

Quiz 6 (Nov 5, 2025)

Name:

Answer

NetID (e.g., ap191):

Please write your answers clearly and keep them brief.

Problem	Score
Question 1	/ 1
Question 2	/ 3
Question 3	/ 6
Total	/ 10

1. You run WeensyOS right after you clone the Lab 4 code (and before you have written any code). Process 1 accesses virtual address `0x3004`: what physical page is accessed by process 1? (1 point)

`0x3`, WeensyOS initially uses an identity map.

2. Process 20 (running on Linux) has page tables that map virtual page numbers (VPNs) `0x50` and `0x70` to physical page `0x8`, i.e., both map to the same physical page. Initially, the reference (access) and dirty bit for both page table entries are set to 0 by the kernel. Subsequently, process 20 writes to address `0x700c0`. No other accesses are made to either page.

i) What is the value of the reference bit for the PTE mapping VPN `0x50`? (1 point) `0`

ii) What is the value of the dirty bit for the PTE mapping VPN `0x70`? (1 point) `1`

iii) What is the value of the reference bit for the PTE mapping VPN `0x70`? (1 point) `1`

3. A computer has 16KB of memory, i.e., it has 4 physical pages. A program running on the computer uses 24KB of memory (i.e., it needs 6 pages), and the operating system uses demand paging to run this program. For convenience, we will label the 6 pages used by the program a—f. Initially, pages a—d are in physical memory.

Consider an execution of the program where it accesses pages in the following order:

aaaabbbccdedcbaf

For each of the eviction policies below, state the sequence of pages evicted (i.e., write down the order in which the kernel evicts pages).

i) Least recently used. (2 points) a, e, d

ii) Least frequently used. (2 points) d, e, d

iii) CLOCK. (2 points) a, b (or e), c

