System call

IMPLEMENTATION

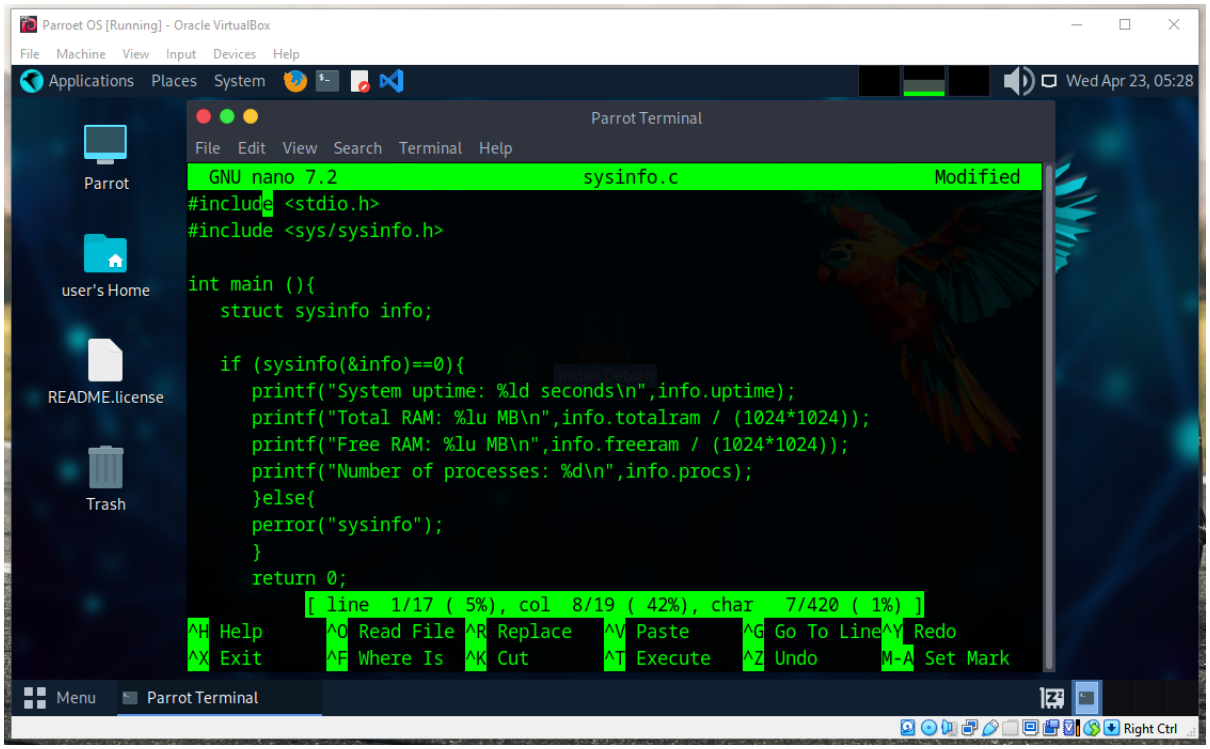
System Call Implementation

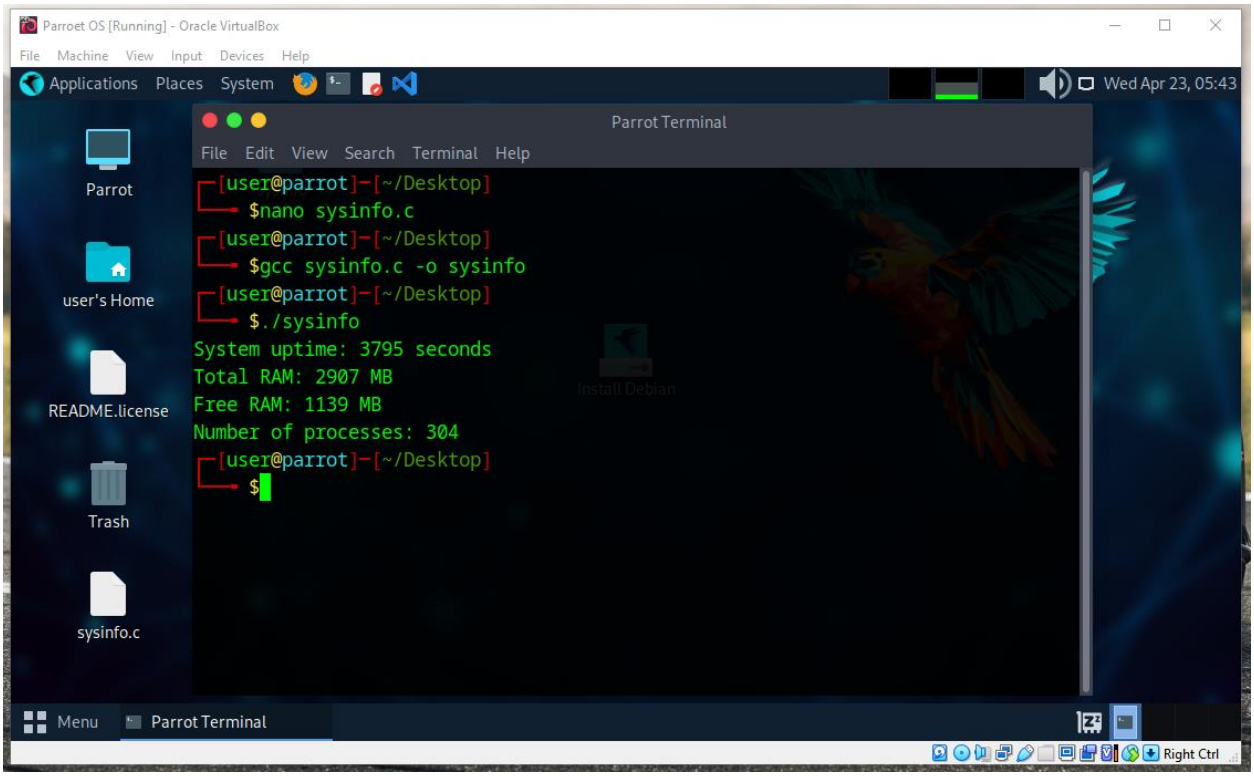
In this section, we delve into the implementation of the sysinfo() system call by writing and executing a C program within the Parrot OS environment. The sysinfo() function, a part of the Linux system call interface, plays a crucial role in accessing various system-level statistics. It is used to retrieve vital information, including the system's uptime (i.e., how long the system has been running since its last boot), the total and available physical RAM, and the number of currently running processes. These metrics provide an overview of the system's resource usage and operational status.

By leveraging sysinfo(), a program can directly interface with kernel-maintained data structures, thus allowing user-space applications to query and report on the health and state of the system without needing to access privileged kernel space directly. This kind of interaction exemplifies one of the core principles of system programming—enabling communication between user-level processes and kernel-level resources in a secure and structured manner.

Implementing this system call within a controlled Linux environment such as Parrot OS not only reinforces the conceptual understanding of system-level programming but also provides practical insights into how operating systems manage hardware resources and process control. Furthermore, this exercise highlights the importance of system calls in enabling user applications to perform low-level operations and underscores the relevance of understanding these mechanisms in the context of Operating Systems and System Programming (OSSP) coursework.

By completing this implementation, students gain hands-on experience in interpreting and working with real-time system data, which is essential for anyone pursuing a deeper knowledge of how operating systems function under the hood.


Parroet OS [Running] - Oracle VirtualBox
File Machine View Input Devices Help
Applications Places System
Wed Apr 23, 05:28
Parrot
user's Home
README.license
Trash
Parrot Terminal
File Edit View Search Terminal Help
GNU nano 7.2 sysinfo.c Modified
#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("Number of processes: %d\n",info.procs);
}else{
perror("sysinfo");
}
return 0;
[line 1/17 (5%), col 8/19 (42%), char 7/420 (1%)]
^H Help ^O Read File ^R Replace ^V Paste ^G Go To Line ^Y Redo
^X Exit ^F Where Is ^K Cut ^T Execute ^Z Undo M-A Set Mark
Menu
Parrot Terminal
Right Ctrl


Parroet OS [Running] - Oracle VirtualBox
File Machine View Input Devices Help
Applications Places System
Wed Apr 23, 05:43
Parrot
user's Home
README.license
Trash
sysinfo.c
Parrot Terminal
File Edit View Search Terminal Help
[user@parrot]-[~/Desktop]
$nano sysinfo.c
[user@parrot]-[~/Desktop]
$gcc sysinfo.c -o sysinfo
[user@parrot]-[~/Desktop]
$./sysinfo
System uptime: 3795 seconds
Total RAM: 2907 MB
Free RAM: 1139 MB
Number of processes: 304
[user@parrot]-[~/Desktop]
$
Menu
Parrot Terminal
Right Ctrl