

Teensy les 1

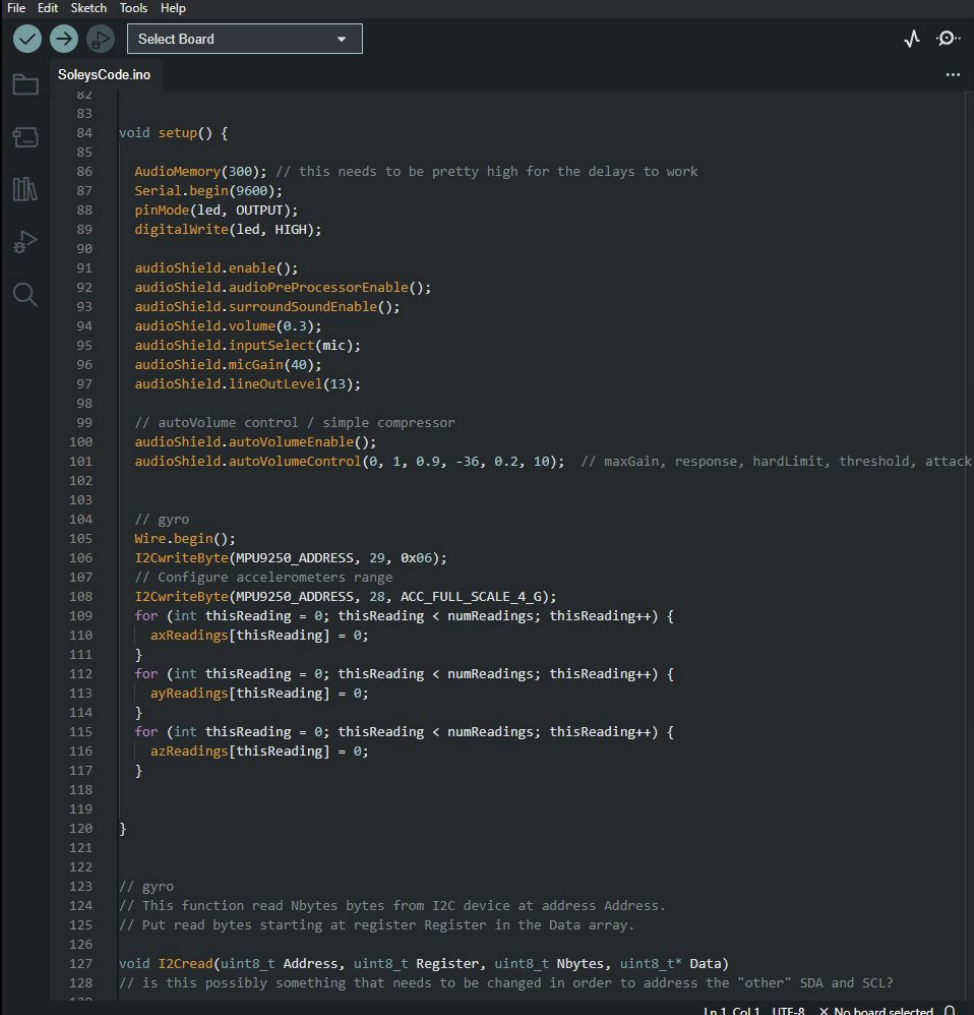
Teensy workflow



- Gecompileerde code vanuit Arduino IDE
- Seriële communicatie van en naar Teensy

Arduino IDE

- Software schrijven
- Software compileren
- Gecompileerde software uploaden
- Seriële communicatie met micro-controller



```
File Edit Sketch Tools Help
Select Board
SoleysCode.ino
82
83
84 void setup() {
85
86   AudioMemory(300); // this needs to be pretty high for the delays to work
87   Serial.begin(9600);
88   pinMode(led, OUTPUT);
89   digitalWrite(led, HIGH);
90
91   audioShield.enable();
92   audioShield.audioPreProcessorEnable();
93   audioShield.surroundSoundEnable();
94   audioShield.volume(0.3);
95   audioShield.inputSelect(mic);
96   audioShield.micGain(40);
97   audioShield.lineOutLevel(13);
98
99   // autoVolume control / simple compressor
100  audioShield.autoVolumeEnable();
101  audioShield.autoVolumeControl(0, 1, 0.9, -36, 0.2, 10); // maxGain, response, hardLimit, threshold, attack
102
103
104  // gyro
105  Wire.begin();
106  I2CwriteByte(MPU9250_ADDRESS, 29, 0x06);
107  // Configure accelerometers range
108  I2CwriteByte(MPU9250_ADDRESS, 28, ACC_FULL_SCALE_4_G);
109  for (int thisReading = 0; thisReading < numReadings; thisReading++) {
110    axReadings[thisReading] = 0;
111  }
112  for (int thisReading = 0; thisReading < numReadings; thisReading++) {
113    ayReadings[thisReading] = 0;
114  }
115  for (int thisReading = 0; thisReading < numReadings; thisReading++) {
116    azReadings[thisReading] = 0;
117  }
118
119 }
120
121
122
123 // gyro
124 // This function read Nbytes bytes from I2C device at address Address.
125 // Put read bytes starting at register Register in the Data array.
126
127 void I2Cread(uint8_t Address, uint8_t Register, uint8_t Nbytes, uint8_t* Data)
128 // is this possibly something that needs to be changed in order to address the "other" SDA and SCL?
129
```

Ln 1, Col 1 UTF-8 X No board selected

Arduino IDE

Javascript:

- Draait in browser in Runtime
- ; wordt vergeven
- Datatype is fluide (altijd let)
- `console.log("hoi")`

Arduino (C):

- Draait gecompileerd op micro-controller
- ; wordt niet vergeven
- Datatype staat vast (van te voren aangeven welk type)
- `Serial.begin(9600);`
in `setup()` en later:
`Serial.println("hoi");`

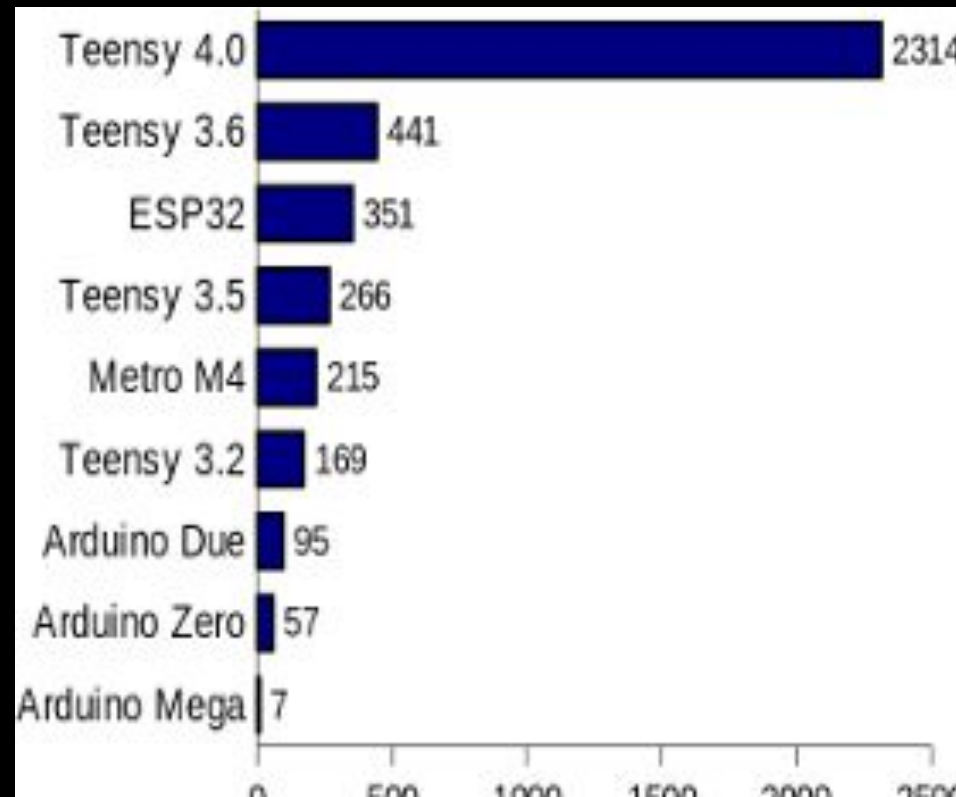
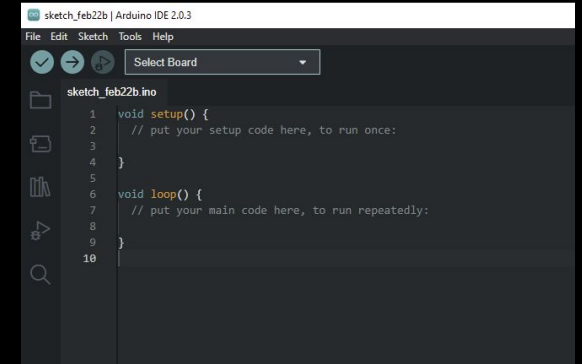
Datatypes in Arduino

Type	Bereik	Voorbeeld declaratie
int	-32768 tot 32767	<code>int numLEDs = 5;</code>
float	-3.4028235E+38 tot 3.4028235E+38	<code>float maxHumanBodyTemp = 37.2;</code>
boolean	true false	<code>bool ledIsOn = false;</code>
byte	0 tot 255	<code>byte redChannel = 0;</code>

Arduino IDE

In Javascript/p5
function setup()
function draw()

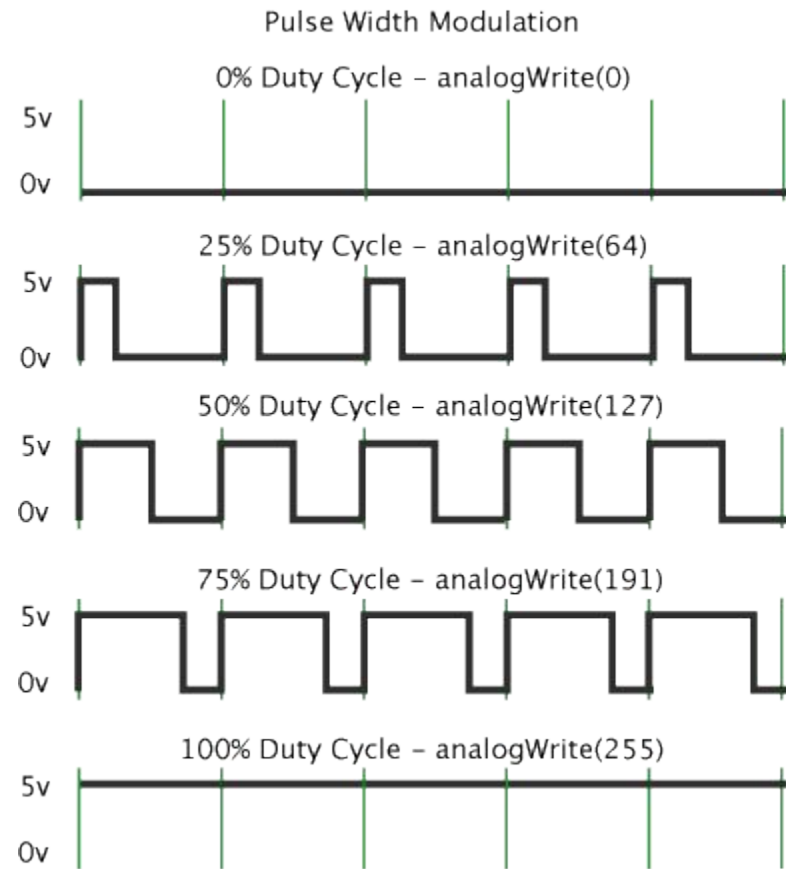
In Arduino C
void setup()
void loop()



Arduino basisfuncties

functie	werking
<code>pinMode(pin, modus)</code>	Stelt de werking van een fysieke pin in op <code>INPUT</code> , <code>INPUT_PULLUP</code> of <code>OUTPUT</code>
<code>digitalWrite(pin, state)</code>	Zet spanning op een pin <code>LOW</code> of <code>HIGH</code> (0v of 3.3v (5v op Arduino))
<code>digitalRead(pin)</code>	Leest spanning op pin (<code>HIGH</code> of <code>LOW</code> / 1 of 0)
<code>analogRead(pin)</code>	Leest voltage op pin (waarde tussen 0 en 1023 / 0v en 3.3v)
<code>analogWrite(pin, byte)</code>	Zet variabel voltage op pin d.m.v. PWM
<code>delay(ms)</code>	Zet gehele microcontroller op pauze voor x-aantal milliseconden

Arduino analogWrite()



Pinout lezen

Welcome to Teensy® 4.0

32 Bit Arduino-Compatible Microcontroller

To begin using Teensy, please visit the website & click [Getting Started](http://www.pjrc.com/teensy).

www.pjrc.com/teensy

Digital Pins
digitalRead
digitalWrite
pinMode

Analog Pins
analogRead

PWM Pins
analogWrite


Digital Audio
Audio Library

Serial Ports
Serial1 - Serial7

I²C Port
Wire Library

SPI Port
SPI Library

CAN Bus
FlexCAN_t4
Library



Pinout diagram showing the Teensy 4.0 board with various pins labeled. The board is shown from a top-down perspective with pins numbered 0 to 23. Labels include: Vin (3.6 to 5.5 volts), 3.3V (250 mA max), GND, 3V, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23. Specific pin functions are labeled: MCLK1, BCLK1, LRCLK1, CRX1, CTX1, RX5, TX5, SCL0, SDA0, SDA1, SCL1, S/PDIF IN, S/PDIF OUT, CRX1, RX1, TX1, RX2, TX2, CS, MOSI, MISO, RX1, TX1, RX2, TX2, CS, MOSI, MISO, CRX2, CTX2, OUT2, LRCLK2, BCLK2, IN2, OUT2, OUT1A, IN1, OUT1C, MOSR, CTX1, MOSL, RX1, TX1, RX2, TX2, CS, MOSI, MISO, CRX1, CTX1, OUT1, LRCLK1, BCLK1, IN1, OUT1, MOSR, CTX1, MOSL, CRX1, CTX1, OUT1, LRCLK1, BCLK1, IN1, OUT1, MOSR, CTX1, MOSL.

Red LED
Loading Status
dim: Ready
bright: Writing
blink: No USB

On/Off
Program
GND
3.3V
VBat

All digital pins have
interrupt capability.

Arduino IDE Seriële communicatie

In void setup()

```
Serial.begin(9600);
```

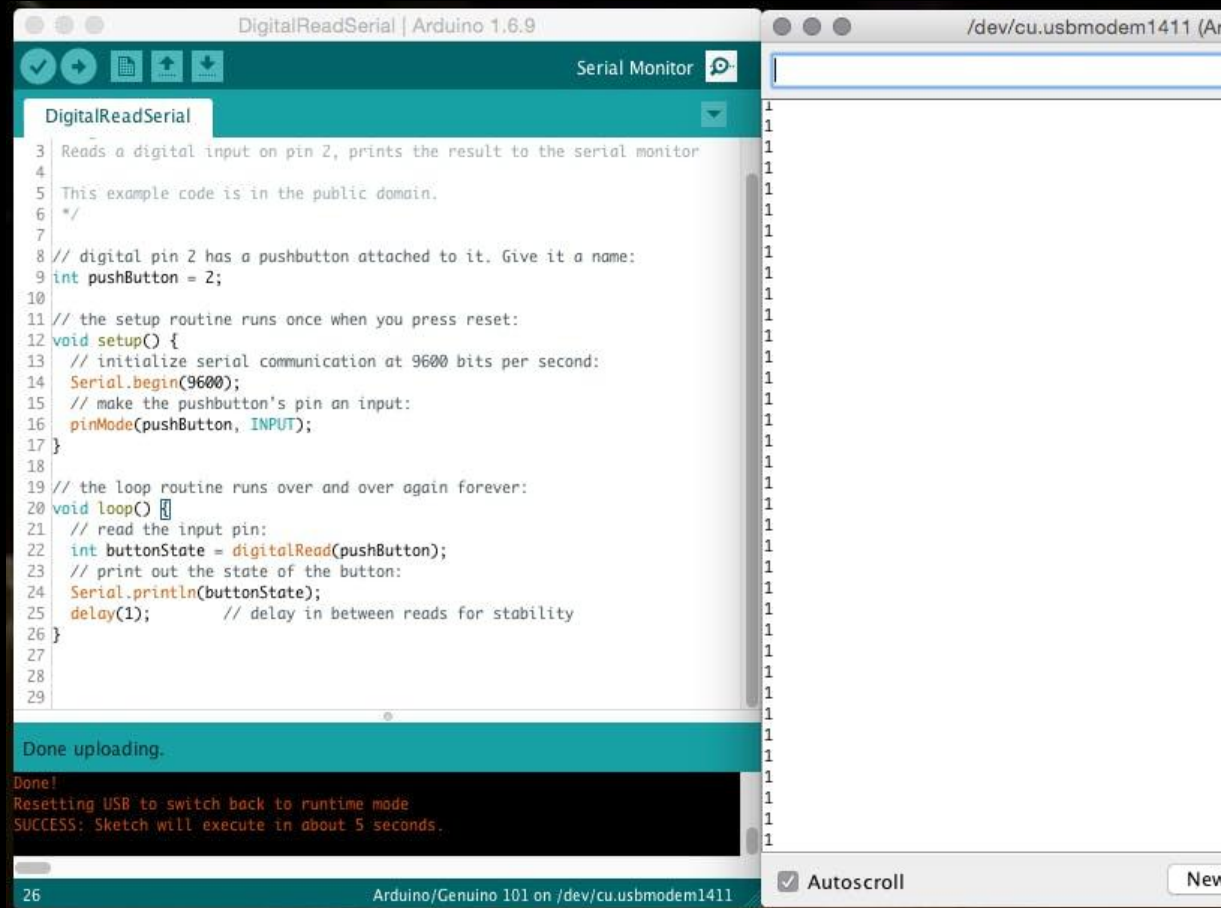
Daarna in bijv. loop()

```
Serial.println("hoi");
```

```
Serial.println(analogRead(4));
```

```
Serial.println("Value of potmeter on pin " + String(potPin) + " is now " + String(analogRead(potPin)));
```

Arduino IDE Seriële monitor

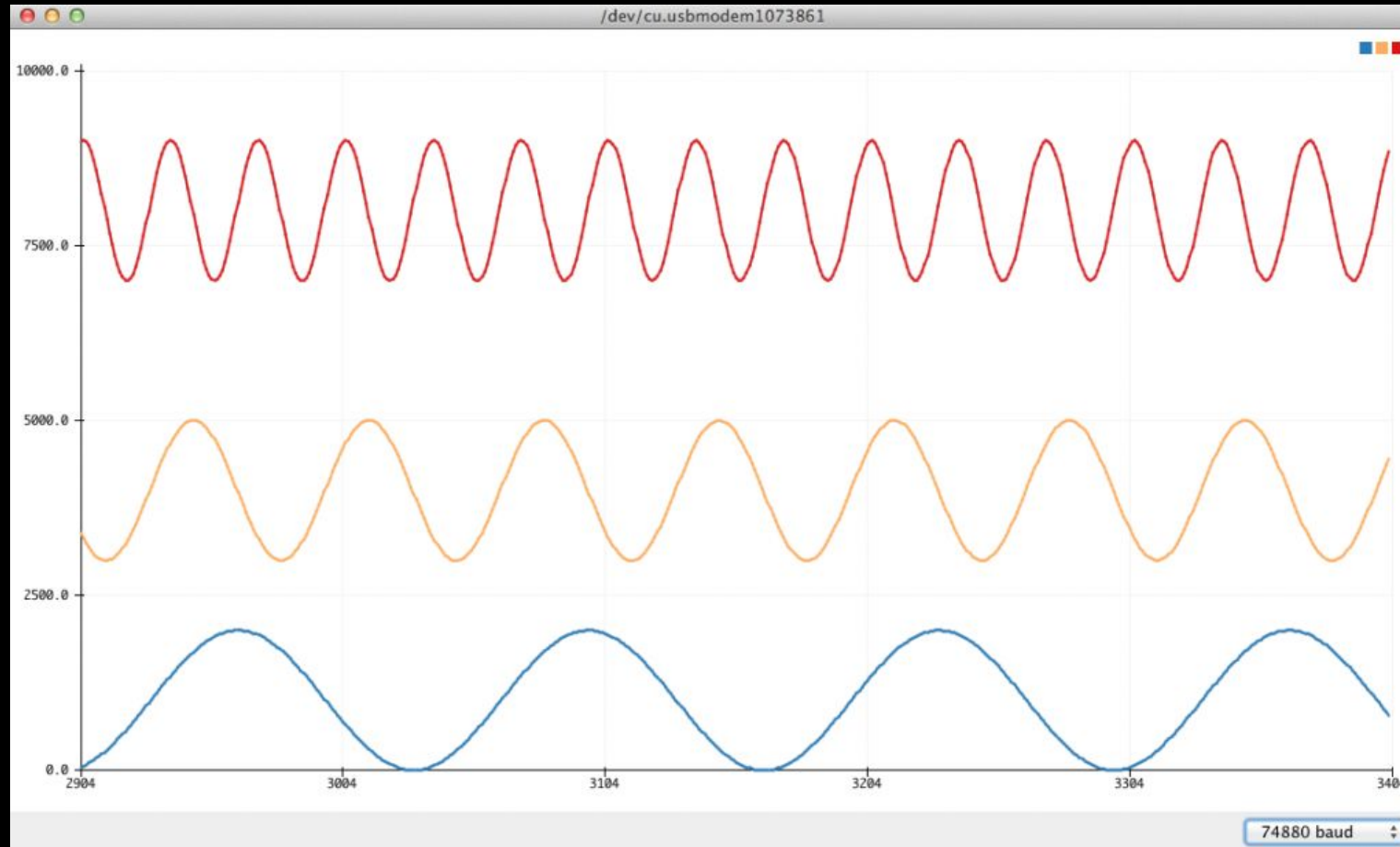


The image shows the Arduino IDE interface with the Serial Monitor window open. The code in the editor is as follows:

```
3 Reads a digital input on pin 2, prints the result to the serial monitor
4
5 This example code is in the public domain.
6 */
7
8 // digital pin 2 has a pushbutton attached to it. Give it a name:
9 int pushButton = 2;
10
11 // the setup routine runs once when you press reset:
12 void setup() {
13   // initialize serial communication at 9600 bits per second:
14   Serial.begin(9600);
15   // make the pushbutton's pin an input:
16   pinMode(pushButton, INPUT);
17 }
18
19 // the loop routine runs over and over again forever:
20 void loop() {
21   // read the input pin:
22   int buttonState = digitalRead(pushButton);
23   // print out the state of the button:
24   Serial.println(buttonState);
25   delay(1);      // delay in between reads for stability
26 }
27
28
29
```

The Serial Monitor window on the right shows the output of the code, which consists of a series of '1's, indicating that the button is pressed. The status bar at the bottom of the IDE shows '26 Arduino/Genuino 101 on /dev/cu.usbmodem1411' and the 'Autoscroll' checkbox is checked.

Arduino IDE Seriële plotter



Arduino installeren (1/2)

Downloads



Arduino IDE 2.0.3

The new major release of the Arduino IDE is faster and even more powerful! In addition to a more modern editor and a more responsive interface it features autocompletion, code navigation, and even a live debugger.

For more details, please refer to the [Arduino IDE 2.0 documentation](#).

Nightly builds with the latest bugfixes are available through the section below.

SOURCE CODE

The Arduino IDE 2.0 is open source and its source code is hosted on [GitHub](#).

DOWNLOAD OPTIONS

Windows Win 10 and newer, 64 bits

Windows MSI installer

Windows ZIP file

Linux AppImage 64 bits (X86-64)

Linux ZIP file 64 bits (X86-64)

macOS Intel, 10.14: "Mojave" or newer, 64 bits

macOS Apple Silicon, 11: "Big Sur" or newer, 64 bits

[Release Notes](#)


Teensyduino installeren (2/2)

Arduino 2.0.x Software Development

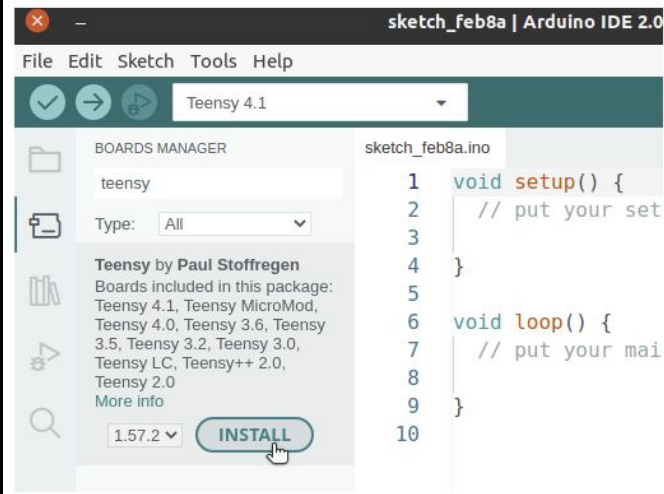
To install Teensy on Arduino IDE 2.0, click File > Preferences. In "Additional boards manager URLs", copy this link:

https://www.pjrc.com/teensy/package_teensy_index.json

Verify code after upload
 Auto save
 Editor Quick Suggestions

Additional boards manager URLs: 

In the main Arduino window, open Boards Manager by clicking the left-side board icon, search for "teensy", and click "Install".



Demonstratie