**Exercise 3**

**SYSTEM ADMINISTRATION IN LINUX**

**Introduction**

System administration plays an important role in providing operating system services to the users. The main objective of the system administrator is to ensure that the resources are utilized effectively, users get all the services they need to complete the assigned tasks and the general security of the system is implemented. In a single user PC based Linux system, the user acts like an administrator also. Hence it is imperative that the users have some basic knowledge of managing systems. A system administrator managing a corporate network consisting of thousands of should have thorough understanding of the system and be an expert in managing the system, apart from knowing tools to automate many administrative tasks. A partial list of tasks performed by an administrator is given below:

* System startup and shutdown
* Managing user accounts
* Helping users to set up their working environment
* Maintaining user services
* Allocating disk space and re-allocating quotas when the user needs vary
* Installing and maintaining software
* Installing new devices and upgrading the configuration
* Provisioning the mail and internet services
* Ensuring security of the system
* Maintaining system logs and profiling the users
* System accounting
* Reconfiguration the kernel whenever required

**Description of the selected tasks:**

* **Start (Boot process)**
* The UNIX performs a sequence of self-tests to determine if there are any hardware problems.
* The UNIX kernel gets loaded from a root device.
* The kernel runs and initialises itself.
* The kernel starts the *init* process.All subsequent processes are spawned from *init* process.
* The *init* checks out the file system using *fsck*
* The *init* processes executes a system boot script.
* The *init* process spawns a process to check all the terminals from which the system may be accessed. This is done by checking the terminals defined under */etc/ttytab* or a corresponding file. For each terminal a *getty* process is launched. This reconciles communication characteristics like baud rate and type for each terminal.
* The *getty* process initiates a login process to enable a prospective login from a terminal.
* **Shutdown:**
* Shutdown utility is invoked to shut down the system in a systematic manner. Shutdown may be done immediately or after a specific time period.

The syntax is

#shutdown –h time [message] // please use man command to get details

* **Managing user accounts**

The administrator should create accounts for users with login id (user name), home directory, group association, etc. When the user quit the organization his account may be deleted.

* **Adding an user account**  useradd command is used to add users. When this command is issued it does the following:
* edits /etc/passwd, /etc/shadow, /etc/group and /etc/gshadow files for the newly created User account.
* creates and populate a home directory for the new user.
* sets permissions and ownerships to home directory.

**Syntax of useradd command: useradd [options] username**

#useradd james <enter>

* Upon execution of this command, a new user by name james is created in a locked state. A password has to be set using “passwd” command to unlock the user account.
* #passwd james

Changing password for user james

New password:

Retype New password:

passwd: all authentication tokens updated successfully.

The /etc/passwd file look like this (figure 1):

|  |
| --- |
| james:x:504:504:james:/home/james:/bin/bash  The above entry contains a set of seven colon-separated fields, each field has it’s own meaning. Let’s see what are these fields:   1. Username: User login name used to login into system. It should be between 1 to 32 characters long. 2. Password: User password (or x character) stored in /etc/shadow file in encrypted format. 3. User ID (UID): Every user must have a User ID (UID) User Identification Number. By default UID 0 is reserved for root user and UID’s ranging from 1-99 are reserved for other predefined accounts. Further UID’s ranging from 100-999 are reserved for system accounts and groups. 4. Group ID (GID): The primary Group ID (GID) Group Identification Number stored in /etc/group file. 5. User Info: This field is optional and allow you to define extra information about the user. For example, user full name. This field is filled by ‘finger’ command. 6. Home Directory: The absolute location of user’s home directory. 7. Shell: The absolute location of a user’s shell i.e. /bin/bash |

Figure 1: Structure of passwd file

* Deleting or closing user accounts

The command userdel is used to remove or delete an user account

*Questions:*1. How do you change user ID of james?

2. What is primary and secondary group ID?

3. How do you change home directory?

4. If you replace /bin/bash with /bin/HelloWorld.exe, what would happen?

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| **Sl No:** | **Assessment Process Description** | | **Mark(s)** |
| 1 | Documentation/Procedure(2) | |  |
| 2 | Program(5) | |  |
| 3 | Program Execution and viva (3) | |  |
|  | Total(10) | |  |
| Remarks |  | | |
| Date of Completion: | | Signature | |

**Result:**

Exercise 4

***login* and .*profile* FILES**

The .login and .profile are known as .rc(run command) files and typically they contain default commands to customize the user environment. A user can edit and modify according to his state. These files will be executed at the time of login.

Example of a typical .login file:

|  |
| --- |
| umask 022 ## user mask, determines access rights;  ## readable by everyone, writable by everyone  setenv PATH /usr/bin:/usr/sbin:/. ## search for commands in the directories in PATH  set prompt=’hostname’> ## primary command line prompt james>  setenv EDITOR vi ## set vi editor as the default editor |

*Questions:*

1. modify .login or .profile to display the time of login and a welcome message to the user.

|  |
| --- |
| Ex: time of login : 11:27am on 07/07/2016  Welcome james, Have a good day.  and displays a good bye message when the user logs out. |

2. What are the different ways an user account may be deleted?

3. How do you add/delete an user to/from a group?

4. What is the meaning of umask 024

5. How do you change access permission for files using*chmod* command

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| --- | --- | --- | --- |
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**Result:**