Full name: _____ Student ID: _____ TA: _____

Computer Architecture and Organization 23/9/2025

Lab 11 Study of Storage Equipment Data and Fle Systems

Objectives

To understand the measurement of the size offiles and directories in afile system.

To know the structure andfile system of the micro SD memory card currently used.

To be able to connect various types of input/output devices with File system

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Lab1 File and Directory

1. Check the actual size of anyfile namefilename in bytes with the 'du' command (Disk Usage) by following the steps below:**(change pi to your user name)**

```
$ cd /home/pi
```

2. Create test.txt and add some content

```
$ nano test.txt
```

3. The size is displayed as the number of bytes preceding thefile name:

```
$ du -b test.txt
_       test.txt
```

The number _ means the number of bytes that the du command returns according to the 'b' parameter sent to indicate the size of the test.tx tfile in bytes.

4. Check the size of any file named stored as number of ____ bytes in the storage device with the following command:

```
$ du -B1 test.txt
_     test.txt
```

The number ___ refers to the number of bytes returned by the du command according to the 'B1' parameter passed. Readers will notice the difference. Even if thefile contains only a few bytes of data, But booking space in secondary devices are always a multiple of ____ bytes, such as 8192, 16384, etc.

5. To get the size or number of bytes using units such as K (1024) M (1048576) G (1073741824) before the name of a directory or subfolder

6. run command

```
$ du -h
```

Write down 5 files of the list:

1) _____ 2) _____ 3) _____

4) _____ 5) _____

TA _____

Lab 2 File System

1. Linux user or administrator Able to monitor usage of data storage devices such as hard disk drives. solid state drive SD memory card by command

```
$ df -h
```

Filesystem	Size	Used	Available	Use%	Monted On

2. The command 'df -T' will add a Type column for each item to the display. and the size is a multiple of 1 KiB (KibiByte) (1K) instead. Note down 5 items that match the previous table.

```
$ df -T
```

Filesystem	Type	1K-blocked Used	Available	Use %	Mounted on

3. The command ‘df -i‘ will display the following items: Note the 5 items that match the previous table.

$df -i

Filesystem	Inodes	Iused	Ifree	IUse %	Mounted on

4. The “stat” command displays details of afile or directory. This experiment will use an existing asm directory andfill in the blanks with numbers. Write and explain the result.

$ cd /home/pi
$ stat asm

_____
_____
_____

TA Check: _____

Lab13.3 Input/output devices in the file system

1. The principle of the Unix operating system is to mount devices and directories using different file systems. Use a different directory name. The root directory or root folder is the default location. Type commands in Terminal:

$ mount

2.Select one line and explain the meaning

_____
_____
_____

Lab Exercise

1.Use the File Manager program and right-click on the file name to display the properties on the General tab and explain in particular the Total size offiles and Size on disk sections why they are different.

2.Create a newfile with the nano program, enter text with one letter and save it. Use the ‘ls -l’ command to display details of the directory containing that file.

3.Gradually increase the number of characters in test.txt until thefile size is more than 4096 bytes, then use the command ‘du -B1 test.txt’ to check thefile size again. Record and explain the results, especially how many sectors the number of Blocks obtained from the command is equal to.

4.Use the following command. to display a list of directories and files and explain what the left most number is and why it has repeated values.

$ ls -i -l /

5.Please use the following command. to display details of the duplicate directory names from the previous point. and explain the results. What's different? Why?

$ stat /proc

$ stat /sys