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**SCHOOL OF COMPUTER ENGINEERING**

**AND TECHNOLOGY**

**TITLE: FILE SYSTEMS**

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**CERTIFICATE**

This is to certify that the project entitled **“File Systems”** has been carried out by Ms. Aakansha Patil (SCETTY301), Mr. Mehul Patil (SCETTY303), Mr. Niranjan Patil (SCETTY305) and Ms. Vaibhavi Sangawar (SCETTY310) under the guidance in partial fulfillment of Third Year Computer Engineering of MITAOE Autonomous Institute, Alandi during the academic year 2018-2019

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**INDEX**

|  |  |  |
| --- | --- | --- |
| **Sr. No.** | **Topic** | **Page number** |
| 1. | Abstract | 4 |
| 2. | Objectives | 5 |
| 3. | Outcomes | 6 |
| 4. | Introduction | 7 |
| 5. | Approaches/Methodologies/Formulation | 9 |
| 6. | Future Work | 11 |
| 7. | Software Used | 11 |
| 8. | Implementation (Code) | 12 |
| 9. | Results |  |
| 10. | Conclusion |  |

1. **ABSTRACT**

In [computing](https://en.wikipedia.org/wiki/Computing), a file system controls how data is [stored](https://en.wikipedia.org/wiki/Computer_data_storage) and retrieved. Without a file system, information placed in a storage medium would be one large body of data with no way to tell where one piece of information stops and the next begins. By separating the data into pieces and giving each piece a name, the information is easily isolated and identified. Taking its name from the way paper-based information systems are named, each group of data is called a "[file](https://en.wikipedia.org/wiki/Computer_file)". The structure and logic rules used to manage the groups of information and their name is called a "file system".

File systems can be used on numerous different types of [storage devices](https://en.wikipedia.org/wiki/Computer_storage_device) that use different kinds of media. The most common storage device in use today is a [hard disk drive](https://en.wikipedia.org/wiki/Hard_disk_drive). Other kinds of media that are used include [flash memory](https://en.wikipedia.org/wiki/Flash_memory), [magnetic tapes](https://en.wikipedia.org/wiki/Magnetic_tape), and optical discs.

A file system is a logical collection of files on a partition or disk. A partition is a container for information and can span an entire hard drive if desired. Your hard drive can have various partitions which usually contain only one file system, such as one file system housing the /file system or another containing the /home file system.

One file system per partition allows for the logical maintenance and management of differing file systems.

Everything in Unix is considered to be a file, including physical devices such as DVD-ROMs, USB devices, and floppy drives.

1. **OBJECTIVES**

* To display the status of a directory
* To create new directories along with new files in them
* To display list of files present in the directory
* To gather information of a particular file
* To display the desired contents of a file
* To display the resumen of a file
* To display information about the all running files in a directory

1. **OUTCOMES**

The program for file systems is written using shell script. It gives the list of all the present directories in the system including user and root level. It displays the files and other media present within a particular directory. It gives the information about contents of any desired file like. java file, .css file, ,html files, etc. and many such different files with different extensions. It can list the various files that are enlisted in a directory and can also display the resumen of a file. The resumen refers to the various parts of a file. For e.g. the list of words, the longest sentence, the number of characters in a particular sentence, etc. It displays all this information and much more.

1. **INTRODUCTION**

All users including the super user have their own home directories where all private data, like documents, bookmarks, or e-mail, are stored. System directories holding central configuration files or executable files can only be modified by the super user.

In Linux, you can choose whether you want to manage files and folders with a file manager or if you rather like to use the command line which is the traditional way. The last-mentioned method is often faster but requires some deeper knowledge of several commands to list, create, delete, or edit files and their properties.

A file manager provides a graphical and more intuitive way to handle these tasks.

A simple description of the UNIX system, also applicable to Linux, is this:

"On a UNIX system, everything is a file; if something is not a file, it is a process."

This statement is true because there are special files that are more than just files (named pipes and sockets, for instance), but to keep things simple, saying that everything is a file is an acceptable generalization. A Linux system, just like UNIX, makes no difference between a file and a directory, since a directory is just a file containing names of other files. Programs, services, texts, images, and so forth, are all files. Input and output devices, and generally all devices, are considered to be files, according to the system.

**Sorts of files**

Most files are just files, called regular files; they contain normal data, for example text files, executable files or programs, input for or output from a program and so on.

While it is reasonably safe to suppose that everything you encounter on a Linux system is a file, there are some exceptions.

* **Directories:** files that are lists of other files.
* **Special files**: the mechanism used for input and output. Most special files are in /dev, we will discuss them later.
* **Links:** a system to make a file or directory visible in multiple parts of the system's file tree. We will talk about links in detail.
* **(Domain) sockets:** a special file type, similar to TCP/IP sockets, providing inter-process networking protected by the file system's access control.
* **Named pipes**: act more or less like sockets and form a way for processes to communicate with each other, without using network socket semantics.

**File types in a long list**

| **Symbol** | **Meaning** |
| --- | --- |
| - | Regular file |
| d | Directory |
| l | Link |
| c | Special file |
| s | Socket |
| p | Named pipe |
| b | Block device |

In order not to always have to perform a long listing for seeing the file type, a lot of systems by default don't issue just **ls**, but **ls -F**, which suffixes file names with one of the characters "/=\*|@" to indicate the file type.

1. **APPROACHES / METHODOLOGIES / FORMULATION**

**Commands Used:**

* **Mkdir**

The mkdir command in UNIX allows users to create directories or folders as they are referred to in some operating systems. The mkdir command can create multiple directories at once and also set permissions when creating the directory. The user running the command must have appropriate permissions on the parent directory to create a directory or will receive a permission denied error.

* **Cp**

**cp** stands for **copy**. This command is used to copy files or group of files or directory. It creates an exact image of a file on a disk with different file name. cp command require at least two filenames in its arguments.

* **Cd**

**‘cd**‘ (**Change Directory**) command is one of the most important and most widely used command for newbies as well as system administrators. For admins on a headless server, ‘**cd**‘ is the only way to navigate to a directory to check log, execute a program/application/script and for every other task. For newbie it is among those initial commands they make their hands dirty with.

* **Grep**

The grep command which stands for “global regular expression print,” processes text line by line and prints any lines which match a specified pattern. The grep command is used to search text or searches the given file for lines containing a match to the given strings or words. By default, grep displays the matching lines. Use grep to search for lines of text that match one or many regular expressions, and outputs only the matching lines. Grep is considered to be one of the most useful commands on Linux and Unix-like operating systems. **grep** is a powerful file pattern searcher in **Linux**.

The grep filter searches a file for a particular pattern of characters, and displays all lines that contain that pattern. The pattern that is searched in the file is referred to as the regular expression (grep stands for globally search for regular expression and print out).

* **Wc-l**

The **wc** (**word count**) command in Unix/Linux operating systems is used to find out number of **newline count**, **word count**, **byte and characters** count in a files specified by the file arguments.

* It is used to find out number of lines, word count, byte and characters count in the files specified in the file arguments.
* By default it displays four-columnar output.
* First column shows number of lines present in a file specified, second column shows number of words present in the file, third column shows number of characters present in file and fourth column itself is the file name which are given as argument.

1. **FUTURE SCOPE**

* In our project all the operations are performed on user level files and directories, project can be later revised for kernel level directory processes.
* It can be used to display all contents of a file and directory by using simple commands which is like mining or digging out data from databases. In our case, the databases are files and directories.

1. **SOFTWARE USED**

* Software

1. Linux Operating System

2. Gedit Text editor

1. **IMPLEMENTATION**
2. **RESULTS**

**10. CONCLUSION**

We conclude that it is possible to display the information about particular files and directories using basic shell script program. Considering a single file, we can obtain the resumen of that particular file along with the basic information such as how many words are present, what is the length of the longest word, how many characters are present, length of the longest line, etc. Along with this, we can also find the occurrence of a certain word in the file. All these tasks help us to get more familiar with the basic components of the files that are present in particular directories.