Extra Homework Problems, 4/9/07, Operating Systems

A. The following logical addresses are written in hexadecimal notation, with each page having size 4 KB. Write down the page on which each address occurs (again in hexadecimal notation).

(a) 56A42
(b) A2799
(c) 0130D
(d) A280C

B. Assume that there are 3 frames available for the process, and consider the reference string

1, 2, 5, 3, 1, 2, 1, 1, 4, 5, 0, 2, 1, 2, 3, 5, 3, 0

(a) Use the FIFO (first-in, first-out) algorithm to determine when the page-faults occur for this reference string. Keep track of the page frames at all times. Show your work.

(b) Use the optimal page replacement algorithm to determine when the page-faults occur for this reference string. Keep track of the page frames at all times. Show your work.

(c) Use the LRU (least-recently-used) algorithm to determine when the page-faults occur for this reference string. Keep track of the page frames at all times. Show your work.

(d) Use the second-chance algorithm to determine when the page-faults occur for this reference string. Keep track of the page frames and their reference bits at all times. Show your work.

C. Assume that there are 3 frames available, and consider the following reference string, where a $W$ superscript means that the given page was written to.

$1, 2^W, 5, 3^W, 1, 2^W, 1, 1^W, 4, 5, 0, 2, 1, 2^W, 3^W, 5, 3, 0$

Use the enhanced second-chance algorithm to determine the page faults for this reference string. Keep track of the page frames and their reference and dirty bits at all time. Show your work.