Operating Systems
Jacobs University Bremen
Dr. Jürgen Schönwälder, Anuj Sehgal

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Quiz Sheet #7

Problem 7.1: *input / output programming* (3 points)

Briefly explain the I/O programming styles "programmed input/output", "interrupt-driven input/output", and "direct-memory-access input/output".

Solution:

- Programmed input/output: The CPU does everything (copying data to/from the IO device) and blocks until IO is complete
- Interrupt-driven input/output: Interrupts drive the IO process, the CPU can do other things while the device is busy
- Direct-memory-access input/output: A DMA controller moves data in/out of memory and notifies the CPU when IO is complete, the CPU does not need to process any interrupts during the IO process

Problem 7.2: *RAIDs and LVMs* (1+1 = 2 points)

Please mark whether the following statements are true or false. Hint: Read carefully!

a) A RAID 5 disk array (distributed parity) can survive a single disk failure but if two disks fail simultaneously, data is not accessible anymore.

b) The purpose of logical volume management is to simplify disk management by separating the logical storage layout from the physical storage layout.

Solution:

a) True

b) True

Problem 7.3: *terminal devices* (2+1 = 3 points)

a) Briefly explain the difference between raw mode and cooked mode.

b) What is the purpose of the terminal capability database?

Solution:

a) In raw mode, no special processing is done and all characters received from the terminal are directly passed on to the application. In cooked mode, the device driver preprocesses characters received from the terminal, generating signals for control character sequences and buffering input lines.

b) The terminal capability database contains escape sequence for different terminal types that are used for cursor movement, color selection, etc.

Problem 7.4: *virtual machines* (1+1 = 2 points)

Please mark whether the following statements are true or false. Hint: Read carefully!

a) The Java Virtual Machine is strictly speaking an emulator of a hypothetical computer architecture.

b) Hardware virtualization allows to run multiple operating systems unmodified while paravirtualization can take advantage of operating systems being adapted to the underlying hypervisor.

Solution:

a) True

b) True