COMP 222 Computer Organization
Assignment #4—Virtual Memory

Objective:

To translate a virtual address to a physical address, involving a custom-sized fully associative page table.

Inputs:

The total size of physical memory (in words)
The page size (words/page)
The replacement policy (LRU, FIFO)

Outputs:

The corresponding physical address for a virtual address
A message indicating a page fault (if any) in the page table

Specification:

The program translates a virtual address to a physical address based on choosing from a menu of choices, where each choice calls the appropriate procedure, where the choices are:

1) Set parameters
2) Map virtual address
3) Print page table
4) Quit program

Upon entering the parameters, the page table is to be dynamically allocated based on the total number of page frames. The page frames will be mapped to virtual pages on demand in the page frame order 0,1,2,3,…

What to turn in:

Softcopy of source code submitted to http://moodle.csun.edu via the submission instructions. Be sure to name your source code: **asmt4*_yourlastname*.c**.

Any deviation from the format for submission will result in an automatic -10%. You can use any editor and/or compiler, but make sure your code compiles and executes under the gcc compiler—otherwise you will receive 0 points for compilation and execution.

```
% asmt4

Virtual memory to Main memory mapping:
--------------------------------------
1) Set parameters
2) Map virtual address
3) Print page table
4) Quit

Enter selection: 1

Enter main memory size (words): 2048
Enter page size (words/page): 1024
Enter replacement policy (0=LRU, 1=FIFO): 0

Virtual memory to Main memory mapping:
--------------------------------------
1) Set parameters
2) Map virtual address
3) Print page table
4) Quit

Enter selection: 2
Enter virtual memory address to access: 5000
Page fault!

Virtual memory to Main memory mapping:
--------------------------------------
1) Set parameters
2) Map virtual address
3) Print page table
4) Quit

Enter selection: 2
Enter virtual memory address to access: 2048
Page fault!

Virtual memory to Main memory mapping:
--------------------------------------
1) Set parameters
2) Map virtual address
3) Print page table
4) Quit

Enter selection: 2
Enter virtual memory address to access: 4509
Virtual address 4509 maps to physical address 413

Virtual memory to Main memory mapping:
--------------------------------------
1) Set parameters
2) Map virtual address
3) Print page table
4) Quit

Enter selection: 2
Enter virtual memory address to access: 7160
Page fault!

Virtual memory to Main memory mapping:
--------------------------------------
1) Set parameters
2) Map virtual address
3) Print page table
4) Quit

Enter selection: 3
VP 4 --> PF 0
VP 6 --> PF 1

Virtual memory to Main memory mapping:
--------------------------------------
1) Set parameters
2) Map virtual address
3) Print page table
4) Quit

Enter selection: 4
```