Beginning with programming in Arduino

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Archived By
b33tr00t-444

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1 The Basics

◇ Format of code in for Arduino:

Listing 1: Arduino code format

```
void setup() {
}

void loop() {
}
```

Commands put inside of `setup()` are executed once. This function is used to 'setup' the arduino board. Commands that we want to run over and over again are put inside of the `loop()` function.

◇ Now, I am using Arduino CLI here. To see the list of connected boards use the following command:

Listing 2: Viewing the list of connected boards

```
$ arduino-cli board list
```

This will display a list of connected boards with their name, FQBN(Fully Qualified Board Name), port, etc. In my case, however, it's showing the following:

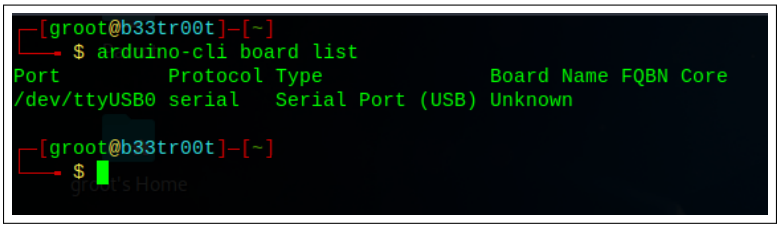

Figure 1: Listing the connected boards

Here, it doesn't show my board's name, instead, it shows 'Unknown'. I know that my board is an Arduino Uno, so I will do a `core search` for my board by using the following command:

Listing 3: Search for my board

```
$ arduino-cli core search uno
```

This will generate the following output:

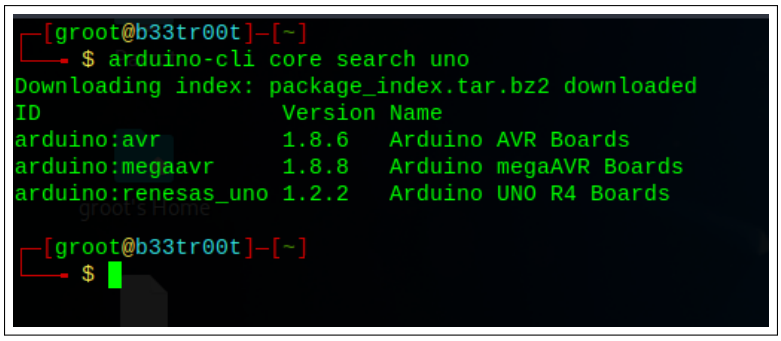

Figure 2: Searching my board

Those names mentioned below the `ID` column are the names of the platform needed for the board, the correct platform needs to be installed to be able to use the board. Based on what I have found (by googling), I need to install the `arduino:avr` platform for my UNO.

◇ To install the required platform, just use the following command:

Listing 4: Installing the platform

```
$ arduino-cli core install arduino:avr
```

Figure 3: Installing the required platform

In my case, it has already been installed for my board (because I had already installed it earlier and this was done for illustration purposes).

◇ Once it's installed, we need to know the FQBN for our board and for that we need to list all the boards but this time it's a different command:

Listing 5: Listing all the boards

```
$ arduino-cli board listall
```

This produces the following:

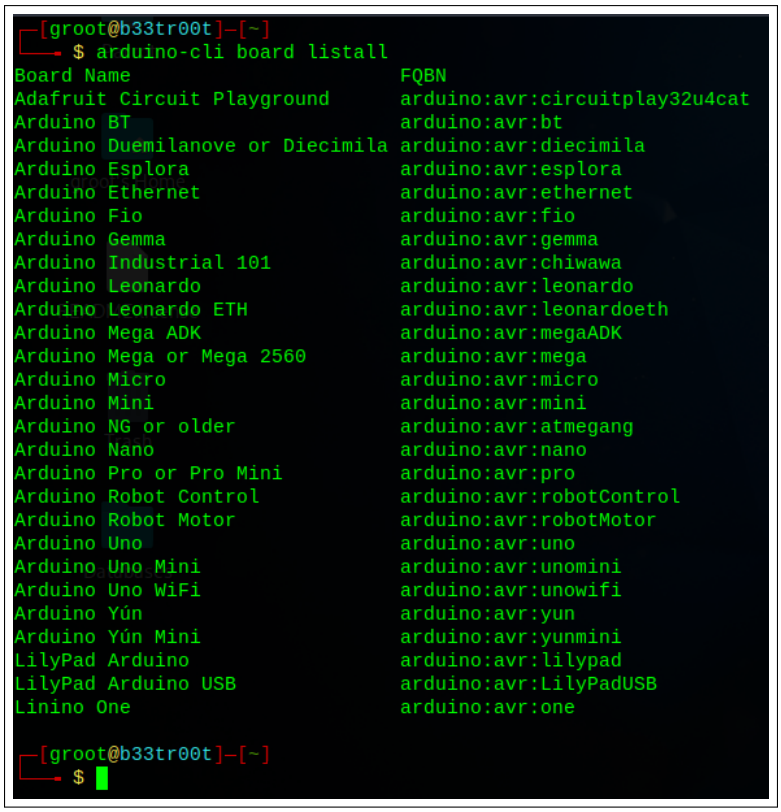

Figure 4: Listing all the boards

As seen from the image, the FQBN for Arduino UNO is mentioned alongside with its Board Name. Now, I can use this FQBN for compiling and uploading my sketch to my board.

2 Writing my first program

- The pin 13 of the arduino is connected to a LED (labelled as `L` on the board).
- My first program in Arduino:

Listing 6: First program

```
void setup() {
        pinMode(13, OUTPUT);
}

void loop() {
        digitalWrite(13, HIGH);
}
```

- To compile this program in arduino CLI, we compile it using the following command:

Listing 7: Compiling an arduino program

```
$ arduino-cli compile -b arduino:avr:uno /home/groot/
    arduino/programs/first/first1/first1.ino
```

- After compiling the sketch, we need to upload it using the following command:

Listing 8: Uploading the sketch

```
$ arduino-cli upload -p /dev/ttyUSB0 -b arduino:avr:uno /
    home/groot/arduino/programs/first/first1/first1.ino
```

- After uploading it to the board, the LED will be turned on.
- Basically in Listing 6 in the function `pinMode()` I have added two parameters, the first is the *pin number* and the second is whether that pin should be treated as an *input* or an *output*. Since I am going to turn it on/off (it's going to output its state), so it's set to `OUTPUT`. Next, in the function `loop()`, I have put the line `digitalWrite(13, HIGH);` which basically means that it's going turn the LED (`13`) on (`HIGH`) and this command is going to repeat over and over again because that's what `loop()` does.

◇ Here's a modified version of Listing 6:

Listing 9: Blinking LED

```
void setup() {
        pinMode(13, OUTPUT);
}

void loop() {
        digitalWrite(13, HIGH);
        delay(1000);
        digitalWrite(13, LOW);
        delay(1000);
}
```

◇ I have added a another `digitalWrite()` that turns the LED (`13`) off (`LOW`).

◇ The `delay(1000)` function pauses the program for a 1000 milliseconds (that 1 second).

3 Programs

- https://github.com/b33tr00t-444/arduino/tree/arduinoFun/programs/first/first1
- https://github.com/b33tr00t-444/arduino/tree/arduinoFun/programs/first/first2
- https://github.com/b33tr00t-444/arduino/tree/arduinoFun/programs/first/first3
- https://github.com/b33tr00t-444/arduino/tree/arduinoFun/programs/first/assignment