

100 Embedded C Interview Questions

C Basics

- What is the difference between C and Embedded C?
- What is the volatile keyword in C?
- What does the const keyword do?
- Why is the main() function special?
- Difference between #define and const?
- What are storage classes in C?
- What is the purpose of typedef?
- What are static and extern keywords?
- What is the difference between signed and unsigned integers?
- How are enums used in embedded systems?

Pointers and Memory

- What is a pointer?
- What is a dangling pointer?
- What is a null pointer?
- What is memory leak?
- Difference between malloc() and calloc()?
- Explain function pointers with example.
- What is pointer arithmetic?
- What is a void pointer?
- What are memory segments in C?
- What is the stack vs heap memory difference?

Bitwise and Low-Level Operations

- What is bit masking?
- How do you set, clear, and toggle a bit?
- What are bit fields?
- Difference between >> and << operators?
- What is endianness?
- How to check system endianness in C?

- What is the use of the & and | operators in embedded C?
- What are shift operators used for?
- How do you reverse bits in a byte using C?
- How to check if a number is power of 2 using bitwise?

Control Flow & Loops

- Explain difference between for, while, and do-while loops.
- What is a nested loop?
- How to exit from nested loops?
- What is the use of break and continue?
- How to write an infinite loop in C?
- Can you implement state machines using switch-case?
- What is the ternary operator?
- What is recursion and should it be used in embedded?
- What is a goto statement and when is it used?
- How to write delay loops in embedded C?

Embedded System Specific

- What is an ISR (Interrupt Service Routine)?
- What is the difference between polling and interrupts?
- What is the use of volatile with ISRs?
- What is a Watchdog Timer?
- What is debouncing in embedded systems?
- What is RTOS?
- What are the states of a task in RTOS?
- What is task priority?
- Difference between preemptive and cooperative multitasking?
- What is a race condition and how to avoid it?

Code Optimization & Portability

- How to optimize code size in embedded C?
- What is code portability?
- What is inline function?
- Difference between macro and inline?

- What is the use of register keyword?
- What is loop unrolling?
- What is dead code elimination?
- How to align structures in memory?
- What are packed structures?
- What is memory-mapped I/O?

Debugging & Testing

- What tools are used for embedded debugging?
- What is JTAG and how is it used?
- What is boundary scan?
- What are assertions in C?
- How do you debug ISRs?
- How to simulate embedded code on PC?
- Difference between emulator and simulator?
- What is the use of GDB?
- What is printf debugging?
- How do you measure execution time in embedded C?

Advanced C Concepts

- What is reentrancy?
- What are static functions?
- What is function inlining?
- How do you implement callback functions?
- What is the difference between blocking and non-blocking code?
- What is memory fragmentation?
- What is volatile vs const volatile?
- What is the use of weak attribute in embedded C?
- What are linker scripts?
- How do you write startup code in embedded projects?