

ITSC205: Operating Systems Internals

Lab QUIZ #2

ITSC205: Operating Systems Internals

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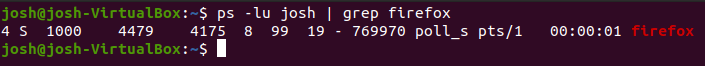
***Attach respective screen captures to demo results. You are allowed to use virtual machines******and labs.***

*“Academic dishonesty in any fashion is a serious offence.  Anyone caught cheating will be dealt with according to SAIT’s academic policy and procedure, Student Code of Conduct AC 3.4 and AC 3.4.1, and as has been detailed in the ETHI 110 Academic Honesty Awareness Tutorial.”*

**Linux Operating System**  **\_\_\_\_/20**

1. ( 3 marks) Attach screen captures that demo the following:

a. Creation of a Linux process with the lowest priority of 99



b. Display the process’ scheduling policy :

**Sorry I didn’t get a screenshot before I made the change. But policy after modification displayed below… hope that’s enough!**

c. Modify current scheduler policy to SCHED-RR (Round Robin Policy)

Text

Description automatically generated

3. (4 marks) Which Linux commands will perform the following?

1. Display current mounted file systems and its features such as: file system type and permissions

**df -h for system type and ls -ail for permissions**

1. Display Files/Directories inode

**df -i**

1. Display Files’ timestamps ( access, modify and change time)

**ps -lu will give timestamp**

1. Creates a hard link

**ln <source> <dest>**

4. (8 marks) Use the 20MB file created in Lab 7 to create an ext4 file system with blocks size 1024 in any available loop device and attach screen captures that displays:

1. Creation of ext4 file system on loop device

Text

Description automatically generated

1. File system ext4 mounted on /mnt directory



1. Display mounted ext4 file system usage



1. Creation of a file called labquiz2 on this file system

Text

Description automatically generated

1. Creation of a file’s soft and hard link in this ext4 file system

Text

Description automatically generated

Hard link

Soft link

1. Display the inodes of the original file and the respective soft link

Text

Description automatically generated

2. ( 5 marks ) Create a POSIX thread that runs the following function:

void \*get\_character(void \*m)

{

    int c;

while( (c = getchar()) !=’Q’ )

putchar(c);

return m;

}

Attach the screen with the code and the results after compiling and executing the thread.

Text

Description automatically generated **couldn’t execute. Had to move on.**

**Windows Operating System \_\_\_/20**

1. (3 marks ) Attach screen capture of System Internals tool that displays the threads used by **explorer** process. Display the threads state and priority

Table

Description automatically generated

1. (3 marks) Attach screen capture of a Windows tool that displays
   1. Page faults and working set of the Windows process with the highest page faults.

**Task manager can display that info.**

* 1. How many active pages are used by this process if each page is 4096 bytes (4K)?

**41,381,881 / 4,000 = 10,346 pages**

1. (3 marks) Attach screen capture of a Windows tool that displays Commit Limit, Pool Nonpaged Allocs and Page Faults/sec in the system.

Graphical user interface, table

Description automatically generated

**Performance monitor ^**

1. (8 marks) Attach screen captures to demo the following for **cmd** process:
   1. Use the respective System Internals tool to find the virtual based address of **.data** for **cmd** process (executable) in the **image** section. In the screen capture underline the address or record it here: \_\_\_**7FF74CED9000**\_\_

Table

Description automatically generated with medium confidence

* 1. Use the respective System Internals tool to find the respective physical address of the founded virtual based address for .data recorded before in point a. In the screen capture underline the founded physical address

**Physical address found in RAMMAP in sysinternals.**



* 1. Use respective Windbg commands that displays for cmd process
     1. threads of this process

Table

Description automatically generated

* + 1. stack of this process

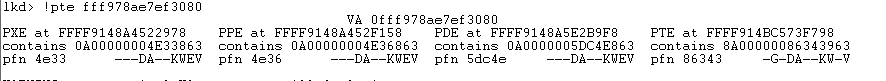
Text

Description automatically generated

* + 1. the content of rbp , rsp and rip



* + 1. the content of the founded physical address in point b.



1. (3 marks) Use System Internals tool to display the DEP status of the browser process and verify if ASLR is enabled for the DLLs used by this process. Attach the screen that demo results

**Process explorer:**

A picture containing table

Description automatically generated

**DLLs:**

Graphical user interface, text, application

Description automatically generated