

第 10 章作业

10.5

- 10.5** Consider the page table for a system with 12-bit virtual and physical addresses and 256-byte pages.

Page	Page Frame
0	–
1	2
2	C
3	A
4	–
5	4
6	3
7	–
8	B
9	0

The list of free page frames is *D, E, F* (that is, *D* is at the head of the list, *E* is second, and *F* is last). A dash for a page frame indicates that the page is not in memory.

Convert the following virtual addresses to their equivalent physical addresses in hexadecimal. All numbers are given in hexadecimal.

- 9EF
- 111
- 700
- 0FF

答：

12位地址，页面大小为256 = 2⁸ B，故后8位为offset，前4位为页码。

- 9EF -> 0EF
- 111 -> 211
- 700 -> D00
- 0FF -> EFF

10.7

- 10.7** Consider the two-dimensional array A:

```
int A[] [] = new int[100][100];
```

where A[0][0] is at location 200 in a paged memory system with pages of size 200. A small process that manipulates the matrix resides in page 0 (locations 0 to 199). Thus, every instruction fetch will be from page 0.

For three page frames, how many page faults are generated by the following array-initialization loops? Use LRU replacement, and assume

that page frame 1 contains the process and the other two are initially empty.

- a.

```
for (int j = 0; j < 100; j++)  
    for (int i = 0; i < 100; i++)  
        A[i][j] = 0;
```
- b.

```
for (int i = 0; i < 100; i++)  
    for (int j = 0; j < 100; j++)  
        A[i][j] = 0;
```

答:

一个整数为4字节，所以一页（200B）可以容纳50个整数，所以存储该数组（100*100个整数）需要200页。

- a. 按列访问数组A，每列产生100次缺页错误。使用LRU，共产生10000次缺页错误。
- b. 按行访问数组A，每行产生2次缺页错误。使用LRU，共产生200次缺页错误。

10.8

10.8 Consider the following page reference string:

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

How many page faults would occur for the following replacement algorithms, assuming one, two, three, four, five, six, and seven frames? Remember that all frames are initially empty, so your first unique pages will cost one fault each.

- LRU replacement
- FIFO replacement
- Optimal replacement

答:

页帧	LRU	FIFO	Optimal
1	20	20	20
2	18	18	15
3	15	16	11
4	10	14	8
5	8	10	7
6	7	10	7
7	7	7	7

10.9

10.9 Consider the following page reference string:

7, 2, 3, 1, 2, 5, 3, 4, 6, 7, 7, 1, 0, 5, 4, 6, 2, 3, 0, 1.

Assuming demand paging with three frames, how many page faults would occur for the following replacement algorithms?

- LRU replacement
- FIFO replacement
- Optimal replacement

答:

- LRU: 18
- FIFO: 17
- Optimal: 13