Lab 3 Notes

Text Editors: Vim

- To access command line mode (or simply called last line mode) we click `:<your command>`
- To save a file and **exit**: `:wq`
- To exit without **saving**: `q!`
- `:set nu` adds line numbers.
  - `:set nonu` removes line numbers.
- `/<your_word>` to search for your word in your file.
  - `:set ignorecase` or `:set ic` to remove case sensitivity when searching.
  - `:set noic` to remove that feature.
- `:%s/<old_word>/<new_word>` to **replace** a word with another word.
  - It is *case sensitive* and if multiple occurrences of the word are found within a line, it'll replace the first occurrence.
    (بمعني ان لو فيه سطر فيه الكلمة اللي عايز استبدلها مرتين، هيستبدل اول كلمة يلاقيها في نفس السطر)
  - If we wanted to replace EVERY occurrence of the word, we type `:%s/<old_word>/<new_word>/g` → `g` here means **g**lobal.
    (لو احنا عايزين نستبدل كل مرة نلاقي فيها الكلمة)
- We can use `view <file>` to view the file without editing it (readonly)
- We can use `nano` as an easier text editor (It is different from vim)

User and Group Administration

- Each user has a **u**ser **id**entifier or UID for short, UIDs has a range from `(0 - 65534)` but the first 1K users are reserved by the system users `(0-999)`.
- Each user has a **g**roup **id**entifier or GID for short, which is used for permissions/privileges management.
  (فكرتها إني اقدر اوزع الصلاحيات علي مجموعات من المستخدمين من غير ما اخش علي كل مُستخدم لوحده)
  - Users **MUST** have a primary group and they can **optionally** join a secondary group.
- Each user has a **login shell**: `/bin/bash` and each user has a home directory located in `/home` EXCEPT the root user which is located in `/root`.
- We can add a comment for each user (optional)
- We use `useradd` to add new users.
  - We can use `-d <directory>` to specify the home directory for the user, it DOES NOT create the directory so you'd have to go and create it using `mkdir`.
  (بعرفه مكان الهووم فين و لكنه لو مش موجود مش هيكريتها)

- To avoid this, use `-md` so that if the directory doesn't exist, it will create it for you.
- Use `-g <primary_group>` to assign a primary group to the user.
- `groupadd <group_name>` adds a group to the system.
- We can use `-G <secondary_group>` to assign secondary groups to the user.
- Use `-s <shell_location>` to specify the default shell for the user.
- Use `-c "Your Comment"` to add comments about the user.

> **Add the user name at the end of the command to avoid unexpected behavior.**

The full format of `useradd` is as follows:

```
useradd -md /home/test -g PrimaryGroup -G Secondarygroup1, Secondarygroup2 -s /bin/bash -c "This is a new user."
```

- Users are kept in a configuration file named `/etc/passwd`
- The format of each entry is as follows:
  `<username>:x:<uid>:<primary_gid>:<comment>:<home_directory>:<default_shell>`

> **The 'x' in the entry used to contain the password of the user, now these passwords are kept in a file that is encrypted called `/etc/shadow`.**

- Groups are kept in a file in `/etc/group` and each entry has a format similar to `/etc/passwd`
  `<group_name>:x:<gid>:<secondary_group_users>`
  (الخانة الاخيرة فيها المُستخدمين اللي داخلين في الجروب كأعضاء ثانويين مش اساسين)
- Groups used to have passwords but it had a vulnerability (ثغرة) where if the password was known, you could easily join the group and thus have higher permissions. But now, only the `root` user can assign groups to users which is much more secure.
- We use `usermod` to modify users' data, may that be the default shell `-s` or the home directory `-d`, etc..
  - We can edit the data of users in vim BUT there is no error management so you'd have to be careful when editing.
- `userdel` is used to delete users from the system, by default it deletes the user from `/etc/passwd` but keeps the home directory.
- If we use `userdel -r` it deletes the user entirely, including the home directory and the mailbox located in `/var/spool/mail/<user>`.
- `useradd -D` is used to display the default settings when creating a user.
  - We can follow this command with options to change the default settings.
    For example: `useradd -D -b /xyz` → Every user from now on will have a home

directory in `/xyz`
    - When users login and logout there are startup files that are **hidden** in each user's home directory. These startup files are located in `/etc/skel`. When a user is added, these files are copied from `/etc/skel` to the user's home directory.
- The output of `useradd -D` is located in `/etc/default/useradd`.

> **These commands have their own version for groups, but they are rarely used.**

- `/etc/passwd` has a backup within the same directory called `passwd-`
- `/etc/shadow` is ONLY accessed by the root user, because it contains critical data about the password of each user.

> **These passwords are hashed.**

The format for each entry in `/etc/shadow` is as follows:
`<username>:<hashed_password>:<last_time_password_was_changed_in_unix_time>:<min_days>:<max_days>:<warning_days>:<inactive_days>:<expiration_date>:<reserved>`

- All this is viewable using `chage -l <user>`
- You can change the entry of a user using `chage`. (Check man page for `chage`)
