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4. Implementation of System Call

1. Introduction

In this section, we explore low-level Linux system calls to retrieve system information and read directory contents directly using the sysinfo()system calls.the implentaton is executed on Parrot OS, a Debian-based Linux distribution often used for security and development.

2. Objective

To understand and use the sysinfo() system call to get system statistics.

To compare these system calls to higher-level alternatives (like readdir()).

3. Environment

Operating System: Parrot OS (x86_64)

Compiler: gcc (GNU Compiler Collection)

Editor: nano / vim / VS Code (as preferred)

4. Implementation

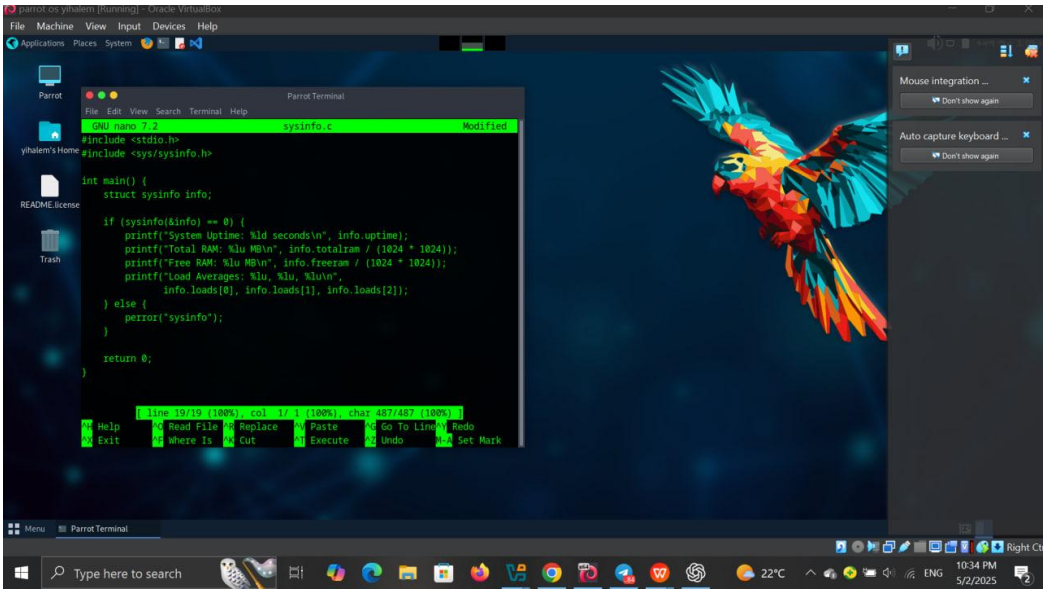
4.1 sysinfo() System Call

This system call provides statistics such as uptime, memory usage, and load averages.

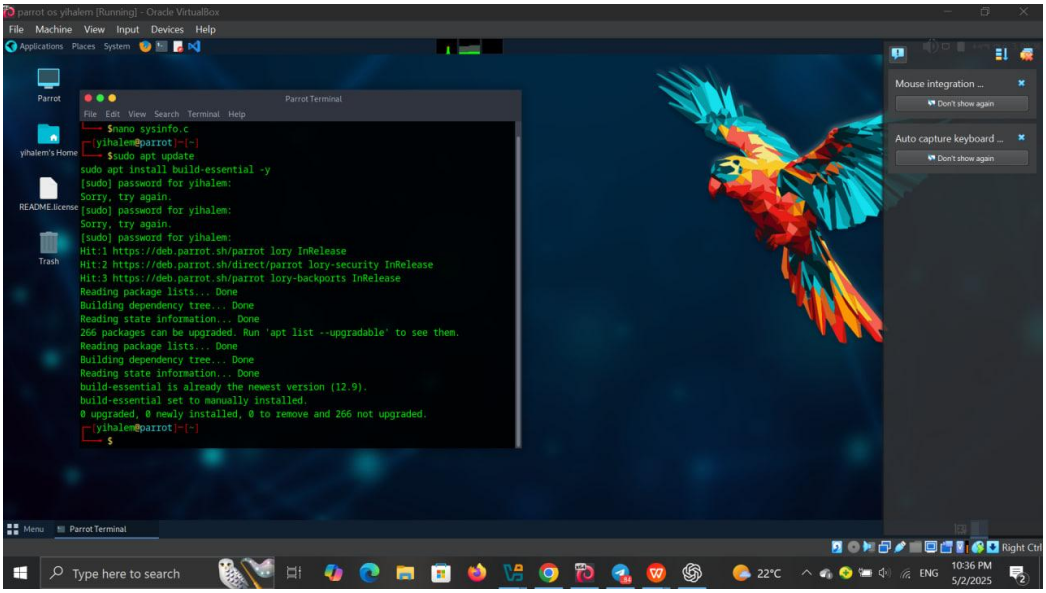
C Program: sysinfo_test.c

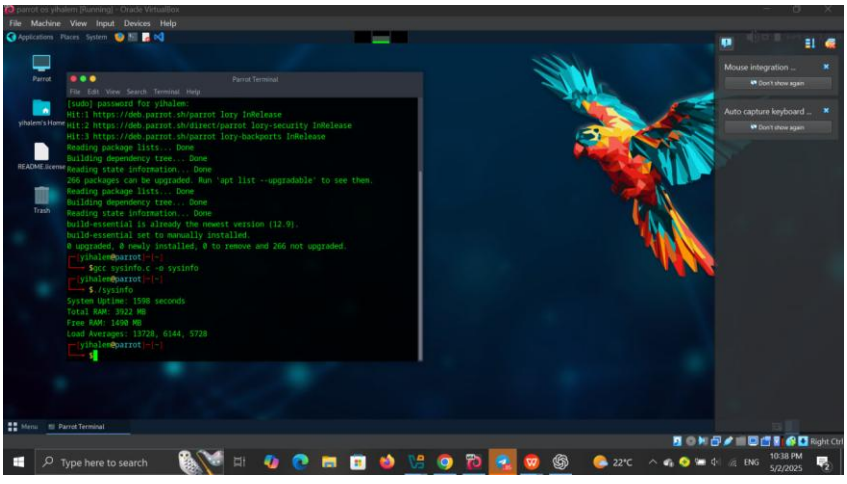
```
#include <stdio.h>

#include <sys/sysinfo.h>

int main() {

   struct sysinfo info;
```

```
    if (sysinfo(&info) == 0) {
        printf("System Uptime: %ld seconds\n", info.uptime);
        printf("Total RAM: %lu MB\n", info.totalram / (1024 * 1024));
        printf("Free RAM: %lu MB\n", info.freeram / (1024 * 1024));
        printf("Load Averages: %lu, %lu, %lu\n",
               info.loads[0], info.loads[1], info.loads[2]);
    } else {
        perror("sysinfo");
    }

    return 0;
}
```



Compilation Command:


parrot os yihalem [Running] - Oracle VirtualBox
File Machine View Input Devices Help
Applications Places System
Parrot
yihalem's Home
README.license
Trash
Parrot Terminal
File Edit View Search Terminal Help
$nano sysinfo.c
yihalem@parrot ~
$sudo apt update
sudo apt install build-essential -y
[sudo] password for yihalem:
Sorry, try again.
[sudo] password for yihalem:
Sorry, try again.
[sudo] password for yihalem:
Hit:1 https://deb.parrot.sh/parrot lory InRelease
Hit:2 https://deb.parrot.sh/direct/parrot lory-security InRelease
Hit:3 https://deb.parrot.sh/parrot lory-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
266 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
build-essential is already the newest version (12.9).
build-essential set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 266 not upgraded.
yihalem@parrot ~
$
Mouse integration ...
Don't show again
Auto capture keyboard ...
Don't show again
Menu
Parrot Terminal
Right Ctrl
Type here to search
22°C
ENG
10:36 PM
5/2/2025


File Machine View Input Devices Help
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Trash
Parrot Terminal
File Edit View Search Terminal Help
[sudo] password for yihalem:
Hit:1 https://deb.parrot.sh/parrot lory InRelease
Hit:2 https://deb.parrot.sh/direct/parrot lory-security InRelease
Hit:3 https://deb.parrot.sh/parrot lory-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
266 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
build-essential is already the newest version (12.9).
build-essential set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 266 not upgraded.
yihalem@parrot ~
$gcc sysinfo.c -o sysinfo
yihalem@parrot ~
$./sysinfo
System Uptime: 1598 seconds
Total RAM: 3922 MB
Free RAM: 1690 MB
Load Averages: 13728, 6144, 5728
yihalem@parrot ~
$
Mouse integration ...
Don't show again
Auto capture keyboard ...
Don't show again
Menu
Parrot Terminal
Right Ctrl
Type here to search
22°C
ENG
10:38 PM
5/2/2025

gcc sysinfo_test.c -o sysinfo_test

Execution:

./sysinfo_test

5. Analysis

sysinfo() provides a snapshot of system status. It is helpful for monitoring system health and performance.

6. Conclusion

This implementation helped develop an understanding of low-level Linux system programming. Using system calls like sysinfo() and other gives better insight into how user applications interact with the kernel.