CSCI 144 Chapter 2 Quiz

Total points 21/40

✓ Which mode does the processor check each instruction before executing? 1/1

- ○ Kernel-Mode
- ○ Dual-Mode
- ◉ User-Mode ✓
- ○ Safe-Mode

✓ In Kernel Mode, the operating system executes with protection checks turned off. 1/1

- ◉ True ✓
- ○ False

✓ What 3 things must hardware support? Check all that apply: 3/3

- ☑ Privileged Instructions ✓
- ☐ Dual Mode Operation
- ☐ Kernel Mode
- ☑ Memory Protection ✓
- ☐ Memory Fragmentation
- ☑ Timer Interrupts ✓

✓ In addition to the 3 things, the hardware must also provide a way to safely _____ _____ from user mode to kernel mode and back. (2 words) 1/1

Transfer Control

Feedback

Correct Answer: transfer control

Match the definitions with the definition:

	Privileged Instructions	Dual Mode Operation	Kernel Mode	Memory Protection	Memory Fragmentation	Timer Interrupts	Score
All potentially unsafe instructions are prohibted when executing in user mode.	◉	○	○	○	○	○	1/1
Regardless of what the process does, the kernel must have a way to periodically regain control form the current process	○	○	○	○	○	◉	1/1
All memory accesses outside of a process's valid memory region are prohibited when executing in user mode	○	○	○	◉	○	○	1/1

✓ While application programs can use only a subset of the full instruction set, the operating system executes in kernel mode with the full power of the hardware

- ◉ True ✓
- ○ False

✕ What happens if an application attempts to access restricted memory or attempts to change its privilege level? It will cause a: 0/1

Timer Interrupt

Correct answer

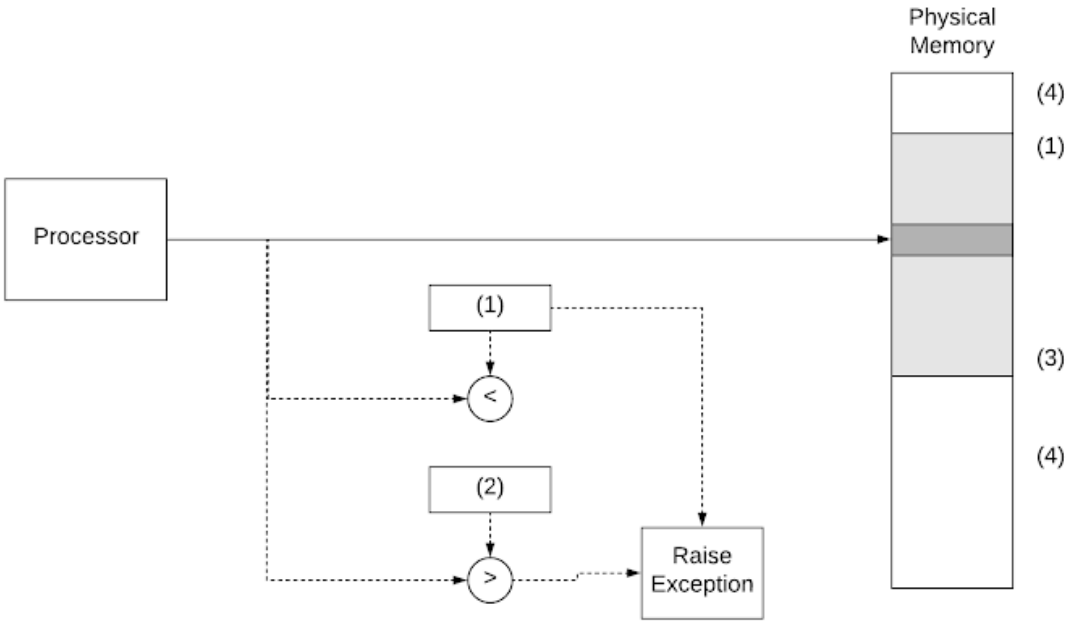
processor exception

Feedback

Correct answer: processor exception

✕ Please label Figure 2.5: "(1), (2), (3), (4)"

0/4



Base pointer, Bounds, Application memory, System memory

Correct answers

base, bound, base+bound, causes exception

base, bound, base + bound, causes exception

base, bound, base and bound, causes exception

Feedback

Correct Answer: base, bound, base + bound, causes exception

✗ Please check all the features physically addressed base and bound registers do not provide 0/4

- [x] Expandable Heap and Stack ✓
- [ ] Virtual Addressing
- [x] Memory Sharing ✓
- [ ] Memory Fragmentation
- [ ] Physical Memory Addresses

Correct answer

- [x] Expandable Heap and Stack
- [x] Memory Sharing
- [x] Memory Fragmentation
- [x] Physical Memory Addresses

✗ A device that can be set to interrupt the processor after a specified delay (either in time or after some number of instructions have been executed) is called a: 0/1

Timer Interrupt

Correct answer

hardware timer

✗ The kernel knows if an application is in an infinite loop 0/1

- (●) True ✗
- ( ) False

Correct answer

- (●) False

Feedback

It does not know

✓ What are the 3 reasons for the kernel to take control from a user process? 3/3

- [x] Processor exceptions ✓
- [ ] New process
- [ ] Resume after an Interrupt
- [x] Interrupts ✓
- [ ] Switch to a different process
- [x] System calls ✓
- [ ] User-level upcall

✗ An interrupt is when the kernel loops, checking each I/O device to see if an event has occurred that requires handling. 0/1

- (●) True ✗
- ( ) False

Correct answer

- (●) False

Feedback

Correct Answer: That is polling, not an interrupt

✓ Interrupts are also used to inform the kernel of the completion of I/O requests. 1/1

- (●) True ✓
- ( ) False

✓ A processor exception is a hardware event caused by user program behavior that causes a transfer of control to the kernel. 1/1

- (●) True ✓
- ( ) False

✗ Check all examples of processor exceptions: 0/4

- [x] A process attempts to perform a privileged instruction ✓
- [x] A process accesses memory outside of its own memory region ✓
- [ ] A process divides an integer by zero
- [ ] A process attempts to write to read only memory

Correct answer

- [x] A process attempts to perform a privileged instruction
- [x] A process accesses memory outside of its own memory region
- [x] A process divides an integer by zero
- [x] A process attempts to write to read only memory

✓ Any procedure provided by the kernel that can be called from user level is a: 1/1

System Call

Feedback

Correct Answer: system call

✓ Operating systems can NOT provide more than one system call 1/1

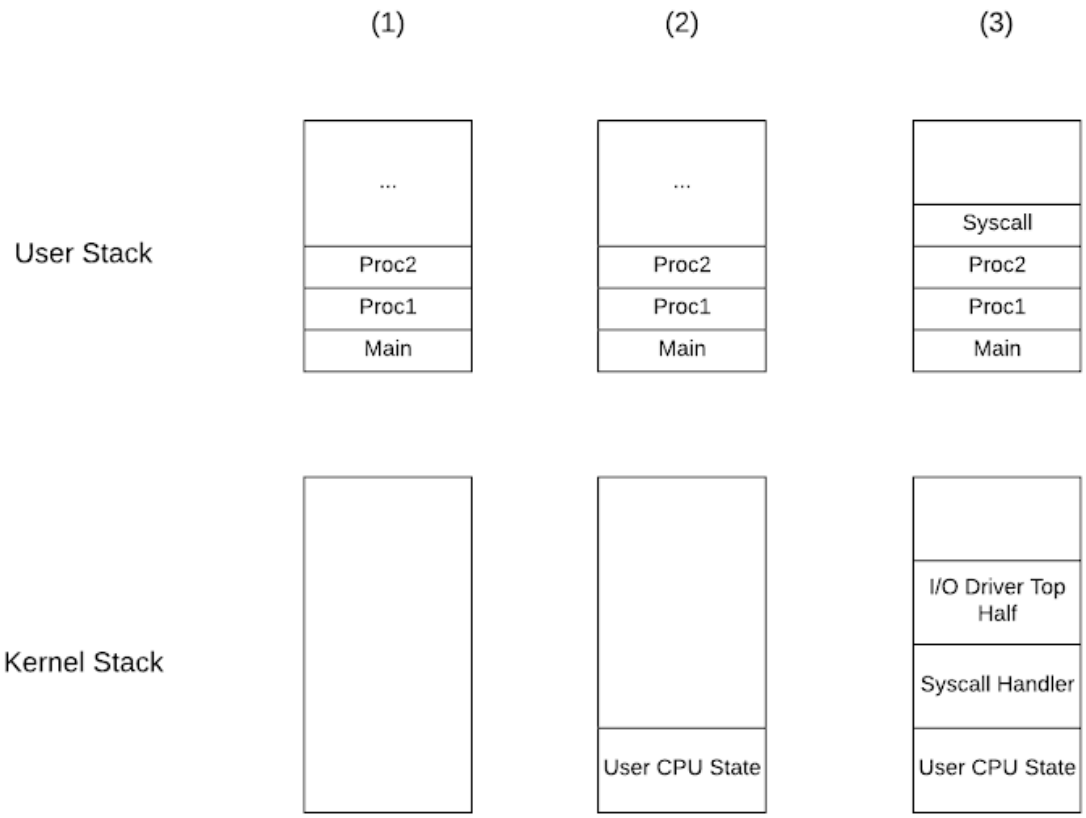
- ( ) True
- (•) False ✓

✓ What are 4 reasons for the Kernel to transition to the User? 4/4

- [ ] Processor exceptions
- [x] New process ✓
- [x] Resume after an Interrupt ✓
- [ ] Interrupts
- [x] Switch to a different process ✓
- [ ] System calls
- [x] User-level upcall ✓

✕ Please label Figure 2.9: "(1), (2), (3)"

0/3



User process running, user process ready, user process paused

Correct answers

Running, Ready to Run, Waiting for I/O

running, ready to run, waiting for I/O

running, ready to run, waiting for i/o

Running, Ready to Run, Waiting for i/o

Feedback

Correct Answer: Running, Ready to Run, Waiting for I/O

✓ Interrupt masking is when interrupts are disabled during the handling of the existing interrupt and re-enabled when the processing is done 1/1

- (●) True ✓
- ( ) False