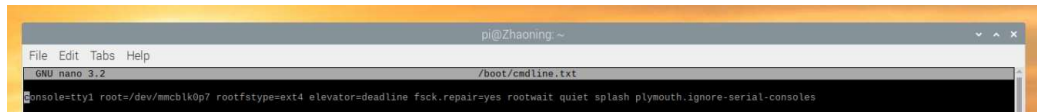
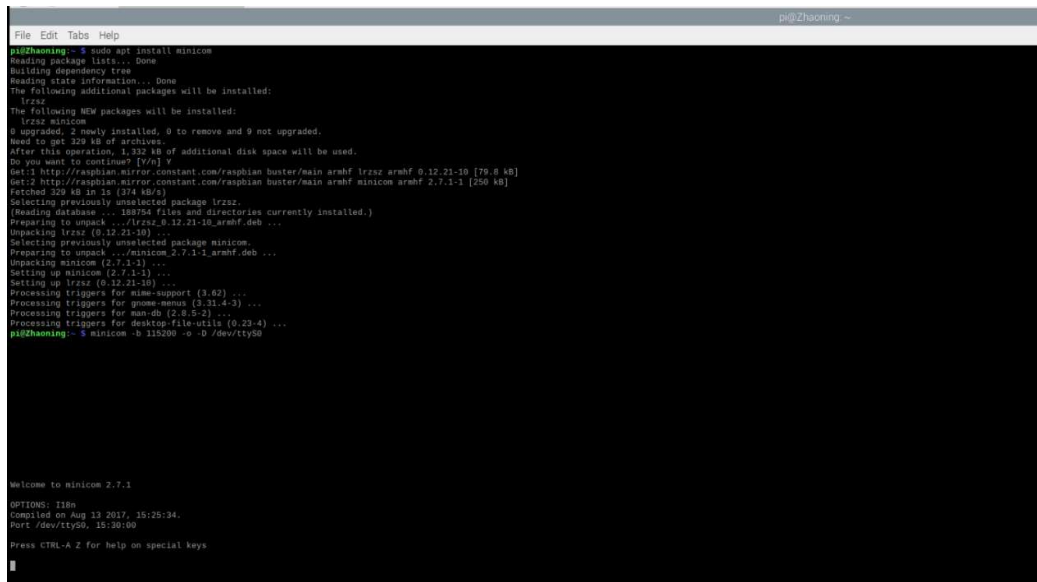


## Lab 2A: General-purpose input/output (GPIO) and serial communication

Open a Terminal on macOS/Linux or [Git Bash](#) on Windows,  
and make sure Serial Council is disabled



### Serial loopback test



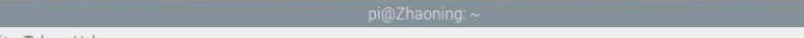
Enable new line

Enable echo

Exit Minicom



Optionally, perform serial test between two Raspberry Pi's using three DuPont female-to-female jump wire



```
pi@Zhaoning: ~
File Edit Tabs Help

Welcome to minicom 2.7.1

OPTIONS: I18n
Compiled on Aug 13 2017, 15:25:34.
Port /dev/ttyS0, 15:42:48

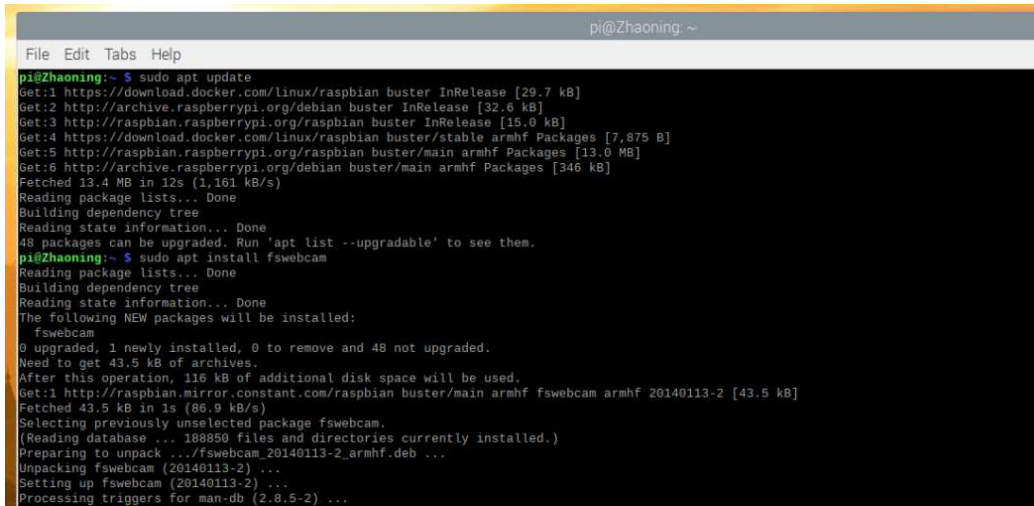
Press CTRL-A Z for help on special keys
```

## Lab 2B: Serial peripheral interface (SPI)

[illegible]

## Lab 2G: USB Webcam

Connect a USB webcam, install fswebcam, and save images:

A terminal window titled 'pi@Zhaoning: ~' with a menu bar (File, Edit, Tabs, Help). The terminal shows the execution of 'sudo apt update' and 'sudo apt install fswebcam'. The output of 'update' shows package lists being fetched from various sources. The output of 'install' shows the dependency tree, the package to be installed, and the disk space requirements. The installation of 'fswebcam' is completed successfully.

```
pi@Zhaoning:~$ sudo apt update
Get:1 https://download.docker.com/linux/raspbian buster InRelease [29.7 kB]
Get:2 http://archive.raspberrypi.org/debian buster InRelease [32.6 kB]
Get:3 http://raspbian.raspberrypi.org/raspbian buster InRelease [15.0 kB]
Get:4 https://download.docker.com/linux/raspbian buster/stable armhf Packages [7,875 B]
Get:5 http://raspbian.raspberrypi.org/raspbian buster/main armhf Packages [13.0 MB]
Get:6 http://archive.raspberrypi.org/debian buster/main armhf Packages [346 kB]
Fetched 13.4 MB in 12s (1,161 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
48 packages can be upgraded. Run 'apt list --upgradable' to see them.
pi@Zhaoning:~$ sudo apt install fswebcam
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  fswebcam
0 upgraded, 1 newly installed, 0 to remove and 48 not upgraded.
Need to get 43.5 kB of archives.
After this operation, 116 kB of additional disk space will be used.
Get:1 http://raspbian.mirror.constant.com/raspbian buster/main armhf fswebcam armhf 20140113-2 [43.5 kB]
Fetched 43.5 kB in 1s (86.9 kB/s)
Selecting previously unselected package fswebcam.
(Reading database ... 188850 files and directories currently installed.)
Preparing to unpack .../fswebcam_20140113-2_armhf.deb ...
Unpacking fswebcam (20140113-2) ...
Setting up fswebcam (20140113-2) ...
Processing triggers for man-db (2.8.5-2) ...
```