

Operating System 2021

Quiz #2

- CPUs
 - ◆ The processor status register determines whether the CPU executes in privileged mode and has access to privileged registers., The size of the registers of a CPU (e.g., 8 bits) does not necessarily imply the size of the address bus (e.g., 16 bits).
- about interrupts, system calls, and signals
 - ◆ An interrupt number is used to index into the interrupt vector in order to find the kernel function handling this type of interrupt., System calls are identified by a system call number, which is used to index into the system call table in order to find the kernel function implementing the requested system call., Interrupts and signals both interrupt the current control flow of a process. While interrupts are handled by the kernel running in system mode, signals are handled by program code executed in the context of a process in user mode., Interrupt and signal masks can be used to temporarily suppress the handling of certain interrupts or signals., CPU registers used while processing interrupts must be restored to their original values before continuing with the interrupted control flow.
- about memory and caches
 - ◆ The memory hierarchy expresses a trade-off between memory size and speed., Cache misses cause CPUs to wait, which slows down the execution of programs and hence cache misses should be avoided.
- about memory segments
 - ◆ A static variable defined within a function is stored in the data segment., The heap and the stack can both grow and shrink., Both, the memory allocator `malloc()` and the C++ operator `new` allocate memory on the heap.
- about stacks and stack frames
 - ◆ Frame pointers link stack frames so that a backtrace of the active function calls can be produced., Memory allocation and deallocation on the stack is very efficient., Overwriting the boundaries of buffers allocated on the stack can change the control flow of a program.
- the Von Neumann computer architecture
 - ◆ The data bus, the address bus, and the control bus together form the system bus., The Von Neumann architecture stores data and program instructions in the same memory subsystem while the Harvard architecture has a memory subsystem for data and a separate memory subsystem for instructions.