L2910-5335 Quiz 3 VerB

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TOTAL POINTS

9 / 10

QUESTION 1

1 Inverted page table **2 / 2**

✓ - **0 pts** Correct

QUESTION 2

2 Logical address **2 / 2**

✓ - **0 pts** Correct

QUESTION 3

3 Page offset **1 / 1**

✓ - **0 pts** Correct

> 💬 page size of 32 KB = 2^15 bytes → offset = 0 ..
> 2^15 - 1

QUESTION 4

4 Belady's anomaly **1 / 1**

✓ - **0 pts** Correct

> 💬 For the FIFO algorithm, the page-fault rate may
> actually increase when the number of page
> frames is increased.

QUESTION 5

5 Effective access time **3 / 4**

✓ - **1 pts** Partially correct

> 💬 EAT = (hit ratio)*(total memory access time for a
> hit in the TLB)
> + (miss ratio)*(total memory access time for a
> miss)
> = 0.98*(10 nsec + 100 nsec) + (1 − 0.98)*(10 nsec
> + 2*100 nsec)
> = 0.98*(110 nsec) + 0.02*(210 nsec)
> = 107.8 + 4.2 nsec
> = 112 nsec

ıll gradescope

Quiz #3 (Module 5)
COMP.3080 – Operating Systems
Fall 2019 – Dr. Wilkes

1. **(multiple choice)** **(MARK A SINGLE ANSWER)** (2 points) Which of the following types of page table has one page entry for each physical page frame of memory?
   - O Clustered
   - O Forward-mapped
   - O Hashed
   - ● Inverted
   - O None of the above

2. **(multiple choice)** **(MARK A SINGLE ANSWER)** (2 points) Which of the following terms is used to refer to an address generated by a process (program running on a CPU)?
   - ● Logical address
   - O Physical address
   - O Post relocation register address
   - O Memory Management Unit (MMU) generated address
   - O None of the above

3. **(true/false)** (1 point) In a system with a page size of 32 KB, 15 bits must be used to represent the page offset in the logical address.
   - ● True
   - O False

4. **(true/false)** (1 point) **Belady's anomaly** refers to the observation that as the number of physical page frames increases, the page-fault rate will decrease or stay the same for all page replacement algorithms.
   - O True
   - ● False

5. **(short answer)** (4 points) Assume a system has a TLB hit ratio of 98%. It requires 10 nanoseconds to access the TLB, and 100 nanoseconds to access main memory. What is the effective memory access time in nanoseconds for this system? **Show your work.**

$$\text{Effective memory acces} = (98\%)\cdot(10\,ns) + (98\%)\cdot(100\,ns)$$

$$= (.98)(10+100) = (.98)(110)\ (ns)$$

$$= \frac{10780}{100} = (10.78\ ns)$$

$$\begin{array}{r} 98 \\ \times\ 11 \\ \hline 98 \\ 98 \\ \hline 1078 \end{array}$$