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**System Call Implementation**

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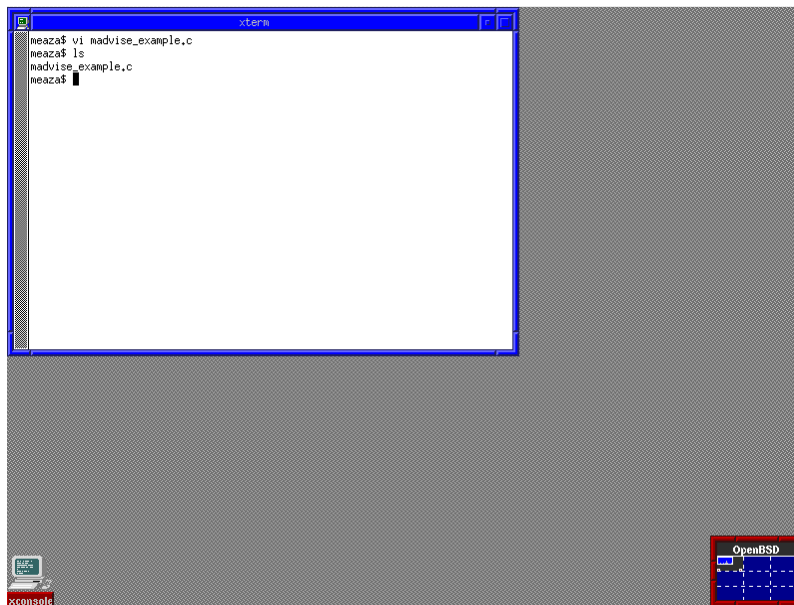
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Submitted to: Wendimu B.

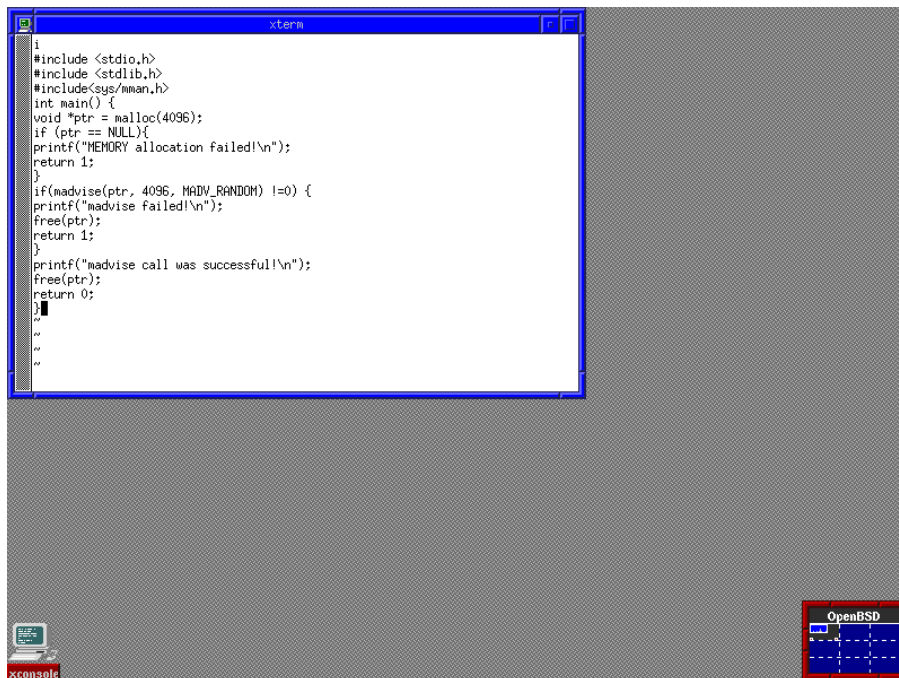
## SYSTEM CALL IMPLEMENTATION

The `madvise()` system call is employed to convey the operating system hints regarding how a program plans to access a particular piece of memory. This offers the OS sufficient information to alter memory treatment for better performance depending on the anticipated access pattern. It alters nothing in the program's behavior but assists in allowing the kernel to make more effective paging and caching decisions. In this case, I employed the `MADV_RANDOM` flag to advise the system that the memory will be accessed in an unpredictable or non-linear way, something which leads the system to bypass unwanted read-ahead reads.

Once the system was installed, i implemented and tested the `madvise` system call. To do this, I used a terminal and executed the command `vi madvise_example.c` to open and edit a C source file.



In the file, I have included a simple C program that allocates 4096 bytes of memory with `malloc`, and then uses the `madvise` system call to inform the operating system that the memory is to be accessed in a random order (`MADV_RANDOM`).



```
1
#include <stdio.h>
#include <stdlib.h>
#include <sys/mman.h>
int main() {
    void *ptr = malloc(4096);
    if (ptr == NULL){
        printf("MEMORY allocation failed!\n");
        return 1;
    }
    if(madvise(ptr, 4096, MADV_RANDOM) !=0) {
        printf("madvise failed!\n");
        free(ptr);
        return 1;
    }
    printf("madvise call was successful!\n");
    free(ptr);
    return 0;
}
"
```

The program tests if the memory allocation and madvise are successful and prints a message accordingly. After saving the file, I compiled it, but initially had an issue where there was a character in the code that was unrecognized.



```
meaza$ vi madvice_example.c
meaza$ ls
madvice_example.c
meaza$ cc madvice_example.c -o madvice_example
./madvice_example.c:1:1: error: unknown type name 'i'
1
^
1 error generated.
```

I recognized the issue, fixed it, and recompiled the program without issues. When running the executable, it gave the following output: "madvise call was successful!", which meant that the system call worked as intended.

