Assignment 6

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Implementing Address Translation via MMU

About the assignment: The MMU is a hardware component responsible for translating virtual addresses generated by the CPU into physical addresses that correspond to actual locations in the computer's physical memory (RAM)

About the code: This program simulates a virtual memory system with interactive inputs. It calculates the number of pages and frames based on process size and page size. Random frame allocation mimics main memory. The program allows users to calculate pages or request frame numbers from logical addresses. It handles errors for out-of-range addresses and provides an interactive menu for functionality. Memory is properly deallocated. Key concepts include page tables, logical-to-physical address translation, and dynamic memory allocation. Overall, the code demonstrates basic memory management concepts in a virtual memory environment.

Output:

```
aryaman@DESKTOP-4MHM220:~/ASSIGNMENT6$ gcc -o address-translator address-translator.c -lm
aryaman@DESKTOP-4MHM220:~/ASSIGNMENT6$ ./address-translator
Enter process size (bytes): 4096
Enter logical address bits: 12
Enter page size (bytes): 256
Logical address bits = 12
Page Number Bits = 4
Page Offset bits = 8
Physical Address Bits = 12
Frame Number bits = 4
Frame Offset bits = 8
Total number of pages in the Logical Address Space = 16
Total Number of frames can be allocated in Main memory = 16

Interactive Menu:
1. Calculate number of pages for the process size
2. Request address and get frame number in main memory
0. Exit
Enter your choice: 1
Total number of pages for the process size: 16

Interactive Menu:
1. Calculate number of pages for the process size
2. Request address and get frame number in main memory
0. Exit
Enter your choice: 2
Enter the logical address: 500
Frame number in main memory: 4

Interactive Menu:
1. Calculate number of pages for the process size
2. Request address and get frame number in main memory
0. Exit
Enter your choice: 0
Exiting...
aryaman@DESKTOP-4MHM220:~/ASSIGNMENT6$
```