

التدريب الصيفي 2
SUMMER TRAINING 2

التدريب التقني المتقدم لمعمل إنترنت الأشياء

لصيف ١٤٤١ هـ - ٢٠٢٠

يوم الثلاثاء 2020/06/16

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References

- <https://www.arduino.cc/reference/en/>



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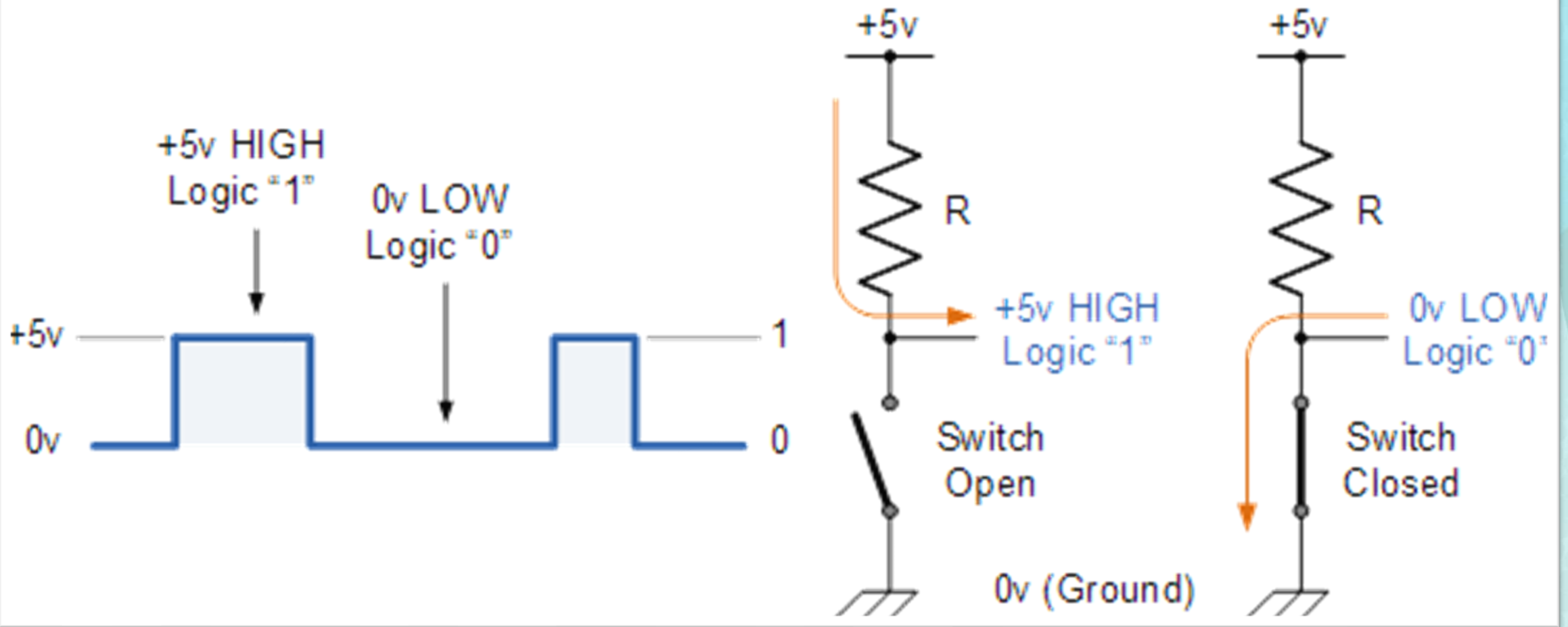
First of all

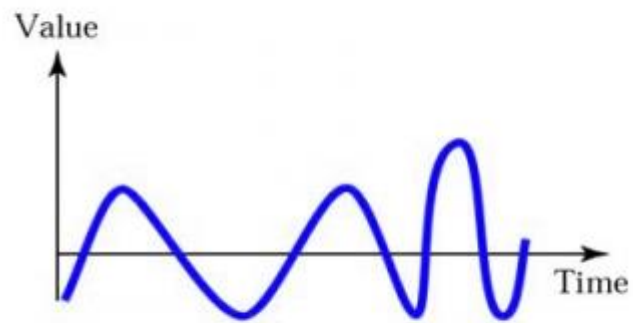
- Is there any questions regarding the past presentations?



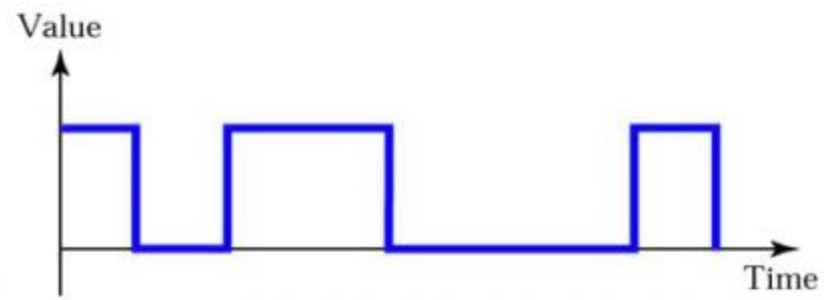
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Analog signal



Digital signal



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Arduino programming (Continued)

- Arduino reference
- DigitalRead()
- AnalogRead()
- AnalogWrite()



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Protocols

- In embedded systems world, there are many low level protocols.
- Most known and used ones are UART, SPI and I2C

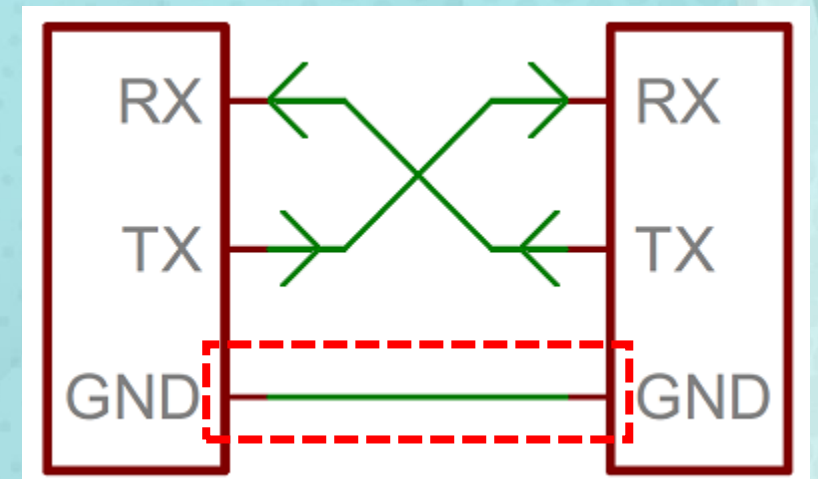
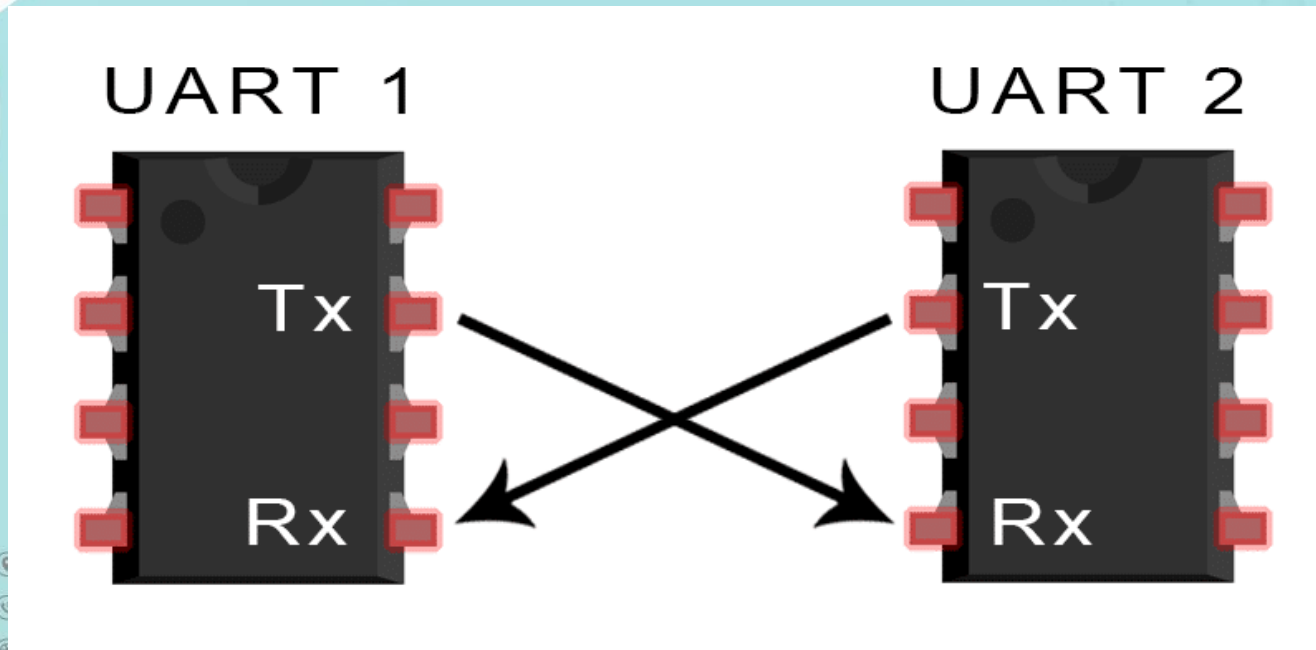


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UART (Serial)

- UART (known as **Serial**) has 2 main signals, Tx and Rx
- Tx for Transmit (Output), Rx for receive (Input)



USB to UART dongle

- There are USB dongles that emulate UART to make it available to PC.
- Or it could be integrated on the device board itself.
- You can find which port the dongle is using by checking Windows device manager.

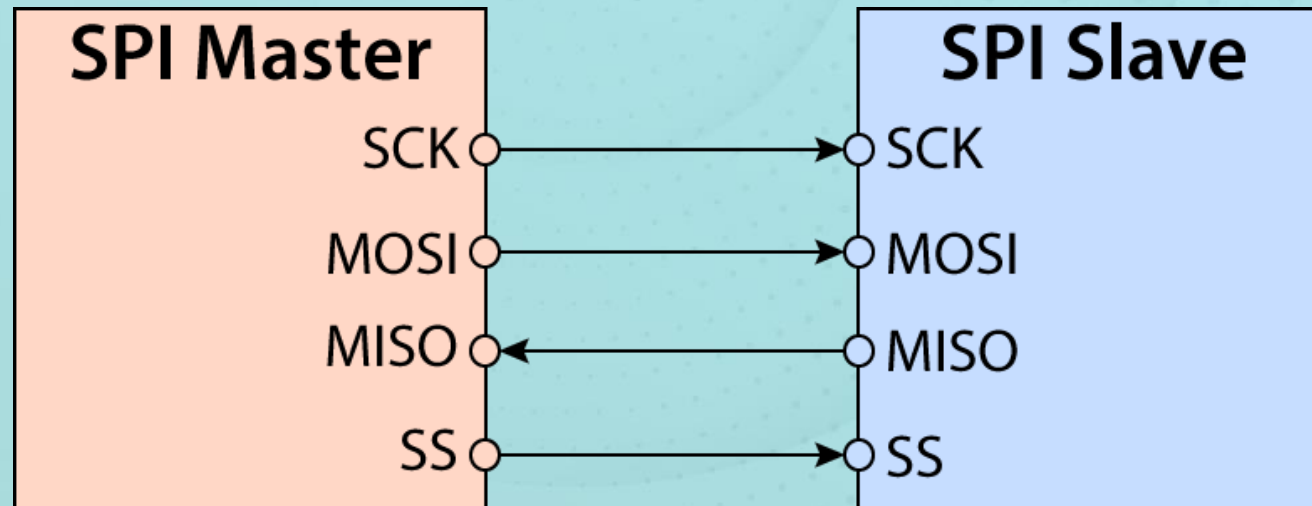


✓ Ports (COM & LPT)

- Standard Serial over Bluetooth link (COM6)
- Standard Serial over Bluetooth link (COM7)
- USB-SERIAL CH340 (COM18) ←

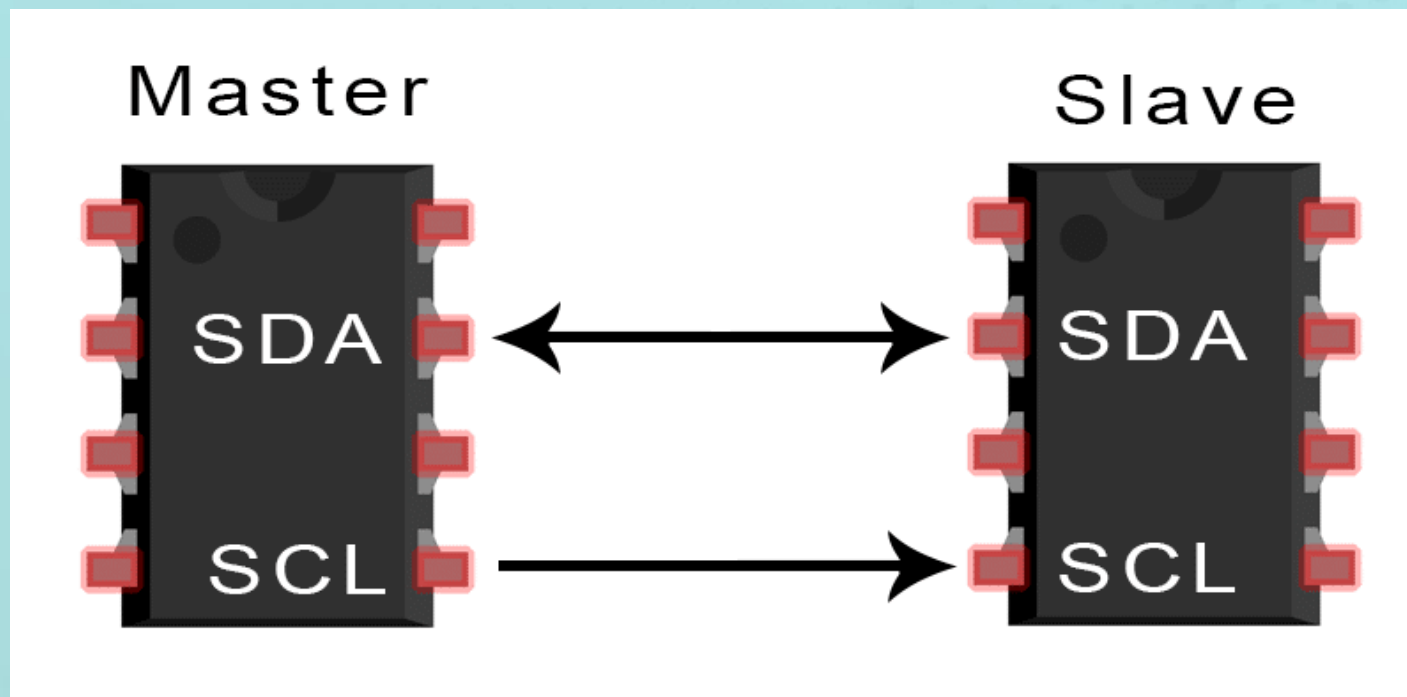
SPI

- Has three main signals: SCK, MOSI, MISO.
- MOSI: Master-Out Slave-In
- MISO: Master-In Slave-Out
- SCK is clock line



I2C (I²C)

- I2C needs 2 signals only (Don't forget GND!)
- SDA is data line
- SCL is clock line



JSON

JavaScript Object Notation (JSON) is an [open standard file format](#), and data interchange format, that uses [human-readable](#) text to store and transmit data objects (Wikipedia)

```
"firstName": "John",
"lastName": "Smith",
"isAlive": true,
"age": 27,
"address": {
  "streetAddress": "21 2nd Street",
  "city": "New York",
  "state": "NY",
  "postalCode": "10021-3100"
},
"phoneNumbers": [
  {
    "type": "home",
    "number": "212 555-1234"
  },
  {
    "type": "office",
    "number": "646 555-4567"
  }
],
"children": [],
"spouse": null
}
```



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Tasks

- Read Button state
- Arduino voltmeter
- Serial plotter
- On Button Pressed LED\DC Motor pulses using Arduino



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