

# Laboratory Assignment: System Administration I

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## 1 Introduction

In this laboratory assignment you will work with basic system administration such as startup scripts, user account management, creating new file systems and examining different tools to create backups of your filesystem.

## 2 Aim

After completion of this assignment you will have:

- Become familiar with upstart, init and boot scripts.
- Know how to administrate user accounts.
- Knowledge how to partition and format new harddrives for your system.
- Be able to set up storage backup on your system.

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### 3 Reading instructions

Before starting this assignment you should have read chapters 3.1-3.5, 3.7, 4, 6, 7 and 10 in Nemeth et al. [6] after which you should read [1], [4], [2], [5], you can also use [3] as a reference material

### 4 Tasks

Perform the following tasks and document all the steps taken to complete the tasks.

#### 4.1 Bootprocess, upstart and init

1. Change the amount of time that grub will wait before booting your system. This can be achieved by editing the grub configuration file.
2. Open the file `/boot/grub/grub.cfg` and study the grub commands involved in booting your system, after which you can restart your system and enter the grub command line, and perform the following steps:
  - manually run all the commands needed to boot your system
3. Even though Ubuntu no longer uses the System V runlevel system, it still uses runlevels to place the system in different states (off, single-user, multiuser and restart). Before starting these tasks, see `telinit(8)` and `runlevel(8)`.
  - which runlevel is your system currently in?
  - Place your system in another runlevel.
4. Explain how the links in `/etc/rc?.d` relates to the scripts in `/etc/init.d`. See `runlevel(7)` for a detailed explanation.

#### 4.2 The file system

1. What information can be found in an inode?
2. Now its time to partition the unpartitioned space on your harddrive from the introduction lab. Start by familiarize yourself with `fdisk(8)`.
  - Which partitions can you find using `fdisk(8)` and what device files are they connected to?
  - Use `fdisk(8)` to partition the empty space on your harddrive,
  - create a new ext3 or ext4 file system on the new partition, see `mkfs(8)`,
  - check that the file system is ok, see `fsck(8)`,
  - create a new mountpoint in your system e.g. `/dump`,
  - mount your newly created and formatted partition to your mount point,

- configure your system to automatically mount your new partition at boot, see `fstab(5)`.
3. Explain the difference between `df(1)` and `du(1)`
  4. Using the command `ln(1)`
    - Create a symbolic link within a file system, and then create a symbolic link to a file located on another file system, what happens and why?
    - Create a hard link within a file system, and then create a hard link to a file located on another file system, what happens and why?

### 4.3 Users and groups

1. Before starting with the next assignment, make sure to get acquainted with `passwd(5)`, `shadow(5)` and `group(5)`, followed by `adduser(8)`, `addgroup(8)` and `adduser.conf(5)`. Make sure to read about the purpose of `/etc/skel`.
  - (a) Explain *UID* and *GID* and how it relates to users in the system
  - (b) Make the appropriate changes so that a `.ssh` folder is created in the home folder for every new user that is added to the system.
  - (c) Add the users *donald* and *mickey* to your system with the help of the `adduser(8)` command.
  - (d) Create the group *disney* and add your newly created users to that group.
2. The next part can be solved using the `ls(1)`, `chmod(1)`, `chown(1)` and `chgrp(1)` commands.
  - (a) check the permissions for the home folders of the newly created users,
  - (b) change the permissions on the home folder so that the owner and the group of the home folder is the only one able to access it.
  - (c) create a new folder in e.g. `/dump` that only the users in the *disney* group can access.
  - (d) explain as much as you can about the file listed below

```
-rw-r--r-- 1 lennart lennart 5496 nov 10 17:40
  lab_assgn2.tex
```

### 4.4 Backup

1. Create four different backup scripts where each shall use one of the following programs: `cp(1)`, `tar(1)`, `cpio(1)` and `rsync(1)`. The backup script will take a backup of your home folder and place it in your newly created partition.
2. With the help of `dd(1)` create a copy of your `/etc/passwd` file where the contents of the file has been converted to upper case letters.

## 5 Examination

Hand in a report containing all your solutions to the questions in section 4

### References

- [1] Grub2. URL <https://help.ubuntu.com/community/Grub2/>.
- [2] Ubuntubootuphowto. URL <https://help.ubuntu.com/community/UbuntuBootupHowto>.
- [3] Upstart intro, cookbook and best practises, . URL <http://upstart.ubuntu.com/cookbook/>.
- [4] Ubuntu's upstart event-based init daemon, . URL <http://archive09.linux.com/feature/125977>.
- [5] Upstarthowto, . URL <https://help.ubuntu.com/community/UpstartHowto>.
- [6] Evi Nemeth, Garth Snyder, Trent R. Hein, and Ben Whaley. *UNIX and Linux system administration handbook*. Prentice Hall, Upper Saddle River, NJ, 4th ed. edition, 2011. ISBN 978-0-13-148005-6 (pbk. : alk. paper).