

Exercise 9

Student's Name and ID: Tomonori Masubuchi s1240078

Task 1.

A process has 4 page frames allocated to it. (All the following numbers are decimal, and everything is numbered starting from zero). The time of the last loading of a page into each page frame, time of last access, and the referenced (*R*) and modified (*M*) bits for each page are as shown below (the times are in clock ticks from the process start at time 0 to the event - not the number of ticks since the event to the present):

Page	Time Loaded	Time Last. ref.	<i>R</i>	<i>M</i>
0	126	279	0	0
1	230	260	1	0
2	120	272	1	1
3	160	280	1	1

A page fault to the page 4 has occurred.

(a) Which page will FIFO replace?

Page2 : Because Time loaded is 120.

Put your answer here.

(b) Which page will LRU replace?

Put your answer here.

Page1 : Because Time Last is 260.

(c) Which page will second chance replace?

Put your answer here.

Page0 : Because the referenced(R) value is 0.

Task 2.

Consider the two-dimensional array **a** like this

long int a[100][100], (32 bits in length)

Where **a[0][0]** is at location 200, in a paged memory system with pages of size 200 (words; i.e. 800 bytes). A small process is in page 0 (locations 0 to 199) for manipulating the matrix; 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, using LRU replacement, and assuming page frame 1 has the process in it, and the other two are initially empty.

```
/* C program 1 */
```

```
for(i = 0; i < 100; i++)
```

```
    for(j = 0; j < 100; j++)
```

```
        a[i][j] = 0;
```

```
/* C program 2 */
```

```
for(j = 0; j < 100; j++)
```

```
    for(i = 0; i < 100; i++)
```

```
        a[i][j] = 0;
```

Put your answer here.

```
/* C program 1 */
```

50 page faults

```
/* C program 2 */
```

5000 page faults

