15 Embedded System Interview Questions

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When applying and interviewing for software engineering jobs, you can benefit from practicing answers to technical questions. For software engineers hoping to specialize in embedded systems engineering, they need to demonstrate an in-depth understanding of embedded systems to showcase their ability to code for industrial or household machines and appliances. By reviewing embedded system interview questions and sample answers, you can enhance your employability during a job interview. In this article, we review tips on how to prepare to answer embedded system questions and provide 15 examples and sample answers to help you develop your own unique responses.

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Interview tips to prepare for embedded system questions

Here are a few ways you can prepare for embedded system interview questions to present

yourself in a professional manner to an employer:

- **Research common embedded system interview questions.** There are a variety of embedded system topics, so it's important that you review both standard and more in-depth questions about the subject. If you need more guidance about the potential questions an interviewer may ask, you can review the job description. Based on the skills and job duties mentioned, you can gain valuable insights into the types of questions an interviewer may ask you.
- **Review your software engineer resume and cover letter.** During your interview, the interviewer may use your resume and cover letter as a reference to guide questions and additional interview topics. By reviewing your professional documents before the interview, you can ensure you're well prepared for questions about skills, previous jobs or educational experiences.
- **Write out sample answers and rehearse them out loud.** Because embedded system interview questions require you to discuss different procedures and software functions, it's helpful to write answers and rehearse them. This ensures you provide confident, well-worded answers during your interview.
- **Practice coding for embedded systems.** Depending on your interview requirements, you may need to complete a technical test to demonstrate your ability to code and troubleshoot embedded systems. Practicing your coding skills before the interview ensures you're prepared for the possibility. It can also help you provide detailed answers about embedded system coding during your interview.
- **Complete a mock interview.** Ask a friend or family member to ask you embedded interview questions so you can practice your responses. This can help you ease your nerves, refine your answers and receive insightful feedback from others about the way you present yourself.

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15 Embedded system interview questions and sample answers

Review these 15 embedded system interview questions and sample answers:

1. Can you define the components of an embedded system?

This question allows an interviewer to gauge a candidate's understanding of standard information about embedded systems. From this, they can determine whether a candidate understands the inner components of embedded systems and how they work. Your answer should demonstrate your understanding by listing each component:

Example: *"There are so many components that contribute to the functions of an embedded system. I would have to say that the standard components of an embedded system include memory, user interface, power supply, timers and display."*

2. When would an embedded system need an infinite loop?

When interviewers ask this question, they want to see how much a candidate knows about more in-depth embedded system topics. A quality answer should outline the situation in which embedded systems need an infinite loop. It should also define an infinite loop:

Example: *"An infinite loop is a set of instructions that cause a computer or related program to continue functioning without an end. Embedded systems need an infinite loop because it's meant to work for a long period of time. This could be weeks, months or years."*

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3. What are the different types of embedded systems and

which do you have the most experience with?

This question allows interviewers to learn more about a candidate's professional background with embedded systems. It also helps them decide whether a candidate needs additional training during the onboarding process, if hired. In your answer, you should list each type of embedded system and discuss one or more examples from your previous experiences where you programmed an embedded system:

Example: *"The different types of embedded systems include mobile embedded systems, stand-alone embedded systems, real-time embedded systems and networked embedded systems. In my previous role working for a cell phone company, we had to program mobile embedded systems for several phone models."*

4. In your opinion, why use an embedded system over other available options?

By asking this question, an interviewer wants to learn about your software engineering experience in comparison with your embedded system knowledge. A quality candidate answer should mention one or more situations where embedded systems work better than other options. They should also name at least one other option to convey their understanding:

Example: *"I think it's better to use embedded systems whenever possible because they're much smaller than the average system, allowing for a longer power supply and quick functioning."*

5. What types of errors do embedded systems encounter? Do you have any examples from your previous software engineering experiences?

This is another interview question where an interviewer wants to gauge more about your professional experience with embedded systems. Your answer should outline the types of errors embedded systems encounter and offer at least one personal example of troubleshooting errors:

Example: *"Some common types of errors for embedded systems tend to include inaccessible memory storage, malfunctioning of data lines or address lines, damaged memory cards and incorrectly-programmed control signals. In my first embedded system engineering job, I made a coding error that lead to mislabeled control signals. However, I caught my mistake quickly and learned from it."*

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6. What is a semaphore and when would you use one?

By asking this question, an interviewer wants to determine your understanding of individual terms or elements that contribute to an embedded system. In your answer, define the term clearly and highlight a situation that requires it:

Example: *"A semaphore is a type of variable that oversees access to certain resources within a system. Typically, you use a semaphore when working with a multitasking operating system, as it ensures the correct use of signals and other controls."*

7. How do you classify I/O devices in embedded systems?

When interviewers ask this question during an embedded system interview, they want to ensure that you understand how to complete a specific and important task for an embedded system. A quality candidate answer should explain what I/O devices are and clearly explain how to classify them within an embedded system:

Example: *"An I/O device is any type of hardware that people use to send messages to a computer or program like a mouse, for example. You classify I/O devices in embedded systems as either block-mode devices or character-mode devices."*

8. Can you differentiate between the functions of semaphores and mutexes?

This question helps interviewers figure out how you differentiate between two elements of an embedded system and whether you have the right amount of experience to understand their differences. Your answer should include a statement that outlines how they differ from one another:

Example: *"The difference between semaphores and mutexes is that a mutex acts as a locking mechanism. In contrast, semaphores act as a signaling mechanism."*

9. Do you know what buses are? If so, can you explain each and their purpose in embedded systems?

This is another interview question that allows interviewers to gauge their understanding of embedded system terms and their functions. Start by defining buses and the different types of buses before highlighting how they contribute to an embedded system:

Example: *"Yes, to my knowledge buses are communication methods within an embedded*

Example: *"Yes, to my knowledge buses are communication methods within an embedded system. This includes USB buses, I2C buses and CAN buses. A USB bus allows exterior devices to connect to a computer. An I2C bus allows two or more devices to connect to one another and communicate information. A CAN bus helps on ECU connect with other ECUs."*

10. Can you define interrupt latency? How do you reduce it and why?

By asking this question, interviewers want to determine what you know about interrupt latency and what it means in an embedded system. Your answer should provide a clear definition of interrupt latency, why you need to reduce it and a list of steps highlighting how to do so:

Example: *"Interrupt latency is the amount of time it takes for normal function to resume for a computer or program after interrupting maintenance occurs. You can reduce interrupt latency* by *coding small ISR instructions. This is important as it improves the speed and functionality of an embedded system."*

11. What is a recursion function?

When an interviewer asks this question, they want to figure out more about your level of experience with embedded systems and specific terms or phrases associated with them. In your answer, define a recursion function:

Example: *"A recursion function is a type of function that can call itself. This means the function can repeat itself and break down for solving in smaller pieces."*

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12. Do you know what ISR stands for within the context of an embedded system? What does it do?

This question helps interviewers determine what you know about the inner-workings of an embedded system. Your answer should highlight your understanding of ISR and how it works within an embedded system:

Example: *"ISR stands for interrupt service routine. In an embedded system, an ISR receives an interrupt request and communicates with the CPU to stop normal functions while it fixes an error or completes maintenance."*

13. What is the difference between a microcontroller and

a microprocessor?

By asking this question, an interviewer wants to gauge your technical knowledge of embedded systems and internal processes. A quality candidate answer should clearly identify and explain how they differ from one another:

Example: *"The difference between a microcontroller and a microprocessor is that the microcontroller has a CPU or central processing unit. In contrast, a microprocessor has a CPU, I/O devices and memory."*

14. What is a volatile keyword and what is its purpose?

An interviewer asks this question to figure out what you already know about volatile keywords and what they do within embedded systems. Your answer should include a definition and how it relates to an embedded system as a whole. If you have an example from a previous job or project, you can use this to enhance your answer:

Example: *"A volatile keyword is a type of keyword that can change over time to affect system functions. It keeps compilers from changing objects within a system and from storing keywords prone to change."*

15. How would you describe IPC mechanisms? Which IPC mechanisms are you familiar with?

This question helps interviewers determine a candidate's experience with IPC mechanisms in embedded systems. A good candidate answer should provide a definition for IPC mechanisms and include a list of IPC mechanism examples:

Example: *"IPC mechanisms are mechanisms that help processes communicate with each other. Some examples of IPC mechanisms include sockets, message queues, shared memory, pipes or semaphores."*

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