Virtual Memory

- 1. A computer uses virtual memory implemented by paging. The TLB lookup takes 100 ns and the update takes 200 ns. Accessing the PT is ten times slower than accessing the TLB. The TLB-hit ratio is 0.6. How much CPU time is needed on average
 - to find out the physical address of a referenced word (assuming that the word is in main memory) and
 - to do the necessary updates to the page tables?
- 2. A computer uses 48-bit virtual addresses, 32-bit physical addresses, 2 KB pages and byte-level addressing. A page table entry consists of a page (frame) number and 11 extra bits (present, modified, access, etc.). Compute
 - (a) the size of the virtual address space,
 - (b) the size of the physical address space,
 - (c) the number of pages,
 - (d) the number of page frames,
 - (e) the size of a page table,
 - (f) the size of an inverted page table.