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/*****************************************************************************
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* Lab 10 - CIS 452
*
* A windows-focused programming assignment that will explore the memory of a windows
 machine.
*
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*****************************************************************************
************/
#include <Windows.h>
#include <iostream>
#include <stdlib.h>

int main()
{
        // Page size
        SYSTEM_INFO sys_info;
        GetSystemInfo(&sys_info);
        std::cout << "Page size: " << sys_info.dwPageSize << " Bytes" << std::endl;

        // Allocate memory
        char* allocated_mem;
        allocated_mem = (char*) malloc(1024 * 1024);
        std::cout << "1M bytes of memory allocated.\n" << std::endl;

        // Query system
        // Determine state of allocated memory
        MEMORY_BASIC_INFORMATION mem_info;
        VirtualQuery(allocated_mem, &mem_info, sizeof(mem_info));
        switch (mem_info.State)
        {
        case MEM_COMMIT:
                std::cout << "Memory state: Committed. " << std::endl;
                break;
        case MEM_RESERVE:
                std::cout << "Memory state: Reserved. " << std::endl;
                break;
        case MEM_FREE:
                std::cout << "Memory state: Free. " << std::endl;
                break;
        }

        // Free memory
        free(allocated_mem);
        std::cout << "\nFreeing memory...\n" << std::endl;

        // Query system after freeing memory
        // Determine state of allocated memory
        VirtualQuery(allocated_mem, &mem_info, sizeof(mem_info));
        switch (mem_info.State)
        {
        case MEM_COMMIT:
                std::cout << "Memory state: Committed. " << std::endl;
                break;
        case MEM_RESERVE:
                std::cout << "Memory state: Reserved. " << std::endl;
                break;
        case MEM_FREE:
                std::cout << "Memory state: Free. " << std::endl;
                break;
        }
        return 0;
}
```