

Name: _____ (First name first)

Score: _____

COSC 6360

QUIZ #2

OCTOBER 5, 2009

Closed book. You can have with you one single-sided 8½ by 11 sheet of notes.

1. When you compare **partial subblocking** and **complete subblocking**, which one

a. Uses the TLB in the most efficient fashion and why? (10 points)

Partial subblocking **_ because _** it uses a more compact organization for each TLB entries with only one VPN and one PPN for each entry. _____

b. Uses the main memory in the most efficient fashion and why? (10 points)

Complete subblocking **_ because _** it does not allocate page frames to the subblock pages that are not currently accessed. _____

2. In the ARC cache replacement policy, which events result in an update of **target_T1**? (2×10 points)

a. **Target_T1 will increase when _** a page fault caused by a missing page that is present in B1 occurs.____

b. **Target_T1 will decrease when _** a page fault caused by a missing page that is present in B2 occurs.____

3. Why does Spin overhead remain below 5 percent? (20 points)

Spin overhead remains under 5 percent because most of the restrictions enforced by Modula-3 are checked at compilation time rather than at run time.

4. What is the major performance penalty occurring when Nooks crosses a lightweight protection domain boundary? (20 points)

Crossing a lightweight protection domain invalidates the contents of the TLB. _____

5. A system of physical clocks consists of two clocks, namely, one that is slow and loses two minutes every hour and another that is fast and advances by two minutes every hour. Assuming that the clocks are managed by Lamport's physical clock protocol, what will be the time marked by each clock at 3 pm given that:

a. both clocks indicated the correct time at noon;

b. the processors on which the clocks resides continuously exchanged messages between themselves from noon to 1 pm ; and

c. message transmission delays are negligible. (2×10 points)

The fast clock will indicate ___ 3:06 pm _____ plus or minus a few seconds at 3 pm.

The slow clock will indicate ___ 2:58 pm _____ plus or minus a few seconds at 3 pm.

Explanation: Both clocks marked 1:02 pm at one o'clock. By three o'clock, the fast clock has gained four additional minutes and the slow clock has lost four minutes.