CS286-Computer Organization & Architecture
Possible Quiz Questions (Quiz #10)
For November 17th

The following is a list of possible questions for our quiz on November 17th. Some of the questions will not be asked in the quiz. All the questions that will appear in the quiz will appear exactly as shown below (however, numeric parameters may be changed). The quiz is closed textbook, closed notes and closed neighbors. Note that the questions, which did not appear in this quiz, still may appear in the exams. You will find a solution for these questions during lectures.

***** One left-over topic from “memory sub-systems” ****************************************************

#1: What is “locality in memory reference”? What are the two different types of “locality”?

***** Topics from “I/O sub-systems” ************************************************************************

#2: Complete the following table:

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>Memory</td>
</tr>
<tr>
<td>I/O Device</td>
<td>I/O Device</td>
</tr>
</tbody>
</table>

#3: Describe the procedure of an interrupt (i.e., describe the four steps in an interrupt).

#4: What are the major problems in dealing with I/O devices using interrupts?

#5: What is “programmed I/O”?

#6: Describe how “programmed I/O” works (the four steps).

#7: What does “DMA” stand for?

#8: What are the two primary advantages in using DMA for processing I/O events?

#9: What is the primary disadvantage in DMA I/O devices?
#10: How is “polling” different from “interrupt”?

#11: What is the advantage(s) and disadvantage(s) of “polling” (compared to “interrupt”)?

#12: Complete the following table by comparing the performance of interrupt, polling, and DMA (specify “best”, “second best” and “worst” for each of the four performance factors).

<table>
<thead>
<tr>
<th></th>
<th>Interrupt</th>
<th>Polling</th>
<th>DMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response Time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU Utilization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buffer Size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Response Time = Waiting time after a packet arrives
- CPU Utilization = Number of machine cycles
- Buffer Size = Size of buffer on a NIC
- Cost = Cost of a NIC

#13: If our computer system does not have “interrupt”, what problems we will have?

#14: What is “context switching”?

#15: What is “the service routine table”?

#16: Describe how each “context switching” is performed (i.e., describe what a processor exactly will do in performing a context-switching).

#17: What is “device driver”?

#18: Most of the computer systems assign “interrupt number (it is “IRQ” for IBM-compatible personal computers). What are the advantages of managing I/O devices using unique integers?

#19: The interrupt table contains the address of the program, each of which is used to service I/O requests at each specific I/O card. The program is also known as something else. How is the program called?

#20: When an interrupt occurs while a user program is being executed by a processor, the stack area in the user program is used, but why?