


**Science &
Engineering**

science - technology - engineering - mathematics
STEM π

Bart Huyskens

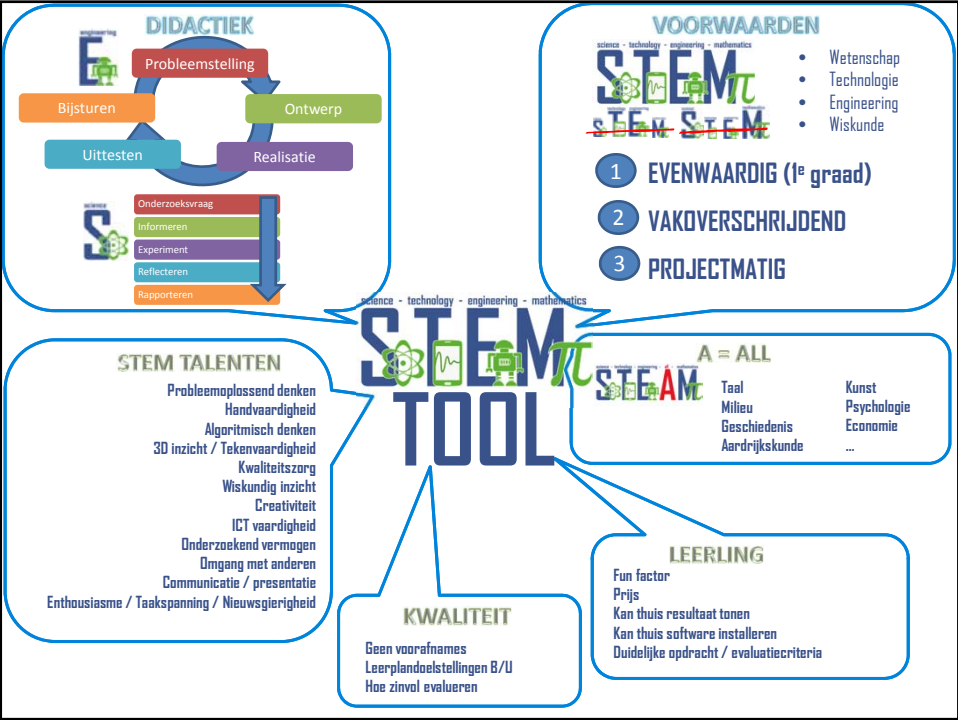
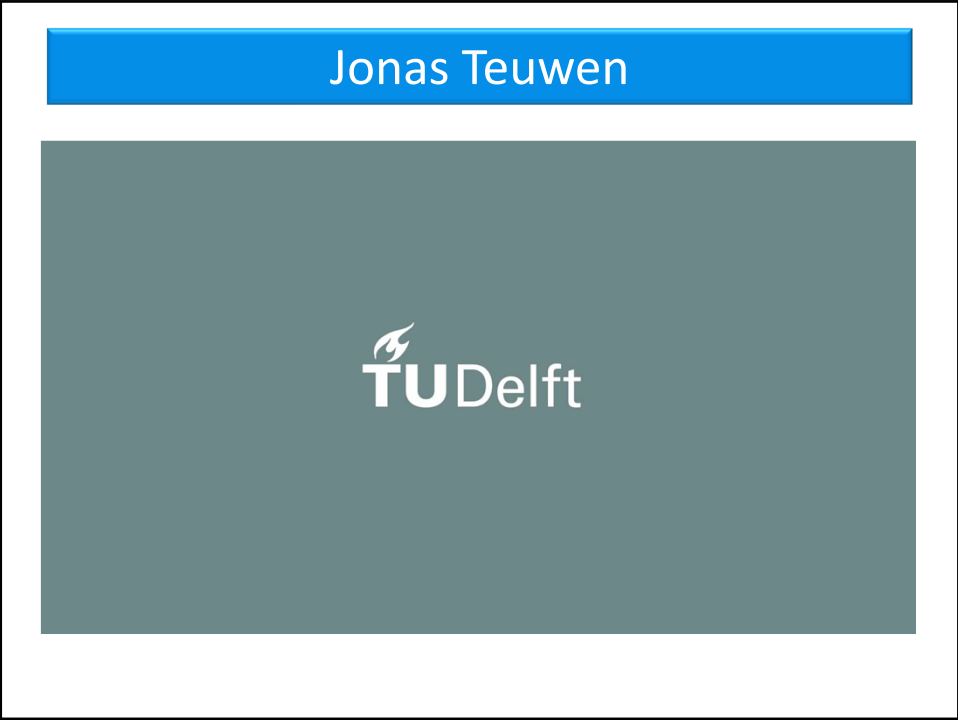
De link tussen
wetenschap en
engineering

Een uurtje
inspiratie



Bart Huyskens

- barthuyskens@telenet.be
- Leraar Elektronica & ICT Schoten
- Ontwikkeling STEM hardware / software
- www.e2cre8.be – www.stemzone.be
- Geen woordvoerder voor



Engineer vs Scientist



Engineering<-> Science



- Eindresultaat = product → productie , omzet, werkgelegenheid, ...

- Eindresultaat = besluit/ theorie / idee / publicatie / hypothese

Te weinig aandacht voor nieuwe wetenschappelijke evoluties

Te weinig aandacht voor de stappen na het 'besluit'



Zelf apps maken



MIT
APP INVENTOR

thinkable

<https://x.thunkable.com/>
<http://app.thunkable.com/>

Kodular

Appy Builder

Ideeën, videolessen en uitgewerkte voorbeelden

via www.stemzone.be >>

- Apps maken eerste graad
- Apps maken tweede graad
- Apps maken derde graad

Oppassen met:

- Online schema's
- Online lesmateriaal
- Online software



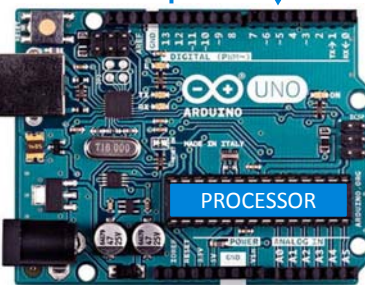
- Miljoenen gebruikers
 - Community
 - Veel materiaal
- Goedkoop:
 - 25-30€ Eu
 - 10€ China

DIGITALE
OUTPUTS
0V/5V

DIGITALE
INPUTS
0V/5V



SERIELE COMMUNICATIE
RS232 – I2C - SPI



ANALOGIE
INPUTS
0V tot 5V

Atmel
MICROCHIP

Code:

```

// Constants do not change during the program
const int OUT_PIN = 4;

// this setup function runs once when you press reset or power the board
void setup()
{
  // initialize digital pin as output
  pinMode(OUT_PIN, OUTPUT);
}

// this loop function runs over and over again forever
void loop()
{
  digitalWrite(OUT_PIN, HIGH); // make pin high
  delay(1000); // wait for 1sec
  digitalWrite(OUT_PIN, LOW); // on Buzzer pin - generate 500Hz signal - f
  delay(1000); // wait for 1sec
  digitalWrite(OUT_PIN, LOW); // make pin low
}


```

Flowchart:

```

graph TD
    Start([BEGIN]) --> CallMacro[Call Component Macro  
X=pot_ptr_black1::GetByte()]
    CallMacro --> Decision{Decision  
If (X < 100) & (X > 50) ?}
    Decision -- Yes --> Output1[Output  
1 -> B3]
    Decision -- No --> Output2[Output  
0 -> B3]
    Output1 --> End([END])
    Output2 --> End

```



Code:

```

// Constants do not change during the program
const int OUT_PIN = 4;

// this setup function runs once when you press reset or power the board
void setup()
{
  // initialize digital pin as output
  pinMode(OUT_PIN, OUTPUT);
}

// this loop function runs over and over again forever
void loop()
{
  digitalWrite(OUT_PIN, HIGH); // make pin high
  delay(1000); // wait for 1sec
  digitalWrite(OUT_PIN, LOW); // on Buzzer pin - generate 500Hz signal - f
  delay(1000); // wait for 1sec
  digitalWrite(OUT_PIN, LOW); // make pin low
}

```

Flowchart:

```

graph TD
    Start([BEGIN]) --> CallMacro[Call Component Macro  
X=pot_ptr_black1::GetByte()]
    CallMacro --> Decision{Decision  
If (X < 100) & (X > 50) ?}
    Decision -- Yes --> Output1[Output  
1 -> B3]
    Decision -- No --> Output2[Output  
0 -> B3]
    Output1 --> End([END])
    Output2 --> End

```

Arduino Uno:

- 1led
- No buzzer
- No servo

Specifications:

- USB PS
- 6Vbatt
- 12VBatt
- 4xAA

Processor:

- ?China processor
- ?China USB proc.
- Enkel 25mA out
- PS:150mA@5V
- Enkel breadboard

Arduino Pro Mini:

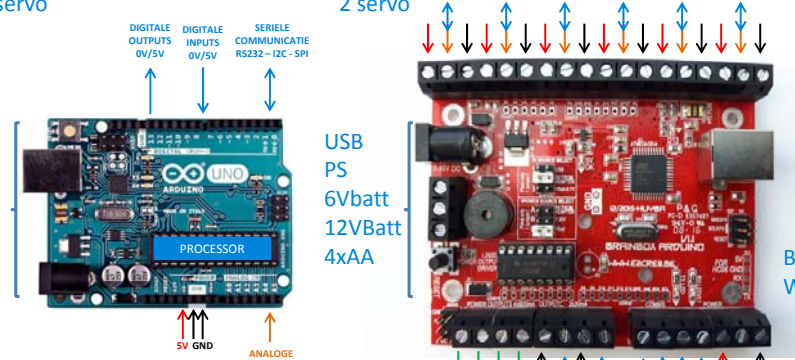
- 3 leds
- 1 buzzer
- 2 servo

Specifications:

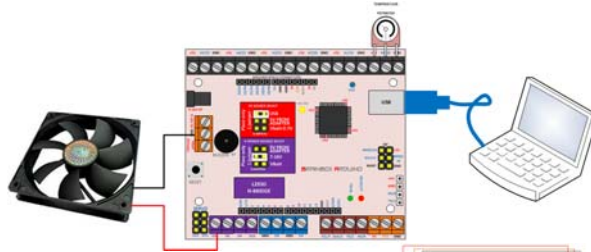
- USB PS
- 6Vbatt
- 12VBatt
- 4xAA

Processor:

- 100% EU processor
- No USB processor
- 4x 600mA out @5-24V
- PS:500mA@5V
- Breadboard + schroef



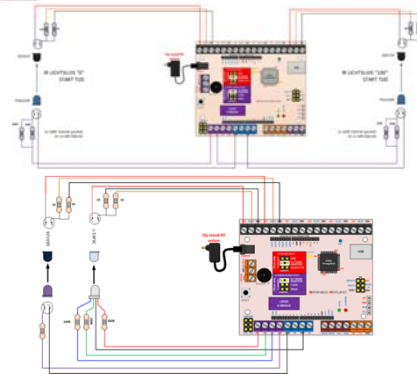
Arduino project



Ideeën, lesmateriaal en uitgewerkte voorbeelden

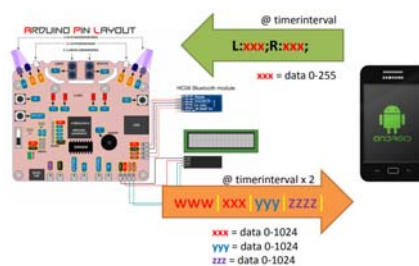
via www.stemzone.be >>

- Brainbox AVR (Arduino)
- Traagheid oog – gehoorschade
- IR component zonlicht -
- Tijd en Snelheid
- Spectrometer



App <-> Arduino Bluetooth

- Demo met BBR



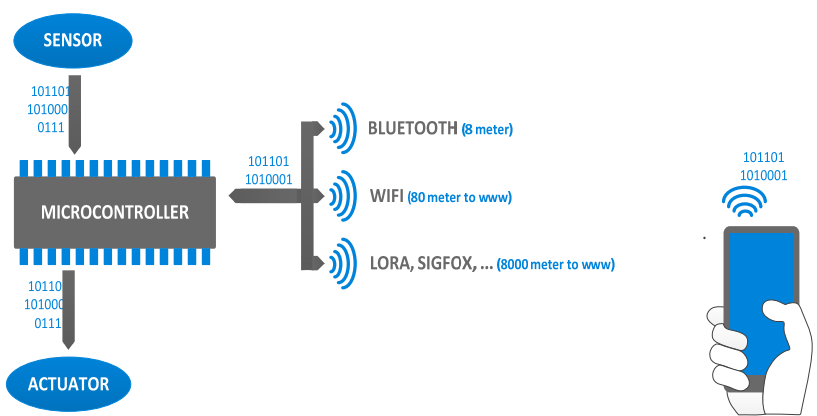
Ideeën, lesmateriaal en uitgewerkte voorbeelden

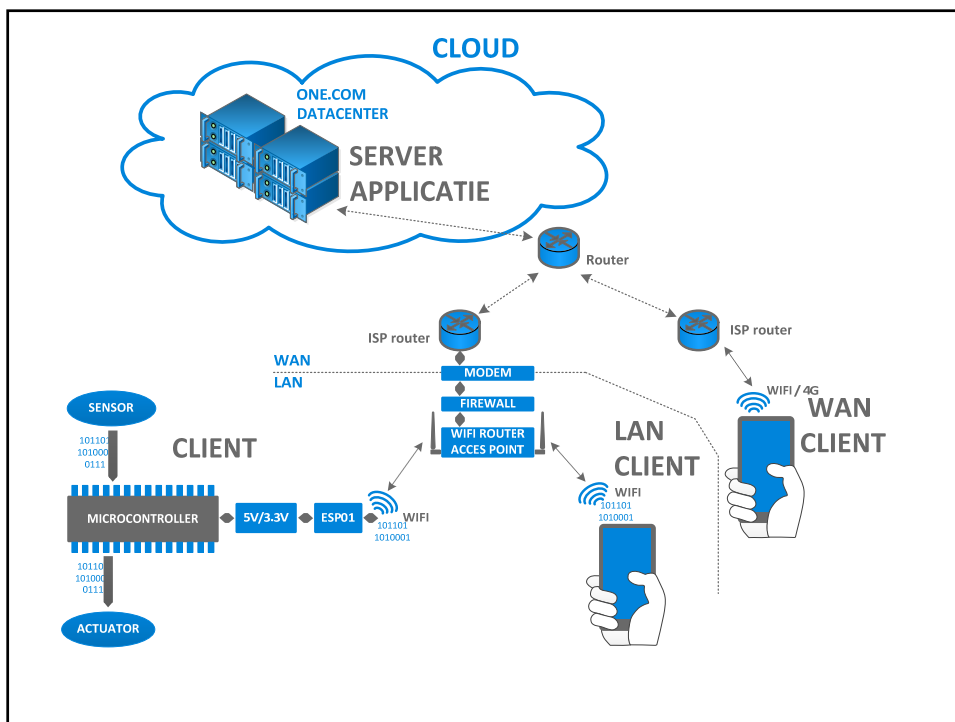
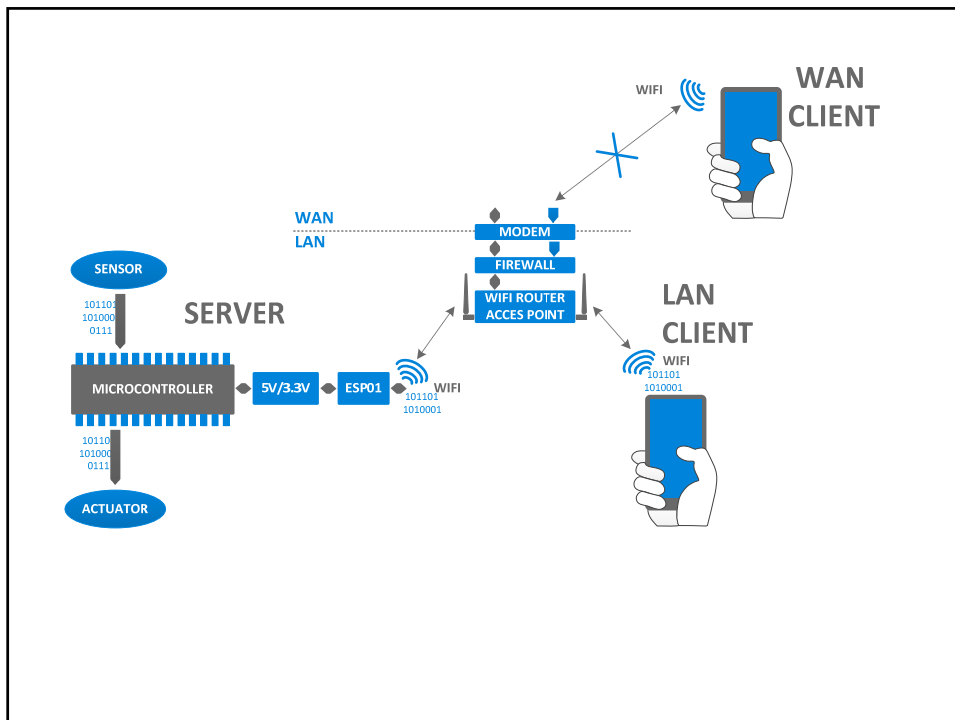
via www.stemzone.be >>

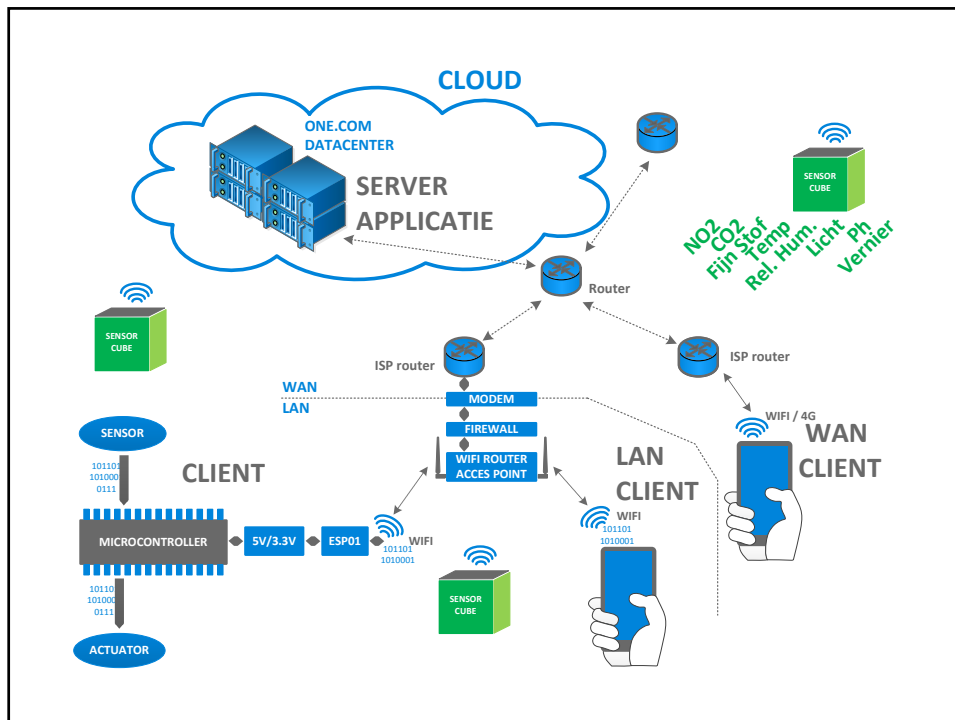
- Brainbox AVR (Arduino)
- Smartcar



IOT op scholen







Nascholingen

- **www.stemzone.be >> NASCHOLING**
 - Zelf Apps maken
 - Sturen en meten met Arduino voor eerste graad
 - Sturen en meten met Arduino voor tweede graad
 - Sturen en meten met Arduino voor derde graad
 - Sturen en meten met apps
 - Wat is STEM
 - Basiselektronica
 - Internet of Things
 - Embedded C voor Arduino/AVR...