26	Data structure	What are the different data structure? Do we've datastructure available as a part of standard library?	
27	Data structure	Write a program to reverse a double linked list	use IDE and demonstrate.
28	Data structure	Write a program to find the middle node of the single linked list.	use IDE and demonstrate.
29	Dynamic Memory Allocation	What is dynamic memory allocation and when it is used?	
30	Dynamic Memory Allocation	What happens if allocated memory is nor freed?	
31	ENUM	What will happen if you try to print a ENUM by using %s?	
32	File Handling	Demonstrate how data and file can be encrypted.	use IDE and demonstrate.
33	File handling	Write a program to write and retrieve employee data from a text file. Data to be encrypted and stored.	
34	Functions	Given a function which takes 4 arguments i.e source, destination, start index, and end index. This function copies string in source tto destination from provided start index to end index. what are the unit test cases, you will write to test the functionality of the function?	use IDE and demonstrate.
35	Functions	Write a recursion program to implement Factorial.	use IDE and demonstrate.
36	Functions	What happens if static variable is passed as reference or value in a function?	
37	Functions	Can we pass any parameter and return a value from the ISR	
38	Functions	What is a static function?	
39	Functions	What is an inline function?When do you use inline functions?	
40	Functions	What is a recursion function.	
41	Functions	Can a pointer be returned from a function?	
42	ISR	Is it safe to call printf() inside Interrupt Service Routine (ISR)	use IDE and demonstrate.
43	ISR	How do you measure interrupt latency	
44	ISR	What is NVIC in ARM Cortex?	
45	ISR	Can we change the interrupt priority level of the Cortex-M processor family?	
46	ISR	Can we pass any parameter and return a value from the ISR?	
47	ISR	Is it safe to call printf() inside Interrupt Service Routine (ISR)?	

48	ISR	Can we put a breakpoint inside ISR?	
49	ISR	Explain the interrupt execution sequence?	
50	ISR	What are the causes of Interrupt Latency?	
51	ISR	Can we use any function inside ISR?	
52	ISR	What is ISR	
53	Keywords	What are the different Modifiers and qualiers in C	
54	Loops	Infinite loops often arise in embedded systems. How do you write an infinite loop in C?	use IDE and demonstrate.
55	Loops	Infinite loops often arise in embedded systems. How do you code an infinite	
56	Loops	Which loop is better FOR or WHILE loop? Which one is more efficient? How do you decide which loop to use.	
57	Macros	How Macros work. What are the standard macros available as a part of standard C library. How macros are taken into consideration during compilation.	
58	Macros	Is it wise to have multi-line Macros? Under what circumstances multi-line macros to be used?	
59	Macros	<pre>#include &lt;stdio.h&gt; #define MIN(a,b) ((a)&gt;(b)?(a):(b)) void main() {     printf("The number is: %d\n", MIN(10,20)); } </pre> What would be printed?	
60	Macros	Write a program using the below _DATE_ _TIME_ _FILE_ _LINE_ _STDC_	
61	MCU	How do you use float variable in MCU?	
62	Memory	How to access the fixed memory location in embedded C? Demonstrate a program	use IDE and demonstrate.
63	Memory	How to detect stack corruption?	use IDE and demonstrate.
64	Memory	If stack corruption is happening how you can avoid them? Demonstrate using a program	use IDE and demonstrate.
65	Memory	Given a range location address 1500 to 2500. Shift a data on 2000 to 3000 location	use IDE and demonstrate.
66	Memory	Explain memory layout in C and how different variables are stored. What is reason for initializing and not initializing variables in memory	
67	Memory	What is the stack overflow	
68	Memory	What is the cause of the stack overflow	
69	Memory	How you can access memory from hardware point. Demonstrate using program	
70	Memory	What are the different addressing modes	
71	Memory	What are the different situation which results in memory corruptions and how do you overcome?	
72	Memory	What is the difference between memcpy and memmove	
73	Memory	What are the different functions supported by Stack?	
74	Memory	How to access the fixed memory location in embedded C	
75	Numbers	Write a program to check if the number is a palindrome	use IDE and demonstrate.
76	Pointer	What is the difference? int const *p = &i; int * const p = &i; When do we use?	

77	Pointer	How do you define and when do we use? Constant integer Constant pointer to integer Constant pointer to constant integer	
78	Pointer	What are function pointers and when do we use it?	
79	Pointer	How char pointer and integer pointer access data from memory	
80	Pointer	What is a function pointer?	
81	Pointer	What is Structure pointer. When do we use it?	
82	Pointer	Can we have a volatile pointer	
83	Pointer	What is the difference between an uninitialized pointer and a null pointer?	
84	Pointers	What is the difference - char *p = "hello" - char s[] = "hello"	use IDE and demonstrate.
85	Pointers	what is dangling pointer? How to avoid. Demonstrate using a program	use IDE and demonstrate.
86	Pointers	Write a program to demonstrate to pointer to pointer	use IDE and demonstrate.
87	Preprocessor	How preprocessors work. What are the standard preprocessors available as a part of standard C library. How preprocessors are taken into care during compilation.	
88	Preprocessor	<pre>#include &lt;stdio.h&gt; #define YEARS_OLD 12 int main() {     #ifdef YEARS_OLD     #undef YEARS_OLD     #define YEARS_OLD 485     printf("Bengaluru is %d years old\n", YEARS_OLD);     #endif     return 0; }</pre> What is age of Bangalore?	
89	Process	What are semaphores & why are they used?	
90	Process	What is a process. How a process is spawn?	
91	Runtime	What is segmentation fault in C	
92	Runtime	Under what circumstances, segmentation fault is encountered. How it can be avoided	
93	Search	Implement searching algorithms ( Linear/Binary search)	use IDE and demonstrate.
94	Sorting	Implement sorting algorithms ( Bubble sort/Selection sort/Insertion sort/Quick sort/Merge sort)	use IDE and demonstrate.
95	Start-up code	What is the start-up code in MCU. Explain the steps	use IDE and demonstrate.
96	Storage	Where string is stored?	
97	Storage	Static variable defined in a header file, and this header file is included in 2 different files, what will happen? How to modify a static variable from other file.	
98	Storage	What happens if the same static variable is intiallize in 2 different files.	
99	Storage	What is the difference between Local, global and static variables.	
100	Storage	<a href="#">What is the difference between const &amp; const volatile.</a> <a href="#">When do we use const and const volatile used?</a>	
101	Storage	What is the precedence of variables if local, static and global variable has the same name (Example – int var)	
102	Storage	What is constant and volatile? When do we use constant and volatile in embedded programing?	
103	Storage	What is a register variable. When do we need to use register variable.	
104	Storage	What is interrupt latency	

105	Storage	How do you measure interrupt latency	
106	Storage	What is a nested interrupt	
107	Storage	Explain the interrupt execution sequence	
108	Storage	Can a variable be both constant and volatile in C	
109	String	Write a program to check if the string is a palindrome	use IDE and demonstrate.
110	String	Write a program to arrange the alphabet in a string from z to a.	use IDE and demonstrate.
111	String	Remove vowels from a string and print the output	use IDE and demonstrate.
112	String	Implement all the string functions like strcat, strcmp, strcpy, strlen	use IDE and demonstrate.
113	String	What are the different String operations available in standard C library?	
114	Structure	Find out the size of a structure without using sizeof operator.	use IDE and demonstrate.
115	Structure & Union	What is the difference? When do we opt for Structure or Union? Demonstrate through a program	
116	Structure & Union	What is the advantage and disadvantage of using a Union over Structure?	
117	Structure	In structure members are int, char and static float. Where the object is stored in memory of a static object	
118	Structure	Explain Structure with padding and non-padding?	
119	Switch	What happens if we use float as a part of switch case	
120	Switch	What is the significance of Break and Continue.	
121	Switch	What are the different attributes that can be used in switch statement?	
122	Tools	What are the debugging tools you have been used?	
123	Typecast	Is it wise to use typecast? Is there any disadvantage of using typecast.	
124	Typedef	What is the advantage of using typedef	
125	Unions	How to convert endianness using unions concept?	use IDE and demonstrate.
126	Variable	Find the given number if it is a power of 2 or not ?	use IDE and demonstrate.
127	Variable	Count the number of bits set using recursion	use IDE and demonstrate.
128	Variable	Change decimal number into binary and print the same.	use IDE and demonstrate.
129	Variable	Find if the given number is a power of 2 or not	use IDE and demonstrate.
130	Variable	Write a program to convert decimal to binary and vice versa	use IDE and demonstrate.
131	Variable	Check if it's a armstrong number	use IDE and demonstrate.
132	Version Control	Do you have knowledge on git/perforce? Demonstrate how do use source version control tool. Check out, Check IN, compile, Run, branch merger to main branch etc	use IDE and demonstrate.

C Topics links

[https://drive.google.com/file/d/18p8RVfzfjK0zo0XxZ51vpwDya0NGbabU/view?usp=share\\_link](https://drive.google.com/file/d/18p8RVfzfjK0zo0XxZ51vpwDya0NGbabU/view?usp=share_link)

[https://drive.google.com/file/d/1HEotrwx9jsGG4Ah8z91pfREcXG0jzS2/view?usp=share\\_link](https://drive.google.com/file/d/1HEotrwx9jsGG4Ah8z91pfREcXG0jzS2/view?usp=share_link)

Thanks and regards,  
kamaraju