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Project 3

Virtual Memory Emulator

For this project, the goal was to create a C program that emulates the virtual and physical memory swapping manages by the operating system. Using multiple arrays to act as a page table and physical memory, the program takes addresses loaded from the address.txt file one at a time, and converts it to a physical address. This conversion requires the frame number in physical memory (simulated by the `valid_frame` array in the code) and an offset value.

Some of the problems that I encountered while creating the program were figuring out how to read and write in C using the `fread()` and `fseek()` methods. These problems were solved through trial and error and by looking at the documentation of the methods to get a better. Another difficulty I experienced was trying to find a way to implement the TLB. In the end I decided to make a struct that had two arrays, one for pages and one for frames. Using a struct made handling both arrays a lot simpler. To compile the program use the following command in terminal:

```
gcc -o vmm VirtualMemoryManager.c
```

To run the program use the following command in terminal:

```
./vmm
```

to change input files, one must change the name of the files inside the code (specifically lines 172 and 173).

The output will be displayed on the terminal. Here is an example:

```
Virtual Memory Emulator — djmejia@stargate:~ — -bash — 80×24
Logical Address: 21238 Physical memomry: 37878 value: 20
Logical Address: 11983 Physical memomry: 59855 value: -77
Logical Address: 48394 Physical memomry: 1802 value: 47
Logical Address: 11036 Physical memomry: 39964 value: 0
Logical Address: 30557 Physical memomry: 16221 value: 0
Logical Address: 23453 Physical memomry: 20637 value: 0
Logical Address: 49847 Physical memomry: 31671 value: -83
Logical Address: 30032 Physical memomry: 592 value: 0
Logical Address: 48065 Physical memomry: 25793 value: 0
Logical Address: 6957 Physical memomry: 26413 value: 0
Logical Address: 2301 Physical memomry: 35325 value: 0
Logical Address: 7736 Physical memomry: 57912 value: 0
Logical Address: 31260 Physical memomry: 23324 value: 0
Logical Address: 17071 Physical memomry: 175 value: -85
Logical Address: 8940 Physical memomry: 46572 value: 0
Logical Address: 9929 Physical memomry: 44745 value: 0
Logical Address: 45563 Physical memomry: 46075 value: 126
Logical Address: 12107 Physical memomry: 2635 value: -46
/*----- Final Data -----*/
number of Translation: 1000
Number of Page Faults: 244
Number of page fault rate 0.244000
Number of TLB Hits: 54
Number of TLB rate 0.054000
```