# “Will Robots take over the world?”

All about Robots, Chatbots and the Hull Pixelbot

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# Will Robots Take Over the World?

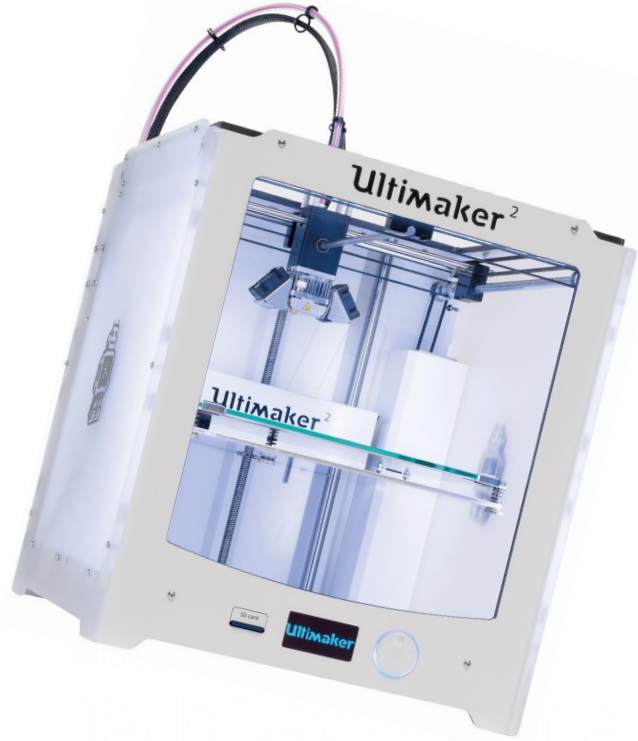
NO

# They already have

- We are surrounded by robots
- They are single purpose devices
- But they are still robots:

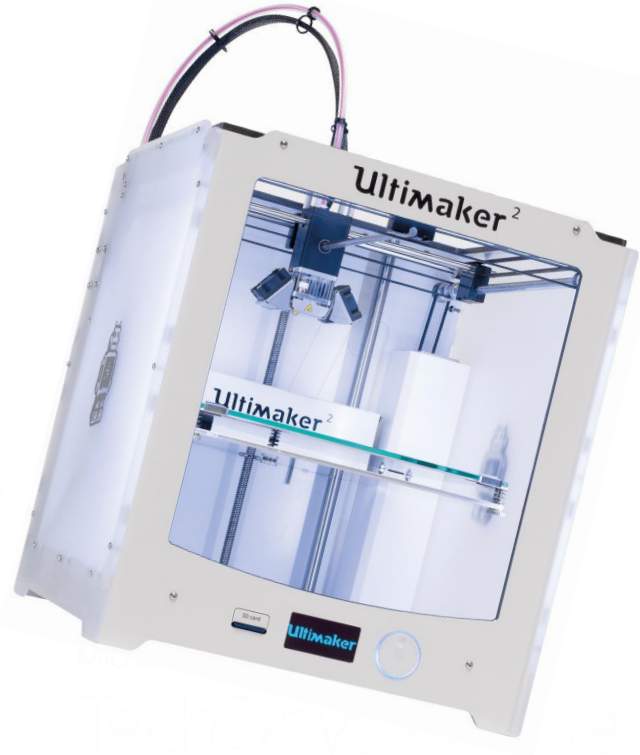
*A robot is a machine capable of carrying out a complex series of actions automatically.*





# 3D Printer

- This robot is special
  - It doesn't automate a task that we used to do by hand
- It does something new
- It's a 3D printer
  - It can produce parts for other machines – even robots
  - It's controlled by a computer that takes a 3D design and then prints it out

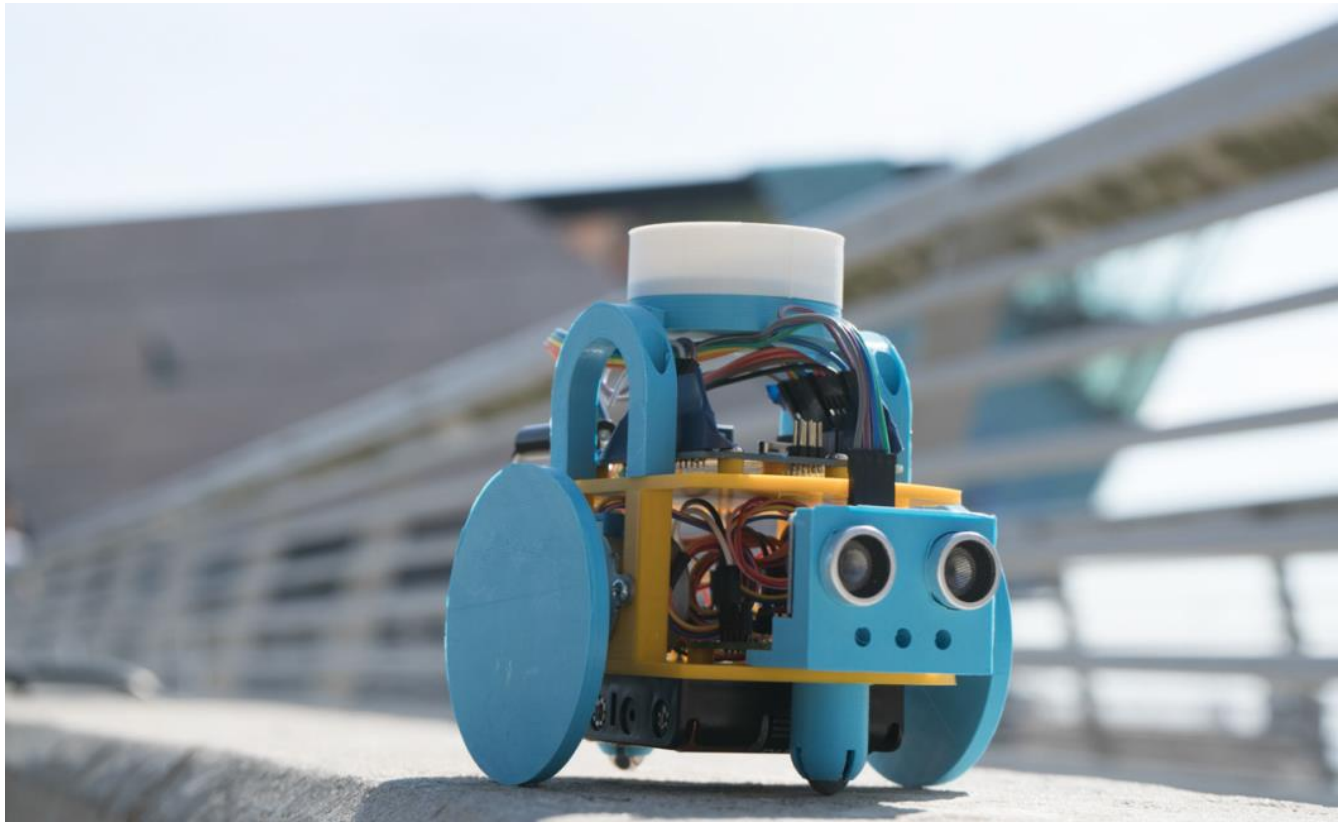
- The key to making a 3D printer is the computer
- We couldn’t make it any other way
- We need computers to produce the designs that are printed
- We need a computer to control the printer itself

# Building your own robot

- The key to making robots is the software that controls them
- Get good at writing software and you can make your robot do anything
- Perhaps you could make it take over the world for you?

# Hull Pixelbot

- Cheap to make
- Easy to build
- Extensible
- Connectable
- Cheap to make

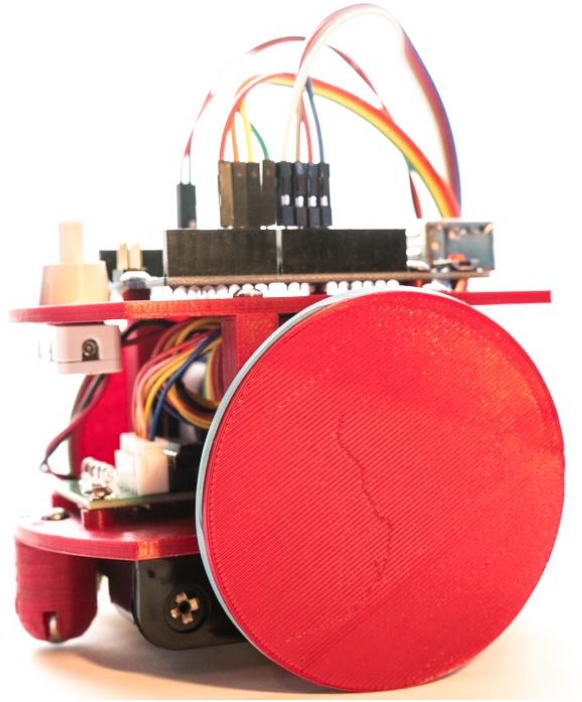


# Cheap to make

- Arduino processor
  - Less than five pounds
- Cheap stepper motor
  - Around one-fifty each
- Cheap pixel ring
  - Around one-fifty
- Distance sensor, battery holder, cables and nuts and bolts add around four pounds
- You can get the electronics for around ten pounds our so: www.aliexpress.com

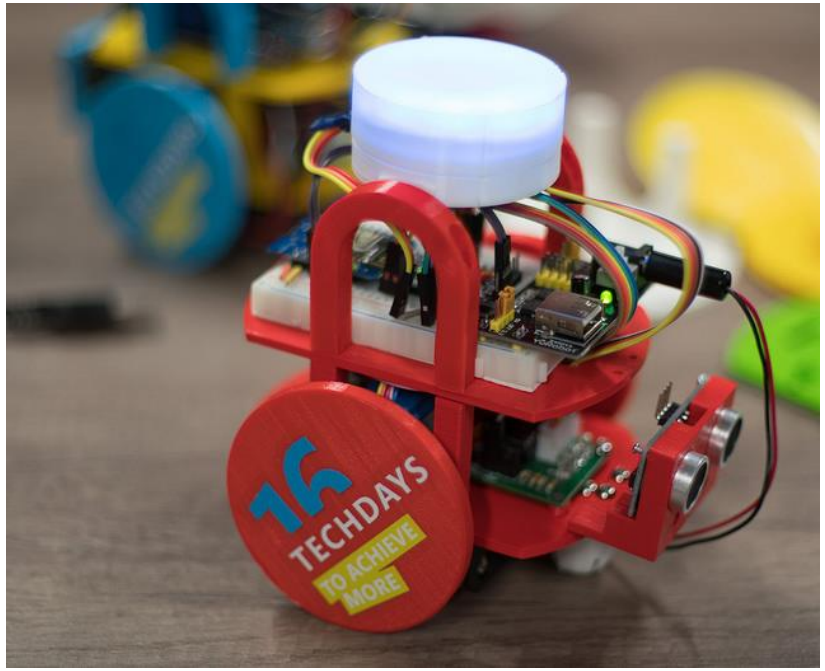
# Easy to build

- All the parts are easy to create with a 3D printer
  - No nasty overhangs or tricky bits
- The robot just fits together using 3mm bolts
- You can design your own platform if you wish
- All the parts are flat, so they could be cut out of thin wood or Perspex
- Or you could use anything you like…



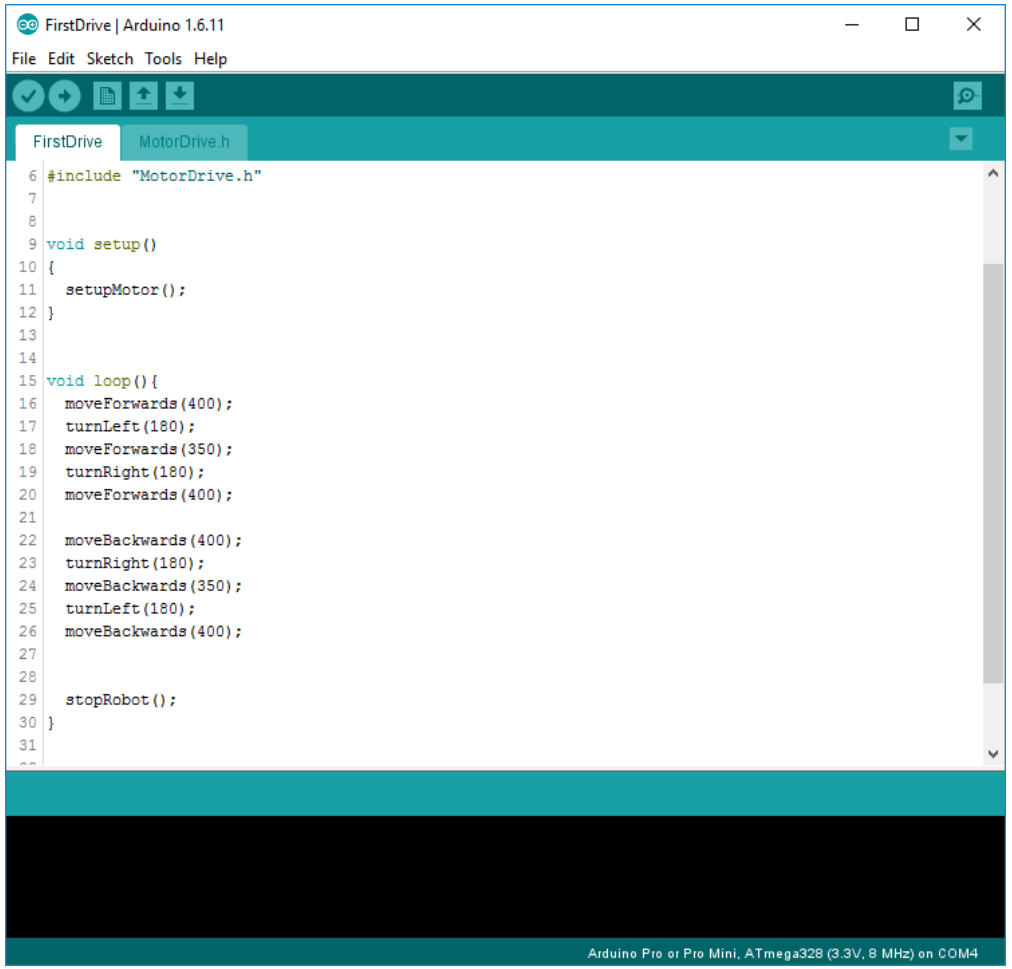
# Extensible

- You can add any sensors that you like to the platform
  - Pixel ring
  - Laser rangefinder
  - Temperature
  - Light sensor
  - LCD panel
  - Switches
- There are ready-made Arduino libraries for all these that you can pick up
- Or you can just build more robots…



# Programming the HullPixelbot

- There is an Arduino library that you can use to drive the robot motors
- You can add your own behaviours based on the sensors that you add
- To do this you write C++ code using the Arduino environment or Visual Studio using Visual Micro



# HullPixelbot Code

- HullPixelbot Code was created to make it easy to control a robot with simple, text based, commands
  - It's a bit like Logo languages from a while back
- You can give the robot single commands and it will obey them
- The commands are interpreted by software running on the Arduino

```
#Just flash the lights
CLtop
PC255,255,0
CD10
PC0,255,255
CD10
CJtop
```

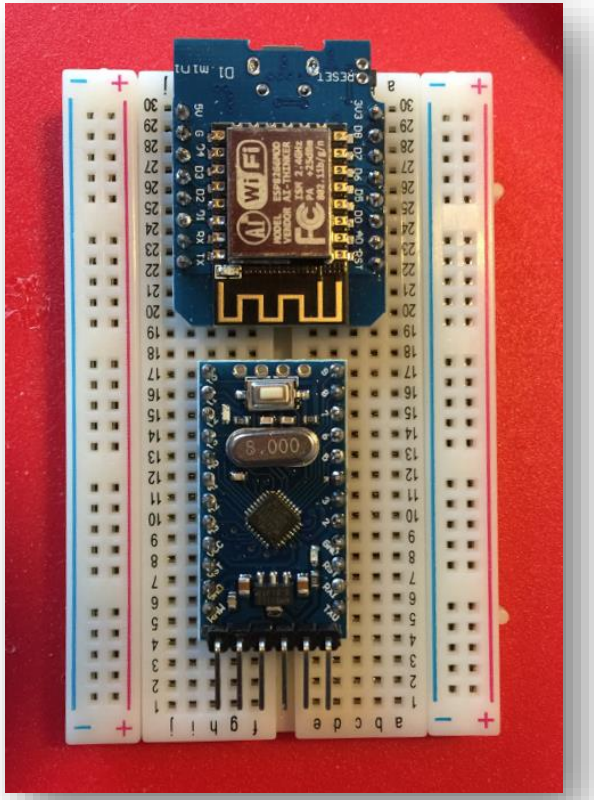
# HullPixelbot Code

- Each command has a two letter identifier and is followed by a number of parameters
- This makes decoding the program very easy
- The code is retained inside the Arduino in its EEPROM
- When the Arduino starts the program runs

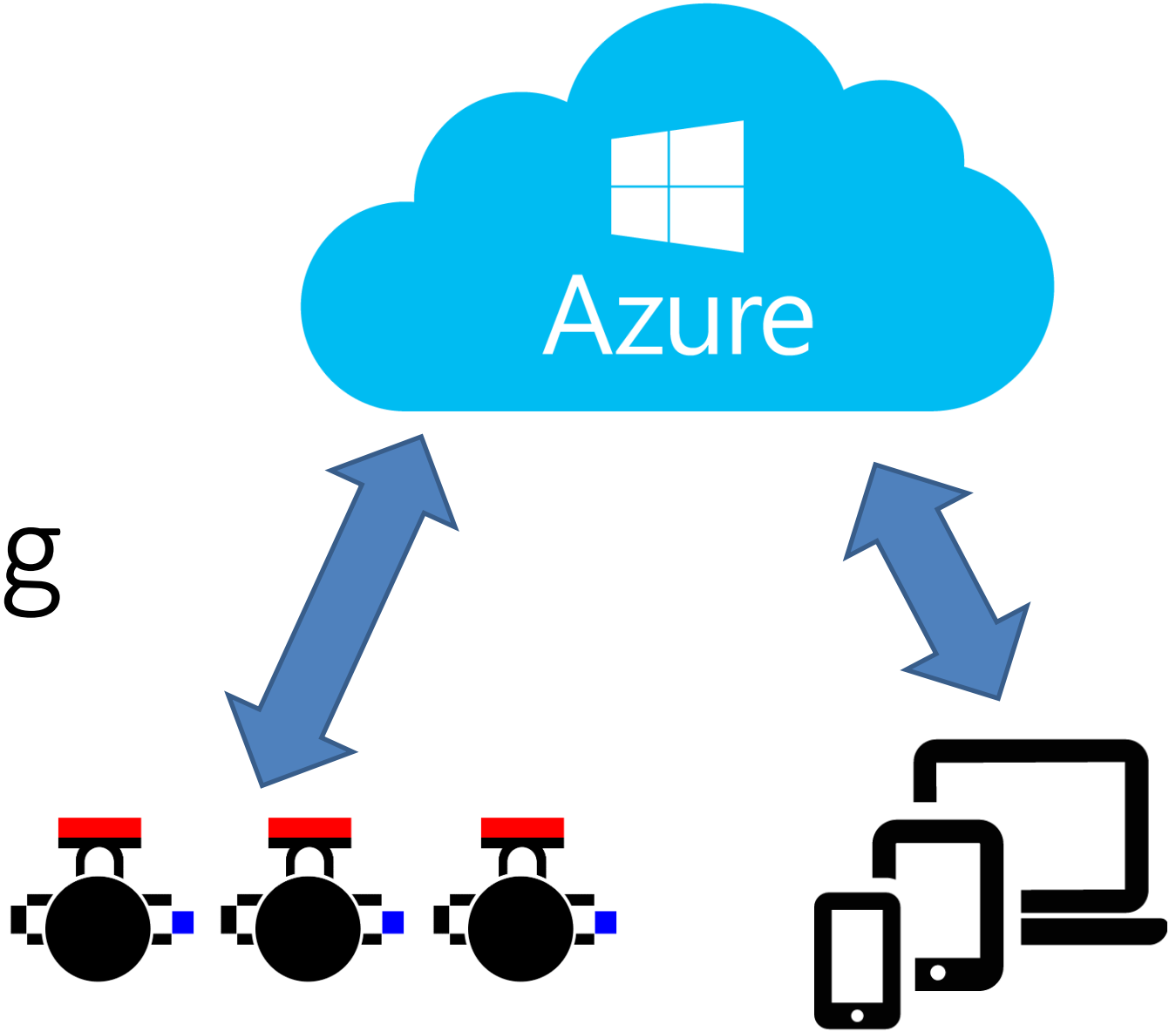
```
#Just flash the lights  <<comment
Cltop                     <<label
PC255,255,0    <<Pixel colour set
CD10                      <<delay
PC0,255,255    <<Pixel colour set
CD10                      <<delay
Cjtop                    <<branch
```

# Dual processor robots

- Arduino Pro and ESP8266
  - The HullPixelbot actually has two processors
    - Arduino for the input/output and motor control
    - Wemos D1 mini for the connectivity
  - This is a great way to create i/o heavy devices
    - Use a serial connection to pass commands between the two
  - For most simple systems you only really need a single device
    - But the Arduino Pro mini only costs around a pound….

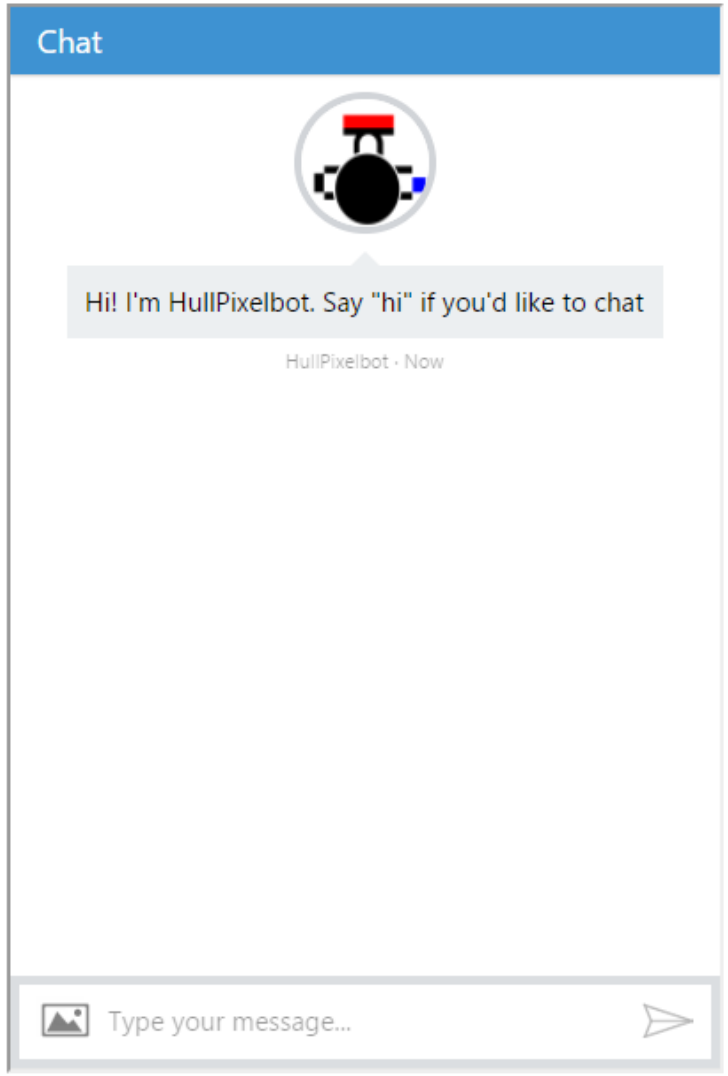


# Networking



# HullPixelbot web chat

- If you go to: hpb.host
- you can find a web dialog for selecting and controlling robots
- This is a “chatbot” that takes your commands and sends them into the robots



# Summary

- Robots are already here
- They are not actually in control yet
- They are easy to connect to the cloud
  - They can be used to build the Internet of Things
- You can build your own robot
  - This is a great idea

www.hullpixelbot.com

# Robot Fun…….

- I have 7 robots that we can play with
- We can drive them round via the hullpixelbot chat application
- We can also run all the programs together

hullpixelbot.com