

# Software Engineering Questions

by Ultan

## Introduction

Some questions from, or relevant to, the course.

## Questions

### Shell

- What is the shell?
- What is `$PATH`?
- What is `.`, `..` and `~` in a file path?
- Where is `/`?
- What does `pwd`, `cd`, `mv`, `cp`, `mkdir`, `chmod`, `rm`, `rmdir`, `ls`, `man`, `which`, `echo`, `cat`, `sudo`, `sha256sum`, `curl` do? Give an example of each
- What does each of `cd -`, `rm -r`, `ls -l`, `ls -a` do?
- What are the modes for a directory?
- What is the user ID of root?
- How do you override the default input/output streams?
- How would you append to a file?
- What is a pipe?
- Why is the `xargs` program useful?

### Shell Tools and Scripting

- What is `$0`, `$1` to `$9`, `$@`, `$*`, `$#`, `$?`, `$$`, `!!`, `$_`?
- Syntax for variables? How do you echo variables?
- What return code indicates no issues?
- How do you separate commands on the same line?
- What is command substitution? Give an example
- What is process substitution? Give an example
- Write a function to make a directory and `cd` into it
- Write a `for` loop and an `if` statement
- What is a shebang? Give a shebang for python
- What is shell globbing? Give an example to move all `*.py` and `*.sh` files to a new folder

- Give an example of using diff
- What is touch useful for?
- Find all directories named source. Find all directories named source (case insensitive)
- Use grep to recursively look through a directories
- How do you see your command history?
- What does starting a command with a leading space do?
- What is the shortcut CTRL+R used for?

## **Vim**

- What are the modes in Vim?
- What are buffers, tabs and windows in Vim?
- What are nouns in Vim?
- What are verbs in Vim?
- Where do you put Vim plugins?
- What do these regular expressions do: ., \*, +, [abc], (RX1|RX2), ^, \$ ?

## **Command-Line Environment**

- What does CTRL+c do?
- What does CTRL+\ do?
- What does kill -TERM <PID> do?
- What does Ctrl+z do?
- What are fg and bg used for?
- What does jobs do?
- How do you refer to a process?
- What does the & suffix in a command do?
- What does disown allow you to do?
- What is a daemon?
- How do aliases persist across shell sessions?
- Make a simple alias
- How do you ignore an alias?
- Where are dot files located?
- How do you connect over SSH? How do you do key-based authentication?
- How to grep locally remote output? How to grep remotely local output?
- Give two methods for copying files to a remote server over SSH?
- Explain how to port forward using an example

## **Version Control (Git)**

- Explain the Git data model (snapshots, modelling history, data model as pseudocode, objects and content-addressing, references and repositories)
- What is the staging area?
- What do the following do?
  - git help <command>
  - git init
  - git status
  - git add <filename>
  - git add <filename> -u
  - git commit -m “message”
  - git log
  - git log -all -graph decorate
  - git diff <filename>
  - git diff <revision> <filename>
  - git checkout <revision>
- How do you show the branches?
- How do you create a branch?
- How do you create a branch and switch to it?
- How do you create a branch based off existing branch and switch to it?
- How do you merge into the current branch?
- How do you rebase a set of patches onto a new base? Illustrate with a diagram
- How do you resolve a merge conflict?
- How do you list remotes?
- How do you add to the remote?
- How do you send object to a remote and update the remote reference?
- How do you set up correspondence between the local and remote branch?
- How do you retrieve objects/references from a remote?
- What does git pull do?
- What is git clone used for?
- How do you edit a commits content message?
- How do you unstage a file?
- How do you discard changes of a file?
- How do you clone without the entire version history?
- How to check who edited which line last?
- What is git stash and git stash pop useful for?

## **Debugging**

- Discuss debugging referring to print statements, logging and debuggers

## **Metaprogramming**

- Give an example of a simple makefile to compile a c file and a c header file
- Explain the semantic versioning format
- What is a lock file?
- What is vendoring?
- Explain at a high level what how a CI system operates
- What is a test suite, unit test, integration test, regression test and mocking?
- In Markdown how do you: write a bullet, a list, italic text, bold text, headings, code, code font and links?

## **Virtual Machines and Containers**

- What is a virtual machine?
- What is a container?

## **Android Studio**

- What is the device file explorer?
- What is the layout editor?
- What is a constraint layout?
- Why is the Gradle build system useful?