

COMPUTER SCIENCE MENTOR SCHEME

Session 1: Linux and Git

PREFACE

All materials **available online** at
<https://thytom.github.io/session1>

Link is available in Discord/Teams.

ME

- Archie
- Senior mentor
- Discord co-admin
- Wrote the Registration Bot (sorry)

TOPICS

- Configuring **VirtualBox**
- Working with **Linux**
- Using **Git** for projects

*Several **demos** using Linux, feel free to follow along.*

SHOW OF HANDS

Who has:

- Installed **VirtualBox**
- Installed an **Ubuntu VM**
- Installed the **Guest Utilities**

INSTALLING UBUNTU ON VIRTUALBOX

https://linuxhint.com/install_ubuntu_virtualbox_2004

VIRTUALBOX CONFIGURATION

You can **change settings about your VM.**

It is recommended to set:

- Memory **4GB** or more if you can
- Video memory **128MB**
- **More than one CPU core**

DEMO: FRESH UBUNTU VM



SOME PROBLEMS

- **Mac users** - setting up guest/host copy/paste
- 32-bit only

We have mentors on hand who can help you.

THE PACKAGE MANAGER

- Linux programs are bundled into **packages**
- **Install and update** via the package manager
- Updates **all your programs***
- Ubuntu uses **two** package managers, **apt** and **snap**

APT COMMANDS

```
# Update package database  
$ sudo apt update  
# Perform system update  
$ sudo apt upgrade  
# Install packages  
$ sudo apt install [packages...]
```

SNAP COMMANDS

*Snap packages are **automatically updated**.*

```
# Install a package  
$ snap install spotify
```

VIRTUALBOX GUEST ADDITIONS

- VirtualBox **drivers** to talk to the host
- This allows for:
 - **better performance**
 - **higher resolutions/fullscreen**
 - **shared copy/paste**

*There are several packages needed to make this work
(listed later):*

```
$ sudo apt install virtualbox-guest-utils virtualbox-guest-  
dkms virtualbox-guest-x11
```

TEXT EDITOR

- Ubuntu comes with **GEdit**
- There are many others
- We recommend **Visual Studio Code** (vscode)

```
$ snap install --classic vscode
```

BUILD-ESSENTIAL, VALGRIND, GIT

Build-essential: Meta-package, pulls in a bunch of useful build tools like **gcc** and **make**.

Git: more on this later, you've likely already used it.

Valgrind: Used later on in PGA for debugging.

PACKAGE LIST

```
# Build tools (used in PGA)  
build-essential git valgrind
```

```
# Virtualbox Guest Utils  
virtualbox-guest-dkms  
virtualbox-guest-x11  
virtualbox-guest-utils
```

```
# Visual Studio Code (via snap)  
vscode
```


DEMO: INSTALLING PACKAGES

WHAT IS GIT?



WHAT IS GIT?



- Version Control System (**VCS**)
- Every change is recorded
- “Timeline” for your code

BASICS OF GIT

- Projects are stored in **repositories**
- **Repositories** contain all your code
- They also contain the **history** of your code

BASICS OF GIT

- Changes are **committed** to the history
- History is **permanent***
- **Time-travel** - roll back to previous commits

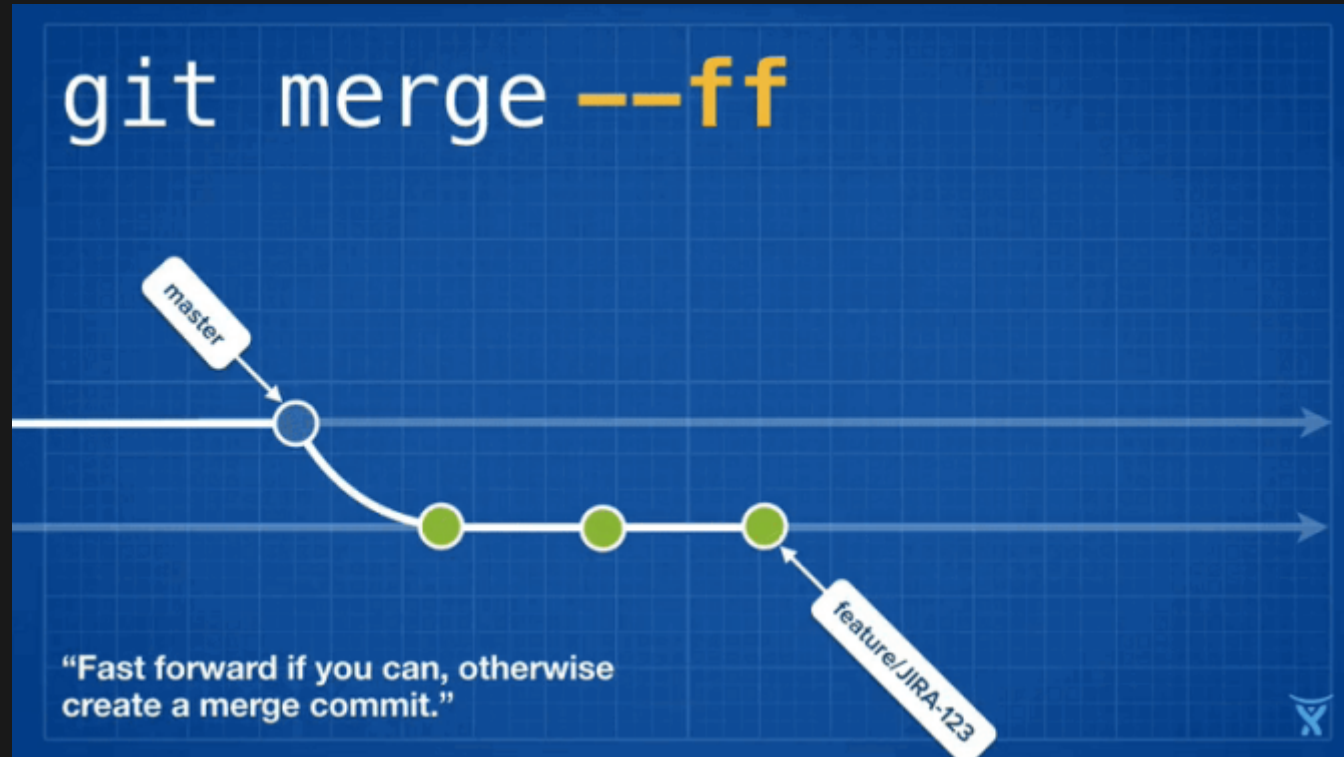
DEMO: COMMITS

Making changes, **committing** them

BRANCHES

- Create a **branch** in history
- Develop features **in isolation**
 - Changes **don't affect** main branch
- **Merge** branch when done

BRANCHES



<https://rlogiacco.wordpress.com/2017/04/05/git-tricks/>

DEMO: BRANCHING

GITLAB/GITHUB

- Online git **hosting platforms**
- A copy called the **remote repository**
- Everyone **pulls** updates from the remote
- Then **pushes** changes back

UNIVERSITY GITLAB

<https://projects.cs.nott.ac.uk>

- Private university **GitLab instance**
- You can host projects here
- Make use of it!

(Some courseworks will be released on here)

EXTRA FEATURES

- Issue tracker
- Merge/Pull requests
- CI/CD
- Forking

DEMO: GITLAB

- Creating a remote **GitLab repository**
- **Pushing** to it

BENEFITS OF GIT

Safety

Complete history of changes, remote **back-ups**

Collaboration

Work on the **same project** from multiple places

Feature separation

Implement a feature, **merge** when it's ready

Maintainability

Branches, issues and **good commits** keeps code organised and clean.

QUESTIONS?

TASK

20 minutes

If you haven't: **Welcome To The Machine**

Otherwise, follow the **worksheet** handed out to you.

*Ask a **mentor** for help if you need it.*