

Real-Time Operating System (RTOS) Interview Questions And Answers Guide.



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Real-Time Operating System (RTOS) Job Interview Preparation Guide.

Question # 1

What is the difference between winCE4.0 and winCE5.0 Is there any specialty?

Answer:-

speciality in the sense ...

- 1) number of processes supported by wince 5.0 is more than wince 4.0
- 2) memory mapping might be varying.

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Question # 2

What is Device driver?

Answer:-

A device driver is a code that performs device control operations specific to the device being addressed. It is software layer that lies between applications and the actual device.

or a more formal definition would be

Device drivers are distinct black boxes that make a particular piece of hardware respond to a well defined internal programming interface.

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Question # 3

When would you choose top down methodology?

Answer:-

Top down methodology is one where overall picture of the system is defined first. Then we go into the details of the sub-systems in the next level and so on. So to brief this, first the complex system is seen as a whole and then this is broken down to smaller simpler pieces.

Top down approach is preferred when understanding of the complete system is done. Sufficient knowledge of the system is required.

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Question # 4

Where is AD Database held what other folders are related to AD?

Answer:-

NTDS.dit is a active AD data base file stores in %systemroot%\system32\NTDS\tds.dit.

Edb.chk, Edb*.log, res1, res2 are the files related to AD

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Question # 5

Write a code to connect Hardware interrupt to ISR?



Answer:-

In Keil
void serial_ISR() interrupt 4 using 0

```
{  
}  
& in AVR studio  
SIGNAL(Interrupt_no)  
{  
}
```

hardware interrupt normally redirects the uC to predefined addresses. In case of high end processors the interrupt table will decide the interrupt vector address and whenever interrupt pin goes low, the table is searched for type and source of interrupt.

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Question # 6

What are the advantages and disadvantages of winCE compared to GPOS?

Answer:-

Adv:

- 1) Supports various types of processor platforms
- 2) Possible to Customize the Kernel and can reduce its size (upto ~300KB kernel size)
- 3) Especially for the embedded device platforms

Disadv:

- 1) Process limits, max. 32 process at a time in WinCE 5.0
- 2) Limited space allocation for each processes, 32MB/each process

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Question # 7

What version of wince supports dual core processor?

Answer:-

only windows embedded compact 7 will support dual core

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Question # 8

What are the rules you follow when you are writing critical section of code?

Answer:-

- a) Use Atomic Instructions
- b) Remember to enable interrupts
- c) Make the critical section code as small as possible. (Prefer not more than 20 instructions)
- d) Prefer not to call other functions from the critical section. if u r calling, see that there is no critical section in the other function too. Critical section is bounded by Disable Interrupt and Enable Interrupt.

Check the example below.

```
fnA()  
{  
  /* Critical Section Start */  
  Disable_Interrupt();  
  Some Instructions A ....  
  Call FnB();  
  /* do Something B */  
  Some Instructions B ....  
  /* Critical Section End */  
}  
fnB()  
{  
  /* Critical Section Start */  
  Disable_Interrupt();  
  Some Instructions ..  
  Enable_Interrupts();  
  /* Critical Section End */  
}
```

Now the Enable_Interrupts in fnB() will enable the interrupts and hence "Some Instructions B .." in fnA() which should have been in critical section will no more be in critical section because the interrupts are already enabled!!

Please check if this condition is handled by the Enable and Disable functions. If you want suggestions on how to solve this problem, do revert back

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Question # 9

When would you choose bottom up methodology?

Answer:-

In Bottom Up Methodology, we build the bottom-most layer first and then ascend onto the actual application i.e. all the smaller chunks of code or assisting functions are build first and then the bigger function which uses these are built. Bottom Up methodology is followed when we are definite about the number, type and functionality of the Bottom most functions(Assisting Functions) to be defined. Once all these functions are defined, we build the bigger system above it. Top down approach is followed when we are not very sure about the number/type of functions that need to be implemented, so the application is started to be implemented and as and when smaller functions are needed, they are built.

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Question # 10

What is task spawn in vxworks?

Answer:-

Task Spawn is used to create a thread in VXworks. Once the thread is created than only we can make all the suspended,delete,resume operations.

Syntax

```
taskSpawn(char *name,int priority,int option,int stacksize,FUNCPTR entryptoint,int avg1,avg2....avg10)
```

1. name: task name examp: task1
2. priority: 0-255 //0---high, 255---low
- 3.options: 0 most of the times
- 4.FUNCPTR: It jumps to function we are calling examp; (FUNCPTR)fun1
- 5.avg1--avg10: almost 0 every time

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Question # 11

What is priority inversion? And What is the solution?

Answer:-

When low priority thread is service and high priority theas is keep on waiting.This situation is called priority inversion.because even though thread have high priority it is not executed.

solution:There are different solution one of them is priority inheritance.It means change the priority of the thread.make high priority thread to low and lower priority thread to high.

In this way only the rule high priority should execute first is follow.

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Question # 12

What is the need of creating 4GB of pages in Linux?

Answer:-

Not sure what this question is. But looks like the question is: Why 4GB addressing space available in Linux. Well, the simple answer is it can address so much of memory with available 32 address lines. $2^{32} = 4 \text{ GB}$.

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Question # 13

What is the difference between normal OS and winCE OS?

Answer:-

Normal OS	wince
drivers runs under	User space(part of device manager)
kernel space	
cannot be customized	customized for embedded application
for embedded application	like mobile phones,thin client...
(exception linux)	
kernel - monolithic	kernel- micro kernel

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Question # 14

What is difference between IRQ and FRQ?

Answer:-



"IRQ is serviced at a normal priority level and FIQ is serviced at high priority level." This statement is wrong

FIQ is the fast interrupt i.e. the latency time taken is less because in the FIQ mode (in case of ARM architecture where these modes are encountered) the mode has an additional set of 8 general purpose registers which means in case of the banked registers there is no need to store these registers into stack when the interrupt occurs. That means r0 to r7 only needs to be stored while moving from User mode to FIQ mode whereas while moving from to IRQ mode r0 to r12 needs to be stored.

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Question # 15

IN RTOS HAVING 10KBYTES OF MEMORY AND YOUR PROGRAMM FOR ASKING FOR 5KBYTES AND YOU GOT NULL ERROR? WHY DOES IT BEHAVES LIKE THIS?

Answer:-

RTOS might be having 10k memory, might not fragmentation problem, and the largest hole available to user might be lesser than 5k, this condition might be one of the reason for NULL error.

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Question # 16

Why MFC is not Supporting in Smartphones, This is also winCE mobile then why?

Answer:-

Well there is nothing related with limited H/w I believe, Because MFC is just a collection classes designed using the Windows APIs, to provide ease of use.

So the proper answer may Be...

To design any application on mobile.. We have very limited APIs which user can directly used. Generally in Embedded system (even in Soft RTOS also), if application design using less (comfort) layer like MFC (and other if it is there :), then your application would be more efficient. That's why even today's era... The application written in Assembly is the most efficient application then others.

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Question # 17

What are the levels in winCE architecture?

Answer:-

there are four levels in Win CE architecture.

They are

- 1) Hardware layer
- 2) OEM layer
- 3) OS layer
- 4) Application layer

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Question # 18

What are the SDKs developed by winCE?

Answer:-

MSFT standard SDK's are,

1. Windows Mobile for Smartphone = Windows Mobile Standard.
2. Windows Mobile for Pocket PC = Windows Mobile Classic.
3. Windows Mobile for Pocket PC Phone Edition = Windows Mobile Professional.

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Question # 19

What is CE Stands in winCCE?

Answer:-

In the name "Windows CE," the letters "CE" are not an abbreviation for anything, but rather they imply a number of the precepts around which Windows CE is designed, including "Compact," "Connectable," "Compatible," "Companion," and "Efficient."

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Question # 20

What is the specialty of winCE?

Answer:-

- Supports various processor x86, MIPS, SH, ARM
- Real TimeOS



- Preemptive
- Max 32 process supported on or previous version of wince 6.x
- XIP
- Small memory foot print.
- Suitable for small gadgets with like Portable media players, Mobile phones

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Question # 21

What is major concerns about any RTOS selection?

Answer:-

Interrupt Latency means the time taken by the processor to pass the control to ISR after the interrupt is raised. Certainly this is the hardware feature.

Footprint of the OS matters because with the same compiler and same optimization techniques, Different OS's will have different footprint.

So this is can be looked upon while selecting the RTOS. RTOS can be chosen looking at various API support it provides. Synchronization support, Scheduler algos, and memory management of the OS.

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Question # 22

Where is ramba, and how to contact?

Answer:-

please share....

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