Quick2Wire

Physical Pi

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http://quick2wire.com/resources

10^6 Raspberry Pi®s

- 7-year olds doing clever things in Scratch
- Minecraft
- Undefined
- Build Monitors

http://en.wikipedia.org/wiki/File:RaspberryPi.jpg

http://quick2wire.com/resources

https://en.wikipedia.org/wiki/File:Robbie_Forbidden_Planet.jpg

http://quick2wire.com/resources

http://www.library.upenn.edu/images/exhibits/music/ziskowski/50.jpg

http://quick2wire.com/resources

http://www.flickr.com/photos/pede/2025693786

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Barriers to entry have never been lower

Cheap CAD

Social marketing and design

Crowdfunding

Manufacturers, makers, markets

We became makers

because we wanted to get children engaged with physical computing

We became makers

because it's a good way to get long-term engagement

We became makers

because we wanted to ignite the passion

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We became makers

so that the kids could have a future

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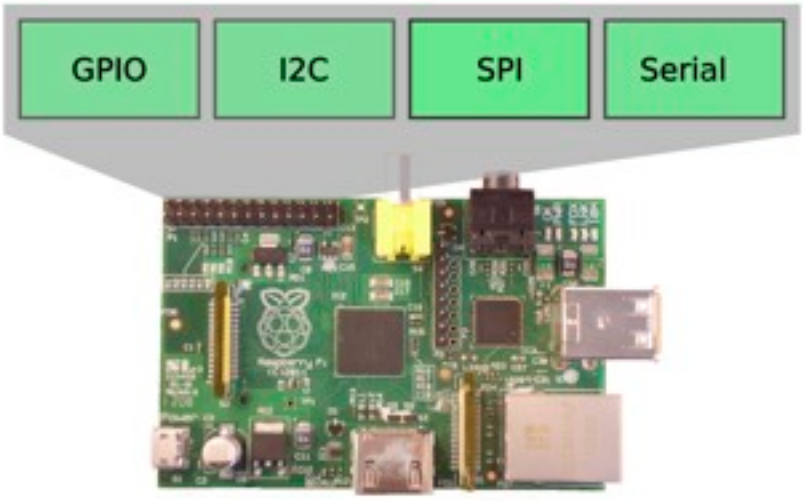
A robot that can explore an unknown area

"C3Pi"



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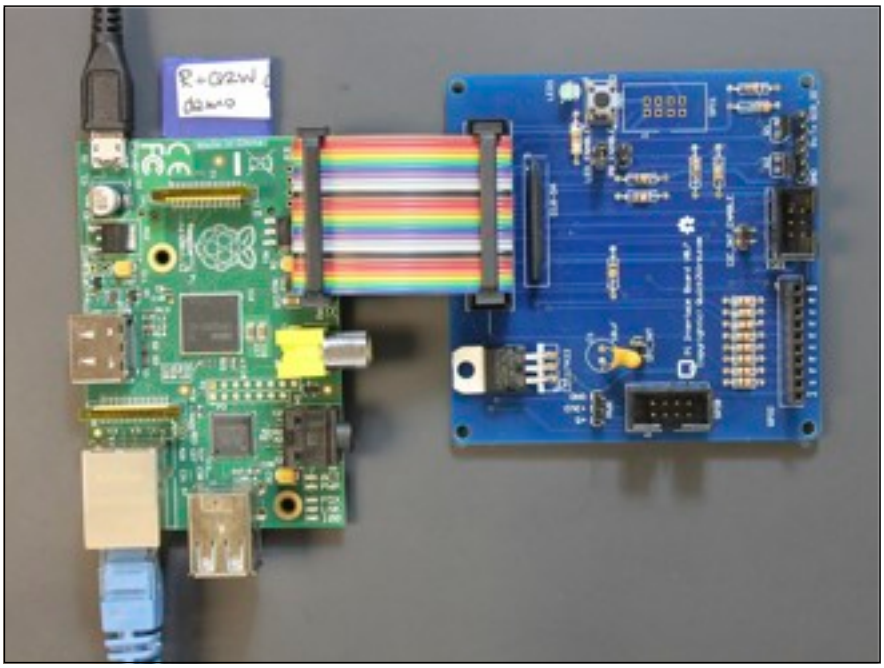
Getting started

Built-in GPIO
- flashing LED
- flashing LED and button
- counting



Built-in GPIO flashing LED

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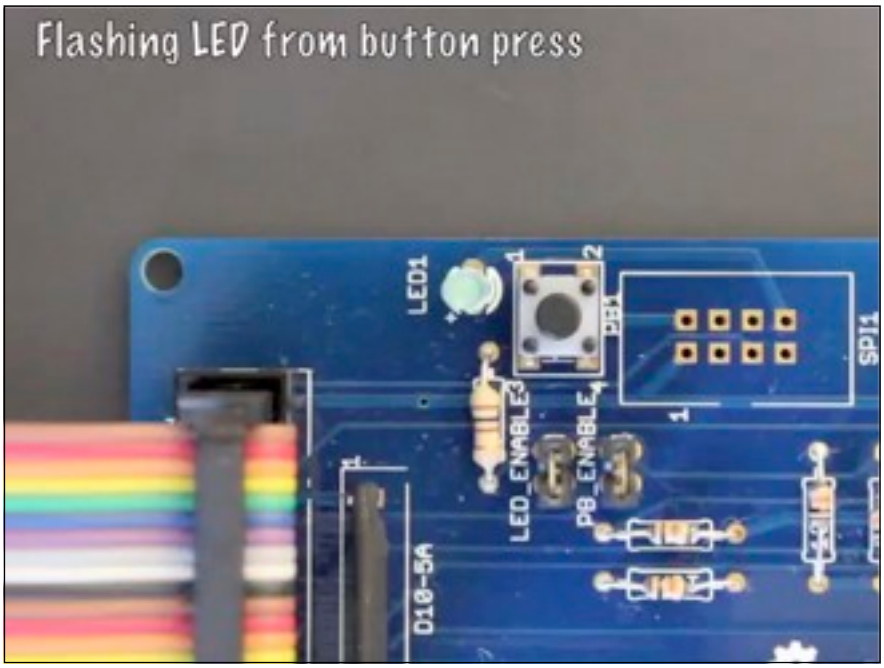
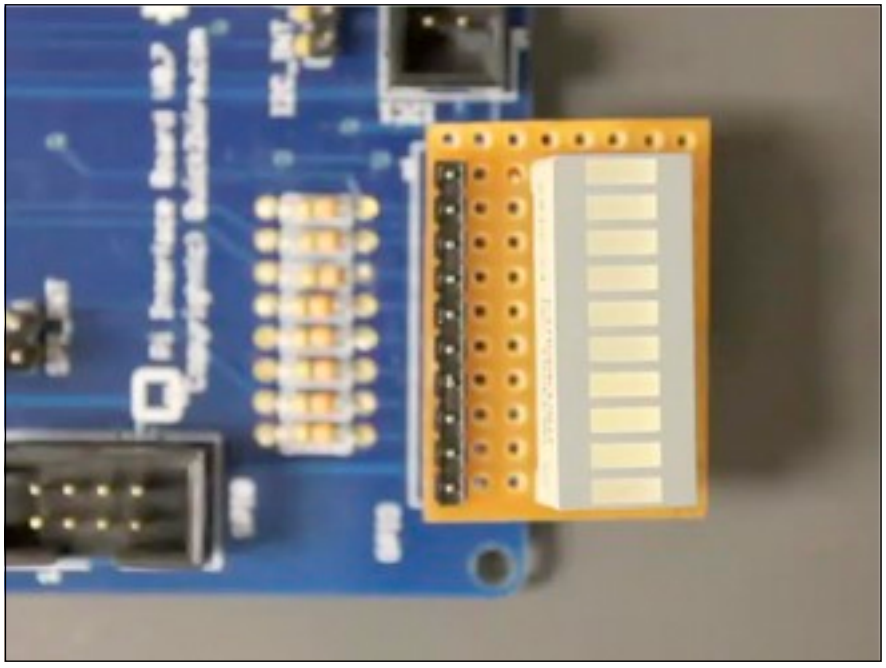
```
with pins.pin(1, direction=Out) as led:
  for v in cycle([1,0]):
    led.value = v
    sleep(0.5)
```

Flashing LED from button press



```
with pins.pin(0, direction=In) as button,\
     pins.pin(1, direction=Out) as led:
  for v in cycle([1,0]):
    led.value = v * button.value
    sleep(0.5)
```




```
pins = [pins.pin(i, Out) for i in range(8)]
try:
  for p in pins: p.open()

  for count in cycle(range(256)):
    for (pin, value) in zip(pins, bitset(count)):
      pin.value = value
      sleep(0.5)

finally:
    for p in pins: p.close()
```

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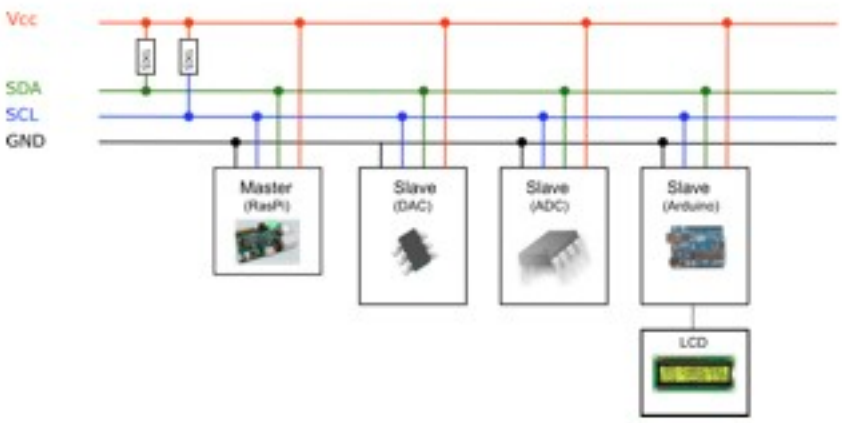
I²C™



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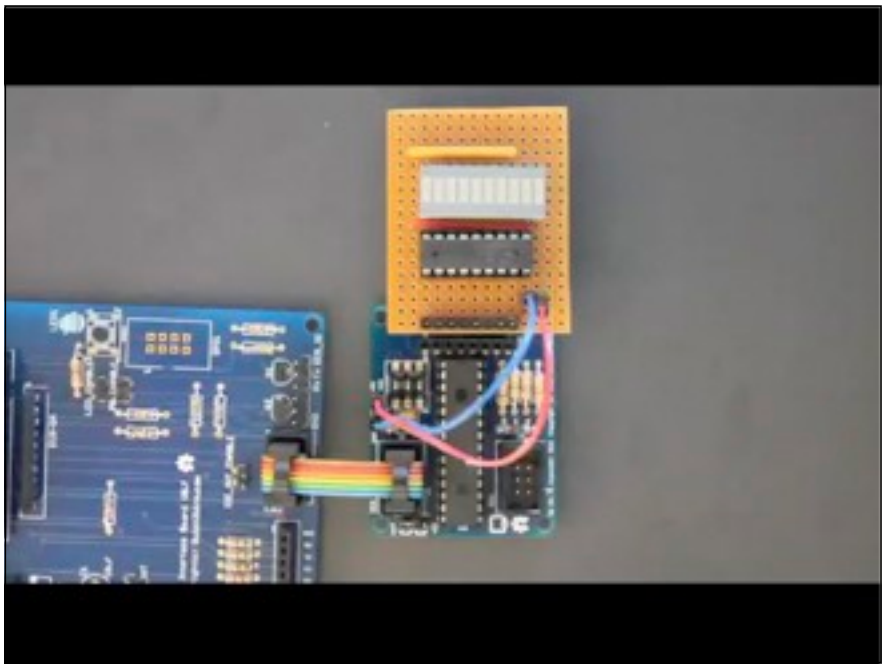
I²C

More GPIO
- many LEDs, single process
- many LEDS, multiple processes

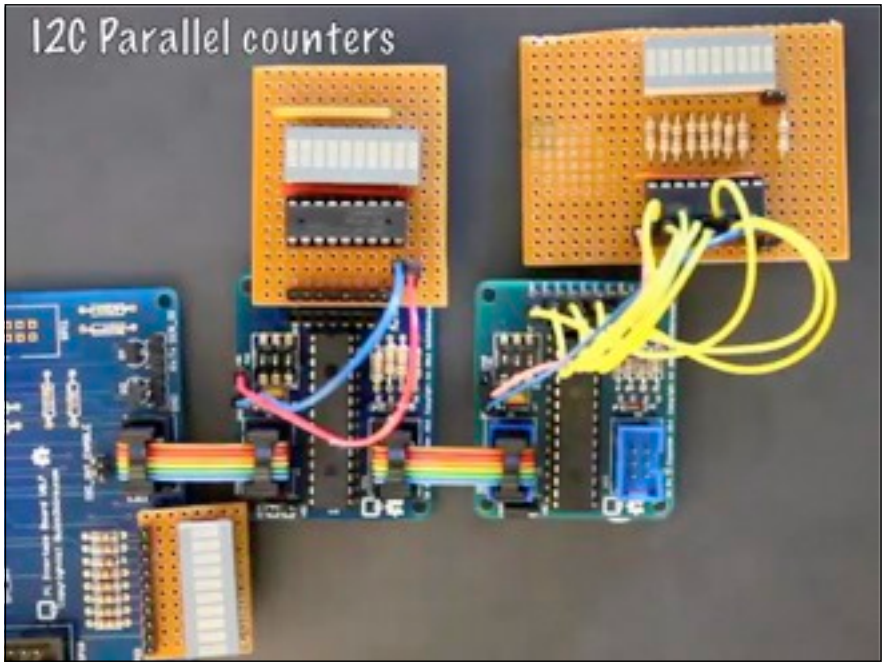
Analogue

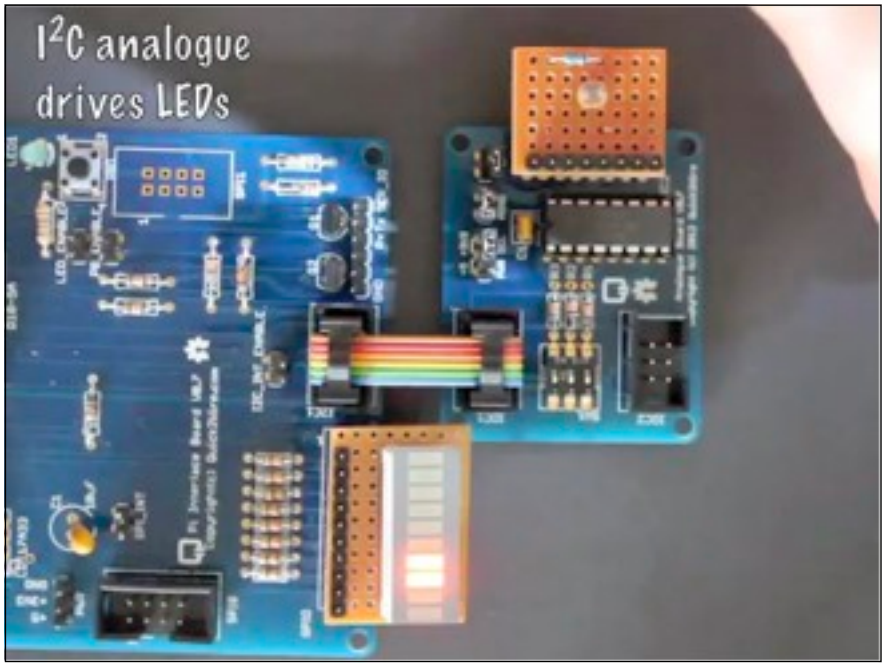


```
with i2c.I2CMaster() as bus:
  pe = PortExpander(bus, address)
  pe.set_iodir_b(0x00)
  pe.clear_gpio_b()
  try:

    for count in cycle(range(256)):
      pe.set_gpio_b(count)
      sleep(0.1)

  finally:
    pe.clear_gpio_b()
```





```
with closing(i2c.I2CMaster()) as master:
    pcf = PCF8591(master, FOUR_SINGLE_ENDED)
    gpio_pins = [pins.pin(i, Out) for i in range(8)]
    display = AnalogueDisplay(1.0, *gpio_pins)
    ain3 = pcf.single_ended_input(3)

    for pin in gpio_pins: pin.open()
    try:

      while(True): display.display(ain3.value)

    finally:
      display.display(63)
      for pin in gpio_pins: pin.close()
```

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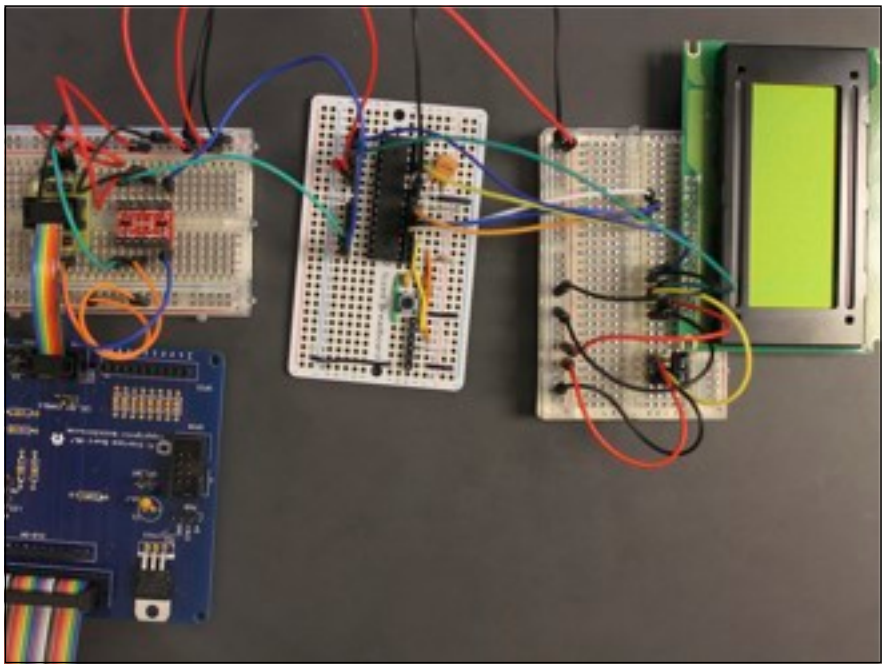
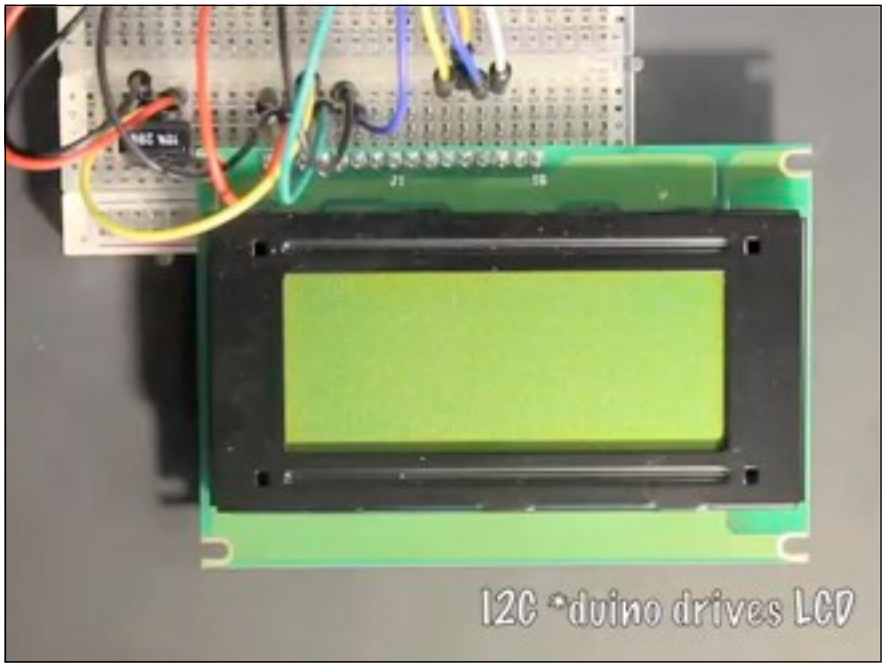
Pi and *duino

Drive an LCD





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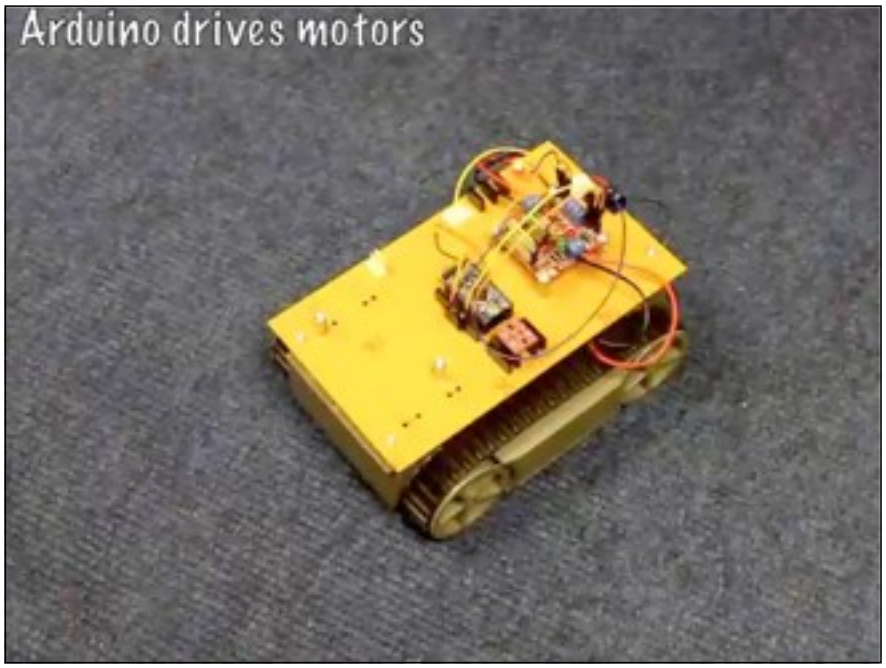
Pi, Arduino, and Robot

Drive motors
IR Sensor
Servo + Ultrasonic Ranger



What worked

Increments

Testing

OCD

Pairing

Fun

What didn't work

1 full-time
8 part-time
7 time zones

Become a maker

You can build...

- a robot
- a weather station
- a 3D printer
- ...

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Easy, fun, affordable

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Tomorrow you can...

Reuse designs

Read guides and tutorials

Buy kits and components

Start to catch up with the 12-year olds