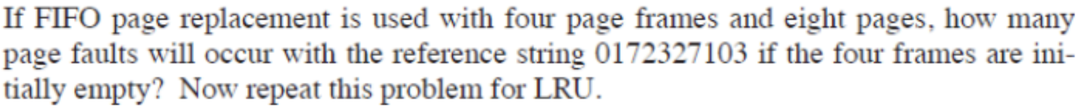
虚存作业2

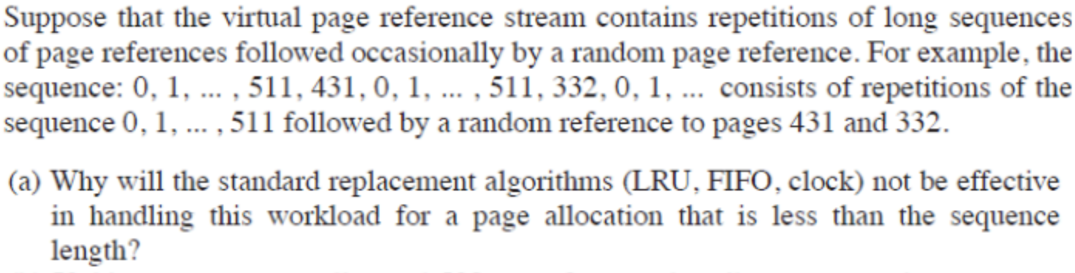
共 5 道题

1.



If FIFO page replacement is used with four page frames and eight pages, how many page faults will occur with the reference string 0172327103 if the four frames are initially empty? Now repeat this problem for LRU.

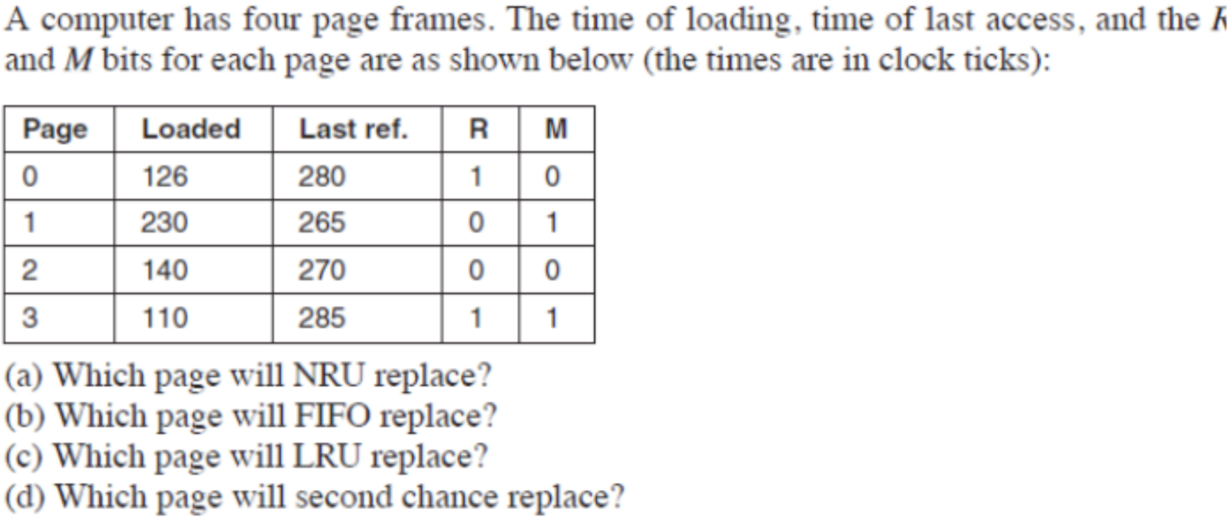
2.



Suppose that the virtual page reference stream contains repetitions of long sequences of page references followed occasionally by a random page reference. For example, the sequence: 0, 1, ... , 511, 431, 0, 1, ... , 511, 332, 0, 1, ... consists of repetitions of the sequence 0, 1, ... , 511 followed by a random reference to pages 431 and 332.

(a) Why will the standard replacement algorithms (LRU, FIFO, clock) not be effective in handling this workload for a page allocation that is less than the sequence length?

3.

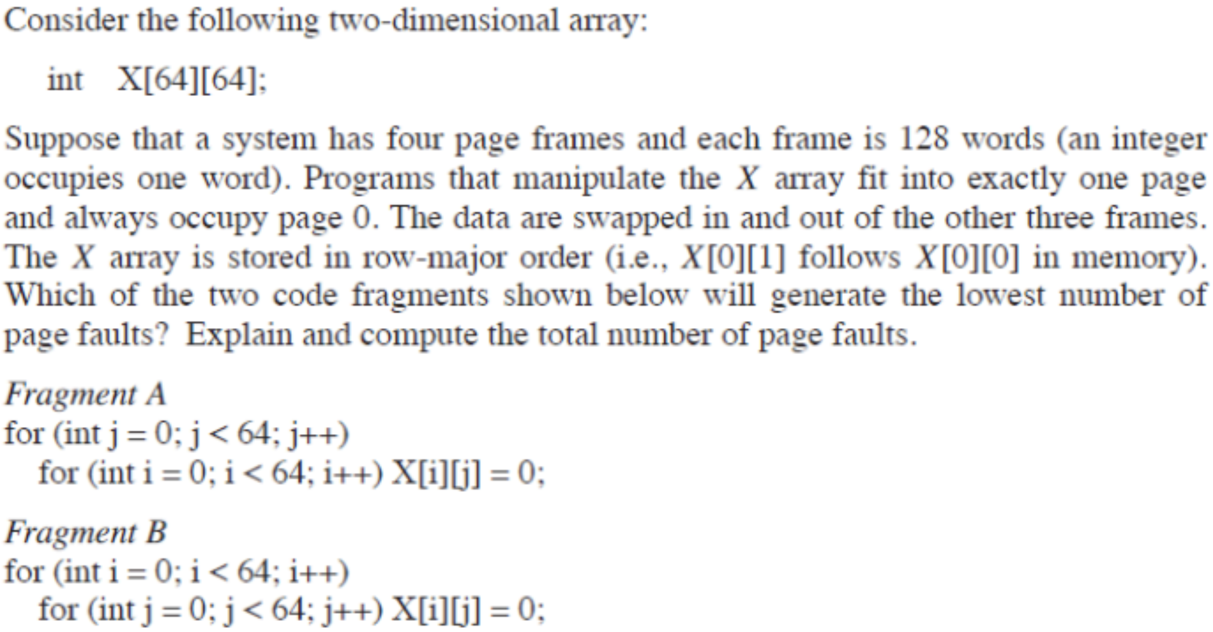


A computer has four page frames. The time of loading, time of last access, and the R and *M* bits for each page are as shown below (the times are in clock ticks):

Page	Loaded	Last ref.	R	M
0	126	280	1	0
1	230	265	0	1
2	140	270	0	0
3	110	285	1	1

(a) Which page will NRU replace?
(b) Which page will FIFO replace?
(c) Which page will LRU replace?
(d) Which page will second chance replace?

4.



Consider the following two-dimensional array:

int X[64][64];

Suppose that a system has four page frames and each frame is 128 words (an integer occupies one word). Programs that manipulate the *X* array fit into exactly one page and always occupy page 0. The data are swapped in and out of the other three frames. The *X* array is stored in row-major order (i.e., *X*[0][1] follows *X*[0][0] in memory). Which of the two code fragments shown below will generate the lowest number of page faults? Explain and compute the total number of page faults.

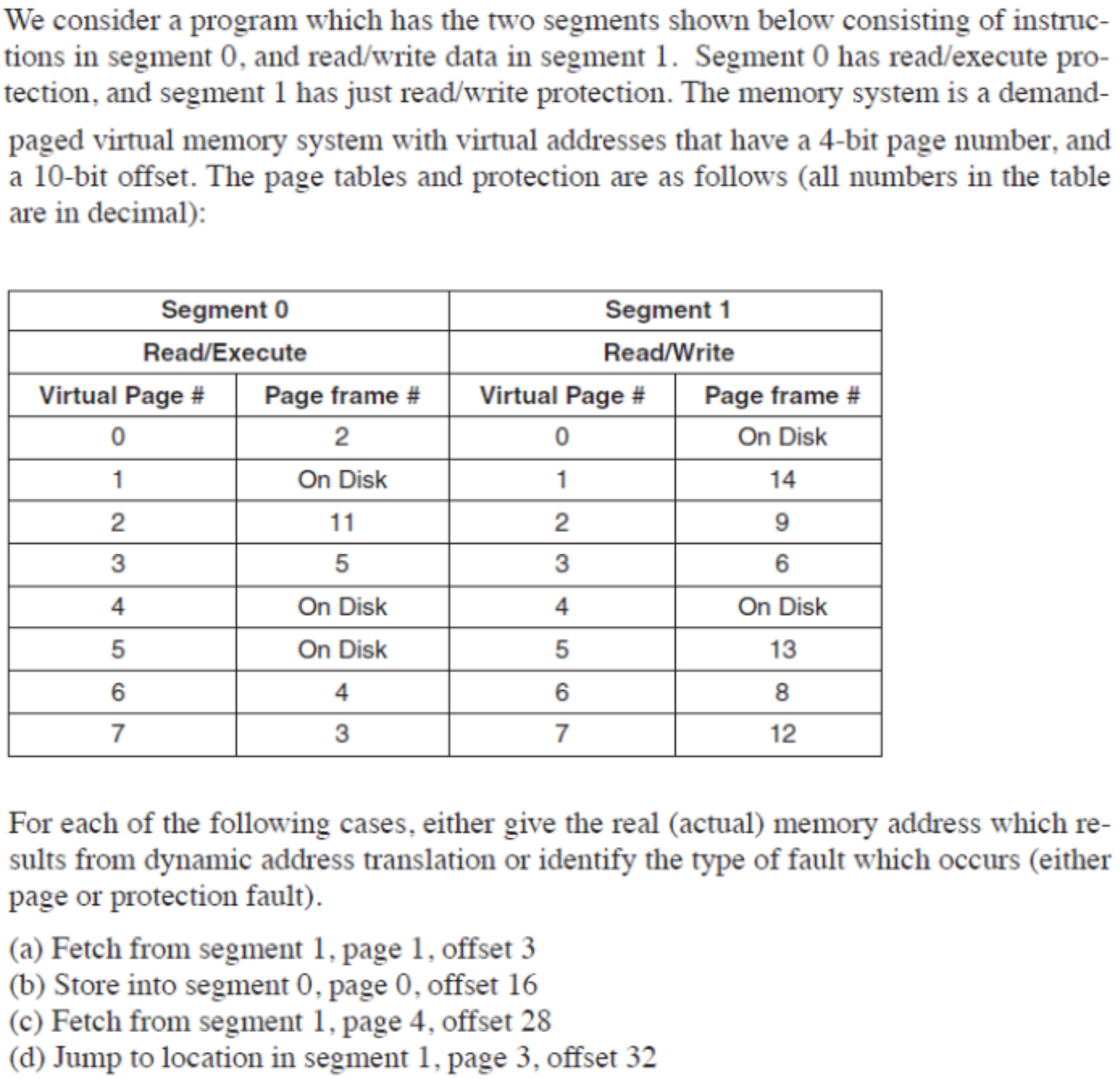
Fragment A

```
for (int j = 0; j < 64; j++)
   for (int i = 0; i < 64; i++) X[i][j] = 0;
```

Fragment B

```
for (int i = 0; i < 64; i++)
   for (int j = 0; j < 64; j++) X[i][j] = 0;
```

5.



We consider a program which has the two segments shown below consisting of instructions in segment 0, and read/write data in segment 1. Segment 0 has read/execute protection, and segment 1 has just read/write protection. The memory system is a demand-paged virtual memory system with virtual addresses that have a 4-bit page number, and a 10-bit offset. The page tables and protection are as follows (all numbers in the table are in decimal):

Segment 0		Segment 1	
Read/Execute		Read/Write	
Virtual Page #	Page frame #	Virtual Page #	Page frame #
0	2	0	On Disk
1	On Disk	1	14
2	11	2	9
3	5	3	6
4	On Disk	4	On Disk
5	On Disk	5	13
6	4	6	8
7	3	7	12

For each of the following cases, either give the real (actual) memory address which results from dynamic address translation or identify the type of fault which occurs (either page or protection fault).

(a) Fetch from segment 1, page 1, offset 3
(b) Store into segment 0, page 0, offset 16
(c) Fetch from segment 1, page 4, offset 28
(d) Jump to location in segment 1, page 3, offset 32