

Quiz 7 (Nov 11, 2025)

Name:

ANSWER

NetID (e.g., ap191):

Please write your answers clearly and keep them brief.

Problem	Score
Question 1	/ 2
Question 2	/ 2
Question 3	/ 1
Total	/ 5



1. Name a device that WeensyOS interacted with (i.e., accessed) using MMIO. [2 points]

The console/screen

2. A process  $P$  is running on an operating system that uses copy-on-write to reduce `fork()`'s overhead. Process  $P$  forks process  $Q$ . After forking,  $P$  writes to address `0x25020`, and  $Q$  reads from address `0x28004`. In the following parts, for each of the virtual page number provided, say whether the page table entry is marked read-only (i.e., the R-bit is set to 0) or as read-write (R-bit set to 1).

Your answer should assume that both accesses have completed (i.e., after values have been read or written) but no other accesses have been attempted. ( $0.5 \times 4 = 2$  points)

- (i) Virtual page number 0x25 in process  $P$ . Read-write:  $P$  wrote, and so the kernel must have copied and updated the bit.

- (ii) Virtual page number 0x28 in process  $Q$ . Read-only: reads do not cause a page fault.

- (iii) Virtual page number 0x32 in process  $Q$ . Read-only: all pages are marked as RO on fork.

- (iv) Virtual page number 0x28 in process  $P$ . Read-only.

3. In class, we discussed how thread contexts could be switched in userspace. Can you switch between processes in userspace? If not, why? [1 point]

No, one cannot modify CR3 from userspace.

