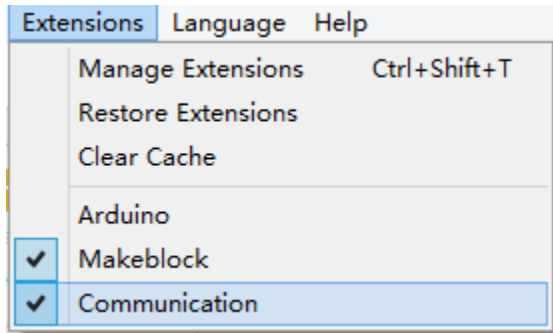# Serial Communications

Introduction:

It is possible to communicate serially with the mBot once a program has been updated to the board. Serial communication can be via USB, 2.4GHz or Bluetooth. To communicate serially, you need to select the "Communication" extension from the Extensions menu:

Once this is selected, you can go to the "Robots" scripts, scroll down to the bottom and you will find the communication blocks. You might need to click "Show Extension":
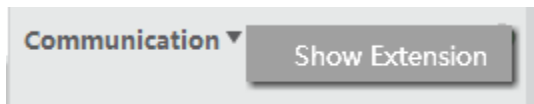
The communication blocks look like this:
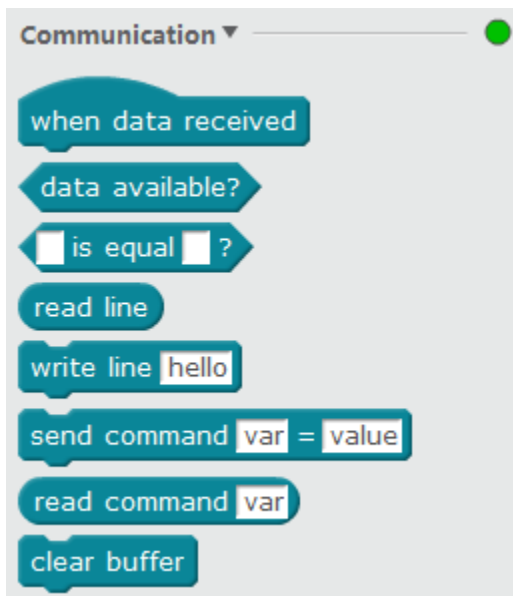
Communication between your robot and your computer happens in the window on the right hand side of the mBlock programming environment:

```
avrdude: input file C:\Users\Maker\AppData\Local\Temp\build42017
avrdude: reading on-chip flash data:

Reading | ################################################# | 1

avrdude: verifying ...
avrdude: 1762 bytes of flash verified

avrdude done.   Thank you.
```
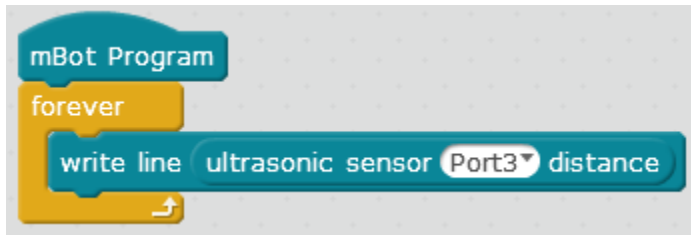
send encode mode
  ○ binary mode ⊙ char mode

recv encode mode
  ○ binary mode ⊙ char mode

Send

Programming:

The current value of sensors can be displayed through this communication. To display the current value, use the "Write line" block:

write line hello

Replace the input "hello" with the ultrasonic sensor value and put it in a forever loop:

mBot Program
forever
  write line ultrasonic sensor Port3 distance

When I run this file, I got the following output:

```
7.41
7.41
7.41
1
7.41
7.
15:16:52.490 < 7.41
7.41
7.41
7.41
7.29
```

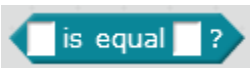send encode mode
○ binary mode ⊙ char mode

Your robot can also be controlled by reading from the input line. First check that data is available:
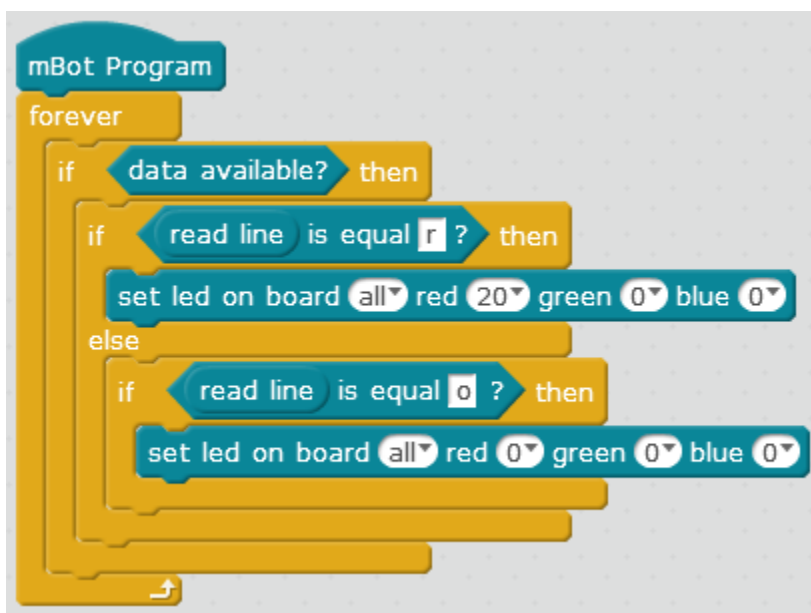
data available?

If it is, then read the line with this:

read line

And compare it with this:

▢ is equal ▢ ?

Finally, program your robot to behave according to your wishes. In this program, an input of "r" will turn the LEDs red, and "o" will turn them off:

mBot Program
forever
  if data available? then
    if read line is equal r ? then
      set led on board all red 20 green 0 blue 0
    else
      if read line is equal o ? then
        set led on board all red 0 green 0 blue 0

Then, in the input area, I have turned the lights on red, off, and back on red again:

```
avrdude: 8306 bytes of flash verified

avrdude done.  Thank you.

17:17:41.379 > r

17:17:46.202 > o

17:18:24.298 > r
```

send encode mode
  ○ binary mode ⊙ char mode

recv encode mode
  ○ binary mode ⊙ char mode

r   Send

Challenge:

1. Write a program that controls the motors with serial communication.