# FAQ AND CHEAT-SHEET

This worksheet answers various questions that frequently come up at Picademy. It's not intended to be something that you work through; rather it's a reference sheet (like a personalized Google … only slower).

## PIN NUMBERS

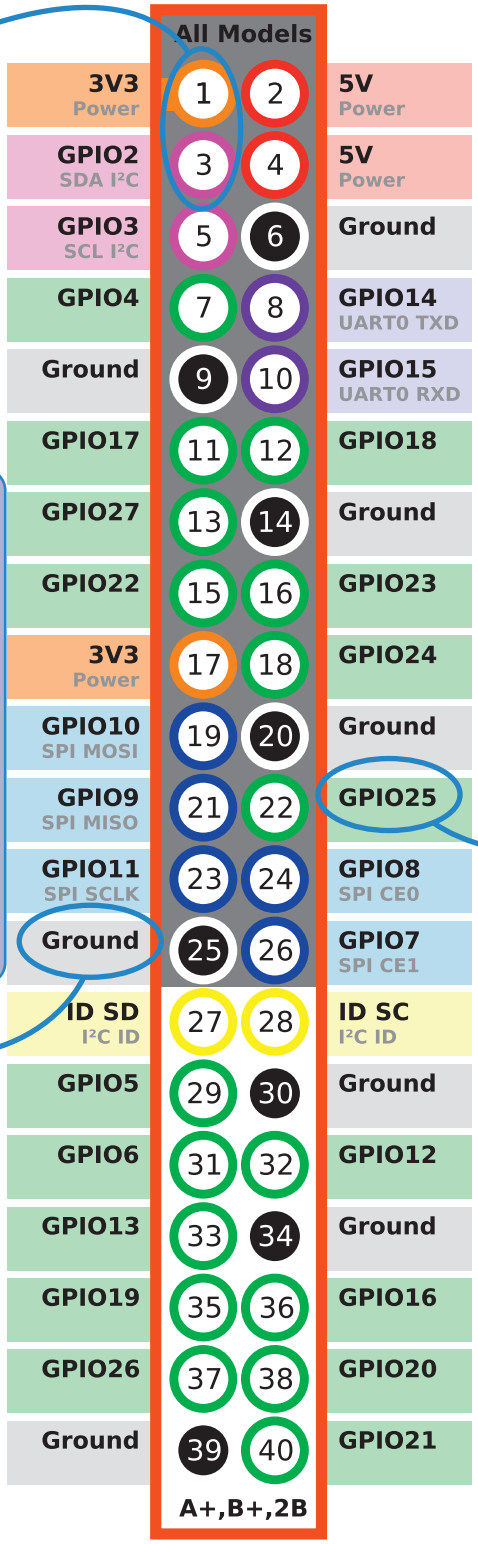
These numbers are the "physical" pin numbers; pins 39 and 40 are closest to the USB ports whilst pins 1 and 2 are furthest away.

However, these numbers are *not* how you refer to the pins in code!

## GROUND

Pick a ground, any ground! They're all the same electrically and it doesn't matter which one you use.

It's also common practice to wire one ground pin to a ground "rail" on a breadboard (the "-" column on the board).




## GPIO NUMBERS

These numbers are the "real" pin numbers that you need when coding.

Don't worry too much about the background colours; where they're green the pin is "only" a GPIO pin (a pin that can be an input or an output).

Where they're other colours, the pins can be configured to do other things too.

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## READING CURSOR (ARROW) KEYS

When making a robot you'll frequently want to control it from the keyboard (at first). But Python's `input` function requires you to press Enter before it returns what you pressed (no good for controlling robots)! You need to use the `curses` library instead. This is built into Python (on Linux and Mac OS X) and the code to use it looks like this:

```
import curses

def main(window):
    window.nodelay(True)
    while True:
        key = window.getch()
        if key != -1: # do nothing if no key is pressed
            window.move(0, 0)
            window.clrtoeol()
            if key == curses.KEY_UP or key == ord('w'):
                window.addstr('Forward!')
            elif key == curses.KEY_DOWN or key == ord('s'):
                window.addstr('Backward!')
            elif key == curses.KEY_LEFT or key == ord('a'):
                window.addstr('Port!')
            elif key == curses.KEY_RIGHT or key == ord('d'):
                window.addstr('Starboard!')
            elif key == ord(' ') or key == ord('x'):
                window.addstr('Stop!')
            window.refresh()

curses.wrapper(main)
```

This example just prints out a direction based on what you're holding down (cursor keys or WASD), but you should be able to adapt this to controlling motors.

### TERMINAL ONLY!

Be warned that `curses` only works under the Terminal (not in IDLE, which is the environment you're probably used to working in).

You can still write the code in IDLE, but to test it, start a terminal and run: `python3 myscript.py`. To stop your script, press `Ctrl+C`.

This is okay, because in your final robot you probably want to start your script on boot-up (and you won't want the windowing system). We'll cover doing that later on...

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## CAPTURING TO DIFFERENT FILENAMES

You've managed to repeatedly capture pictures with the camera, but each time you run your script it restarts the image numbers!

There's a couple of solutions to this. The first would be to interrogate the directory you're saving your images in, work out the biggest image number there, and then start from that plus one. But that's a lot of work. A much easier method is to capture images with a timestamp in the filename:

```
from datetime import datetime
from picamera import PiCamera
from gpiozero import Button

camera = PiCamera()
button = Button(17)
camera.start_preview(alpha=192)
while True:
    button.wait_for_press()
    filename = datetime.now().strftime('image-%Y-%m-%d-%H-%M-%S.jpg')
    camera.capture(filename)
camera.stop_preview()
```

The %-placeholders in the strftime call will be replaced with year, month, day, hours, minutes, and seconds respectively. You can remove, reshuffle or replace these placeholders as you wish.

### WHAT'S THE TIME, MR. PI?

Unfortunately, the Pi has no battery backed clock on board. This means when it loses power, it loses the time. If it's got a network connection it'll ask the Internet what the current time is on boot-up but you'll find non-networked Pi's have no idea what time it is when they boot (unless you set it manually).

# FAQ AND CHEAT-SHEET

GPIO Zero Examples

- Button
- Motion Sensor
- Light Sensor
- Ultra-sonic Sensor (if released?)

Minecraft Block reference

Playing Sounds in Python