Lab 1

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Exercise 1

(a) Use the lsb_release command to print all the distribution details.
I first consult the man page of lsb_release and find that the **-a** switch is needed to print all the distribution details.

```
moritzpfeffer@debian:~$ man lsb_release
Lots of text
```

Then i use the switch to get all distribution information.

```
moritzpfeffer@debian:~$ lsb_release -a
No LSB modules are available.
Distributor ID: Debian
Description: Debian GNU/Linux 9.13 (stretch)
Release: 9.13
Codename: stretch
```

(b) Use the uname command to print the kernel release info.
I first consult the man page of uname and find that the **-r** switch is needed to print the kernel release info

```
moritzpfeffer@debian:~$ man uname
Lots of text
```

Then i use the switch to get all distribution information.

```
moritzpfeffer@debian:~$ uname -r
4.9.0-16-686
```

Exercise 2

(a) Determine the shell that is used by default by using the echo command and the $SHELL environment variable.
To get the value of an environment variable we can simply echo it.

```
moritzpfeffer@debian:~$ echo $SHELL
/bin/bash
```

This shows that the default shell is *bash* located at */bin/bash*.

(b) List all the directories found in the $PATH environment variable.

```
moritzpfeffer@debian:~$ echo $PATH
/usr/local/bin:/usr/bin:/bin:/usr/local/games:/usr/games
```

Thus the directories in $PATH are:

- /usr/local/bin
- /usr/bin
- /bin
- /usr/local/games
- /usr/games

Exercise 3

List the number of scripts that run
(a) at run level S, (b) run level 2, and (c) run level 5.
Reading the man page of wc i find that the **-l** option reduces the output of wc only to the number of lines fed into it. Combining it with ls allows me to count the files in a directory.

```
moritzpfeffer@debian:/etc$ ls /etc/rcS.d/ | wc -l
10
moritzpfeffer@debian:/etc$ ls /etc/rc2.d/ | wc -l
20
moritzpfeffer@debian:/etc$ ls /etc/rc5.d/ | wc -l
20
```

Thus (a) at run level S **10** scripts are run and at (b) run level 2 **20** scripts are run, and at (c) run level 5 **20** scripts are run.

Exercise 4

Research the difference between systemd and init (System V init)
(a) describe in your own words the difference between these systems
I will describe four differences between systemd and init.
One important motivation for systemd was to speed up boot times. To achieve this systemd starts services **on demand** and in **parallel**, while init starts services **serially**. [1]
Secondly init starts services through shell script, while systemd recommend .service files. Thus, I would say that init uses an **imperative** approach (scripts), whereas systemd prefers a **declarative** one. [2]

Thirdly, systemd's .service files and other unit files can be grouped into **targets**, which **replace init's runlevels**.
Furthermore, systemd contains many more components than init. For example, it features a ntp-implementation called systemd-timesyncd and systemd-timer which can run recurring tasks like cron does. Thus, the fourth difference is that **systemd is less focused and larger** than the original init. [3]
(b) determine which of the two is used by the operating system you have installed in VirtualBox. How can you tell? The archlinux wiki on systemd tells us that systemctl is the "main command used to introspect and control systemd is systemctl". By entering "systemctl" into the terminal and executing it i confirm that it is present in the VM. From that i infer that systemd is used.