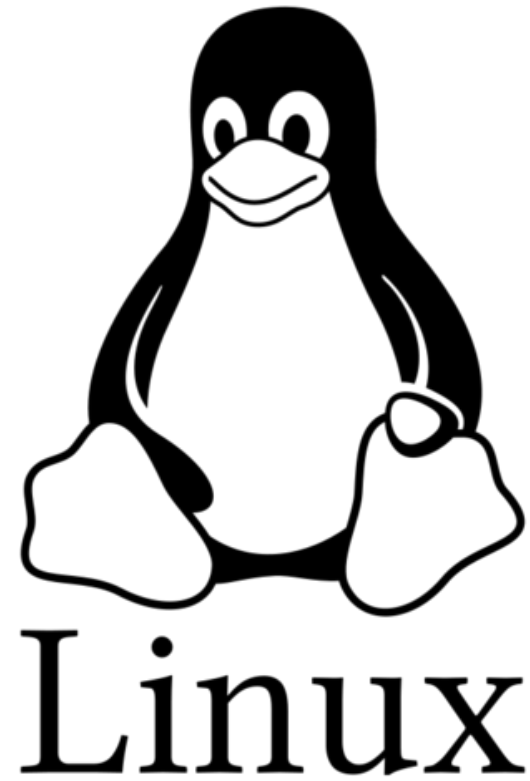


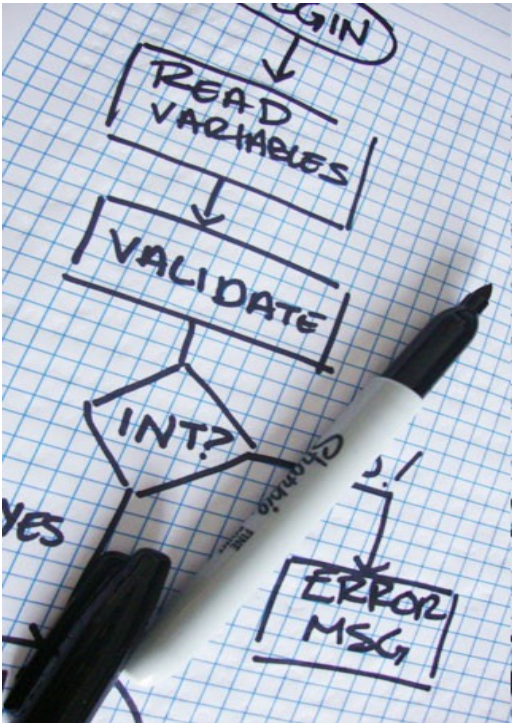
Arduino + Linux



Arduino



Cos'e' Arduino?



Core

```
Blink | Arduino 1.0
File Edit Sketch Tools Help

Blink
/*
 * Blink
 * Turns on an LED on for one second, then off for one second, repeatedly.
 * This example code is in the public domain.
 */

void setup() {
  // initialize the digital pin as an output.
  // Pin 13 has an LED connected on most Arduino boards:
  pinMode(13, OUTPUT);
}

void loop() {
  digitalWrite(13, HIGH); // set the LED on
  delay(1000);           // wait for a second
  digitalWrite(13, LOW); // set the LED off
  delay(1000);           // wait for a second
}

1 Arduino Uno on /dev/ttyACM1
```

A screenshot of the Arduino IDE interface. The window title is 'Blink | Arduino 1.0'. The menu bar includes 'File', 'Edit', 'Sketch', 'Tools', and 'Help'. The code editor shows the standard Blink sketch code. The status bar at the bottom indicates '1 Arduino Uno on /dev/ttyACM1'.

IDE



Hardware

OpenHardware

Documentation

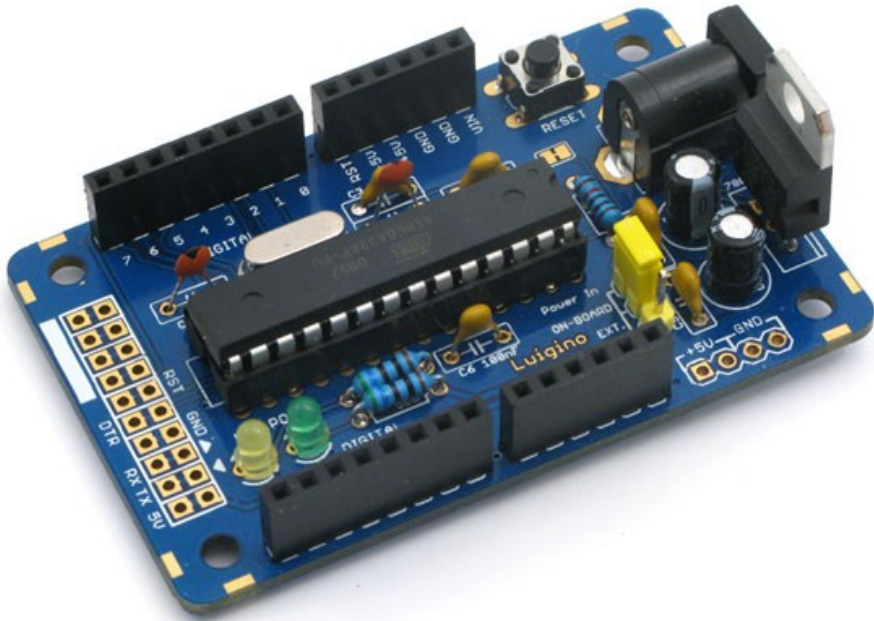
OSH: Schematics, Reference Design, Board size

The Uno is open-source hardware! You can build your own board using the following files:

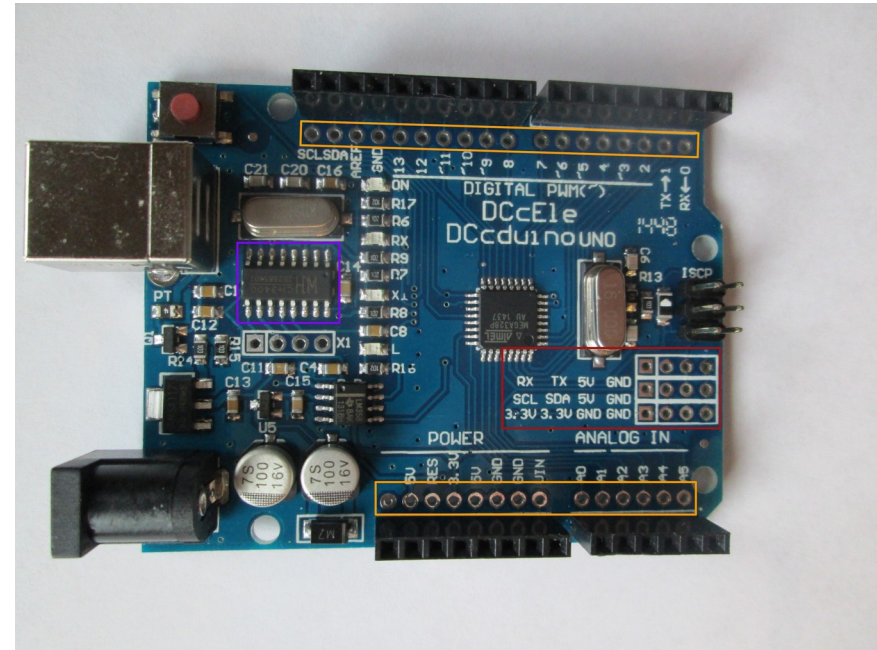


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- Modifiche e miglioramenti
- Concorrenza

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Luigino



DCduino

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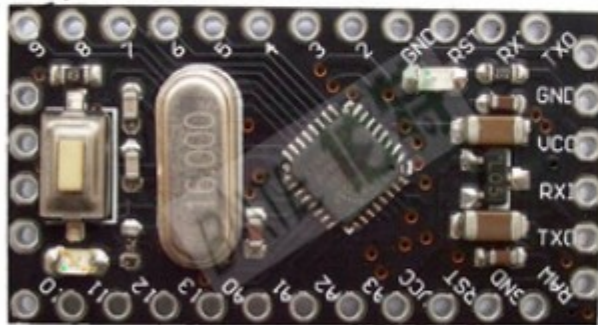


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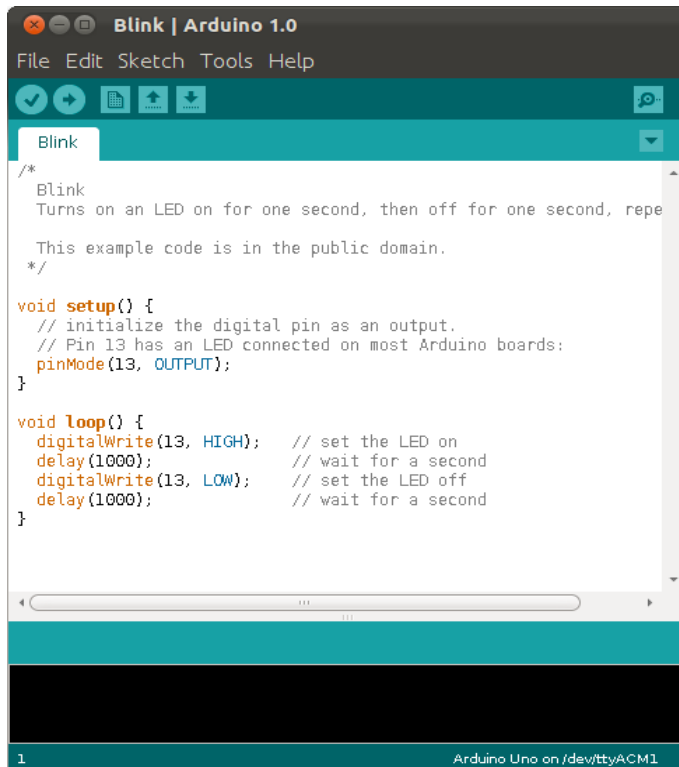
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Open Source



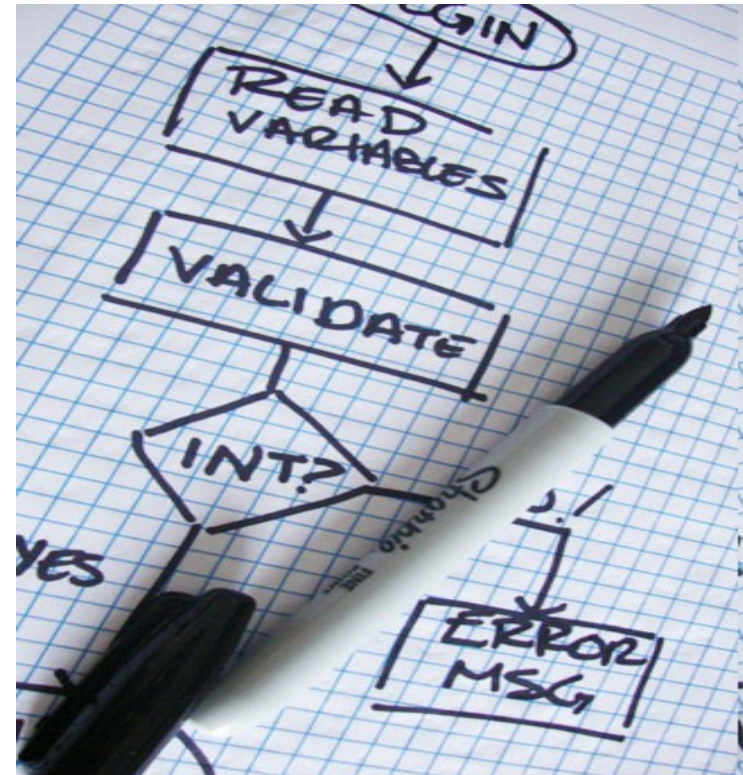
- Modificabile
- Nuove feature
- Nuove librerie
- Portabile su altre architetture

Open Source



```
Arduino 1.0
File Edit Sketch Tools Help
Blink
/*
 * Blink
 * Turns on an LED on for one second, then off for one second, repeatedly.
 *
 * This example code is in the public domain.
 */
void setup() {
  // initialize the digital pin as an output.
  // Pin 13 has an LED connected on most Arduino boards:
  pinMode(13, OUTPUT);
}
void loop() {
  digitalWrite(13, HIGH); // set the LED on
  delay(1000);           // wait for a second
  digitalWrite(13, LOW); // set the LED off
  delay(1000);           // wait for a second
}
1 Arduino Uno on /dev/ttyACM1
```

IDE



Core

Arduino Core

```
int ledPin = 13; // LED connected to digital pin 13

// The setup() method runs once, when the sketch starts

void setup() {
  // initialize the digital pin as an output:
  pinMode(ledPin, OUTPUT);
}

// the loop() method runs over and over again,
// as long as the Arduino has power

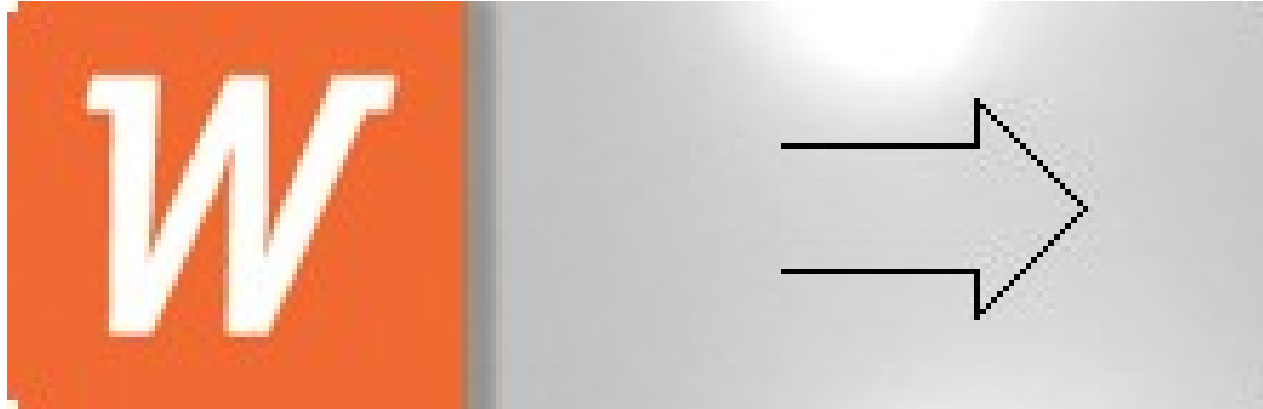
void loop()
{
  digitalWrite(ledPin, HIGH); // set the LED on
  delay(500); // wait for a second
  digitalWrite(ledPin, LOW); // set the LED off
  delay(500); // wait for a second
}
```

Wiring



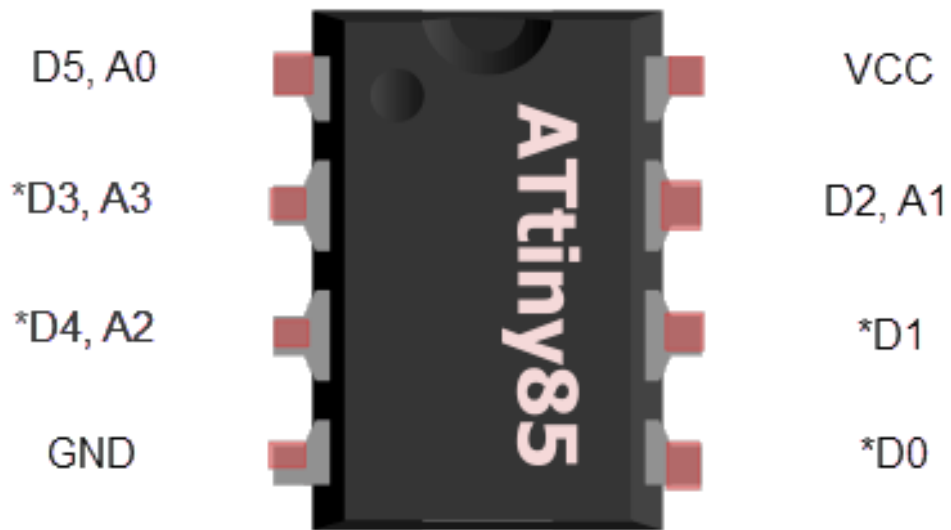
Librerie

Standard

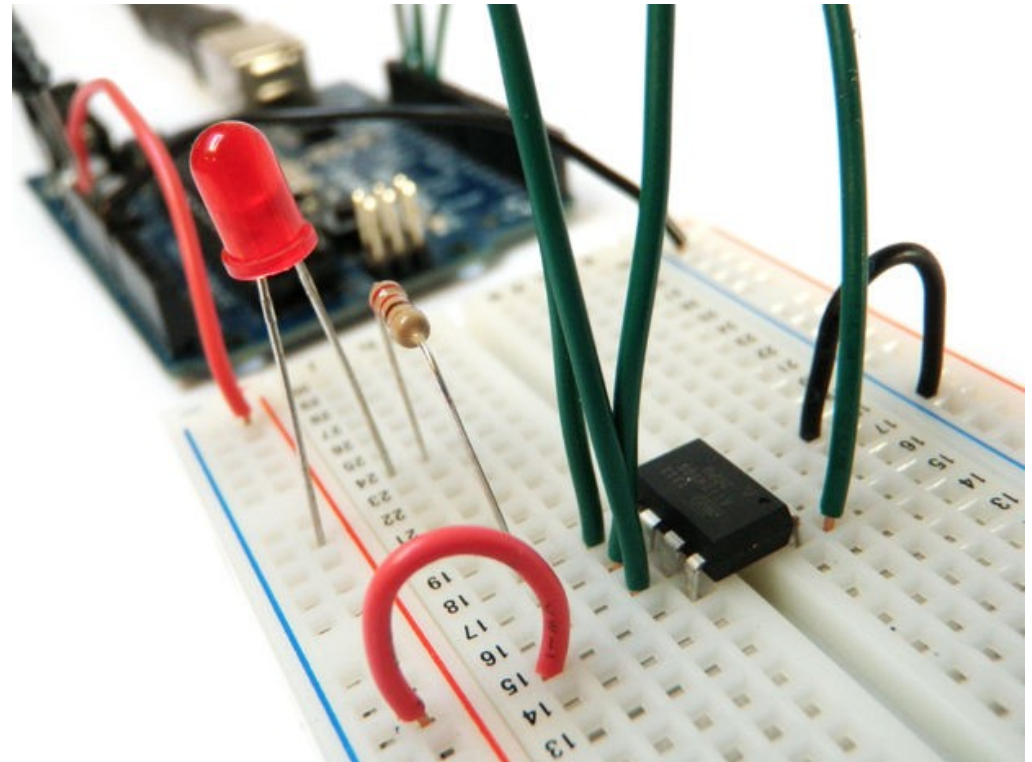


Arduino Core (Wiring e librerie)
Tendono a diventare uno standard
Per le piattaforme di prototipizzazione
E piccoli microcontroller.

Scalabile verso il Basso

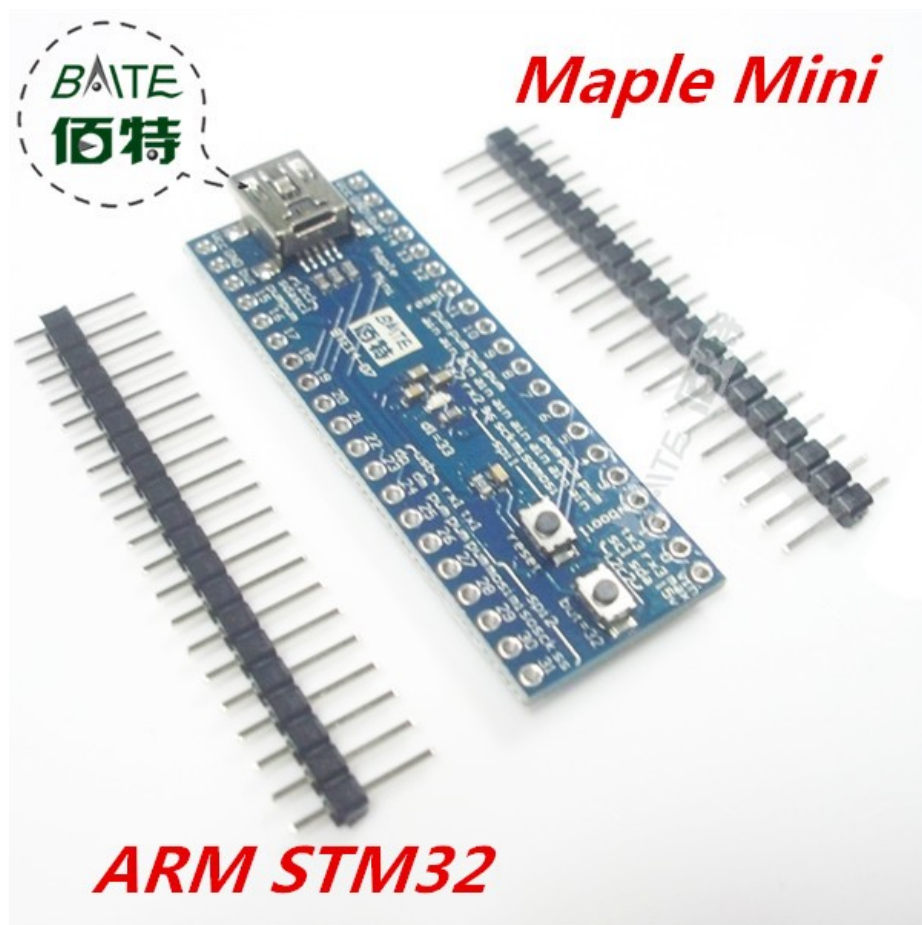


D# = Digital (* = PWM)
A# = Analog In



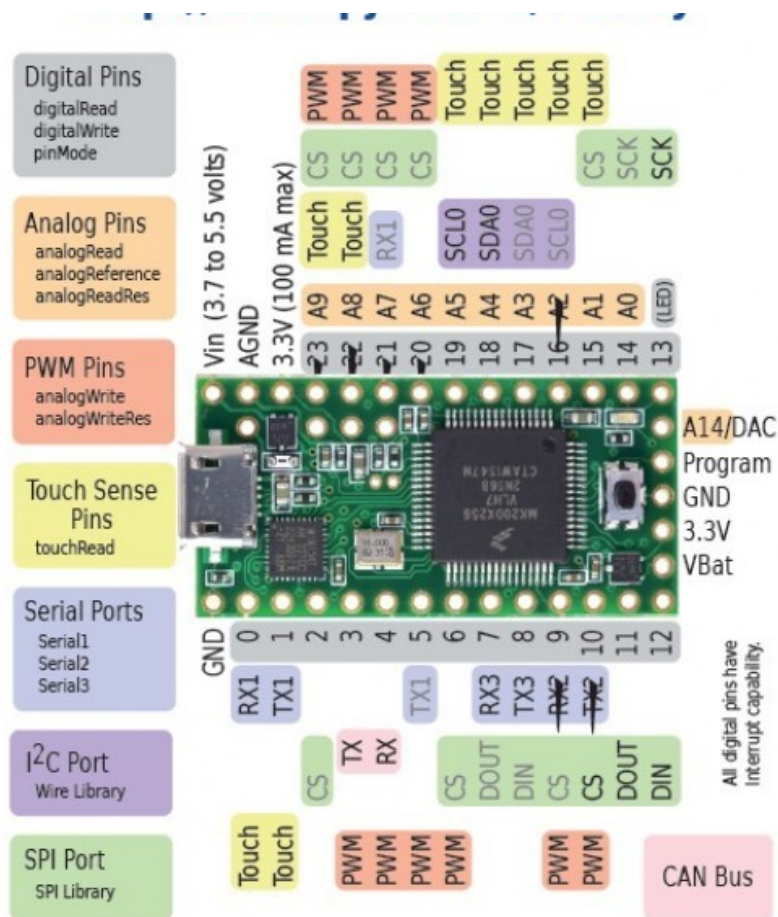
Attiny85: AVR

Scalabile verso l'alto



- Maple Mini
- Adattamento
- Arch: ARM STM32
- Cortex M0
- STM32duino
- Programmabile con codice e IDE Arduino

Design originali



- Teensey 3.1
- Scheda originale
- Teenseyduino
- Cortex M4 32 BIT
- 64K RAM invece che 16k
- 5v tollerante
- 2 analog - digital

Schede standard

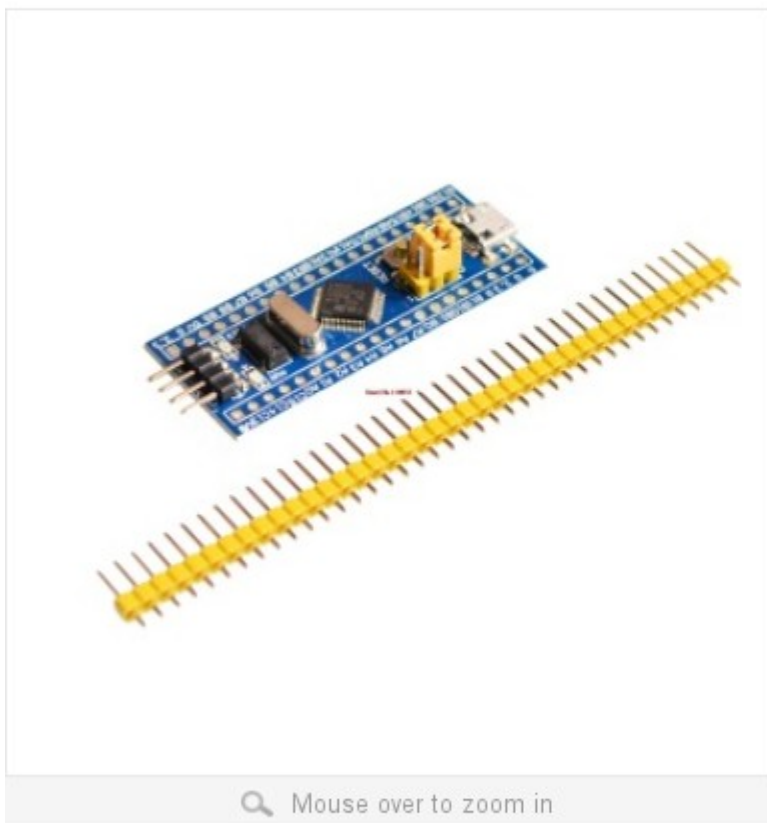
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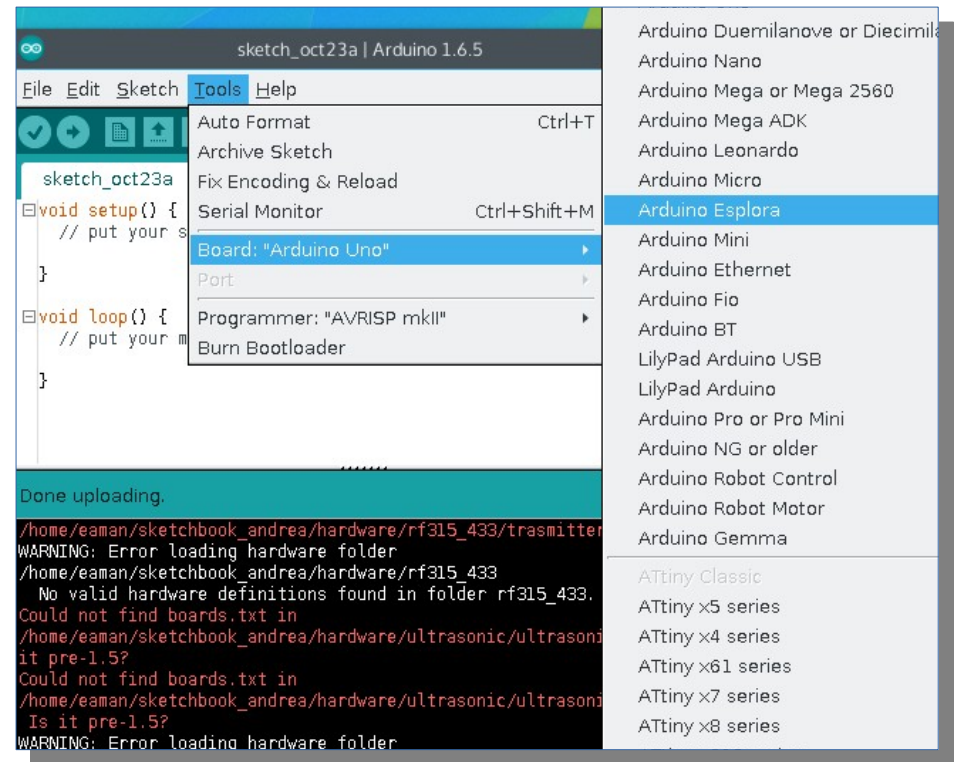


- NodeMCU
- WiFi SOC ESP8266
- TCP/IP IEEE 802.11 b/g/n Wi-Fi
- 32-bit RISC CPU
- Lua C++ Python
- Esp8266 / Arduino
- Internet of Things
- Librerie Arduino (in sviluppo!)

Integrated Development Environment

```
*/  
  
// Pin 13 has an LED connected on most Arduino boards.  
// give it a name:  
int led = 13;  
int red = 12; // Definiamo un altro led  
int breve = 200; // Variabile richiamabile nel corso dell'esecuzione  
int lunga = 1000;  
  
// the setup routine runs once when you press reset:  
void setup() {  
  // initialize the digital pin as an output.  
  pinMode(led, OUTPUT); // Abilitiamo entrambi i LED  
  pinMode(red, OUTPUT);  
  pin  
}  
  
// the loop routine runs over and over again forever:  
void loop() {  
  digitalWrite(led, HIGH); // turn the LED on (HIGH is the voltage level)  
  delay(breve); // wait for a second  
  digitalWrite(led, LOW); // turn the LED off by making the voltage LOW  
  delay(breve); // wait for a second  
  digit  
  digits  
  digits10 d, HIGH); // turn the LED on (HIGH is the voltage level)  
  digital  
  digitalWrite d, LOW); // turn the LED off by making the voltage LOW  
  delay(lunga);  
}  
  
-- Keyword completion (^N^P) match 2 of 4
```

Editor



Compilazione

Compilatori



- GCC-AVR: Compilatore
- AVRDUDE: Caricare il software
- Makefile: arduino-mk
- Eventuale: Ino - Arturo

Non IDE

```
/* Blink without Delay
Class: definizione di una classe LED.

L'oggetto LED integra i dati (proprietà) del led con i metodi (le funzioni).
*/

// Oggetti:
class Lampeggiatore {
  // Lampeggia un LED utilizzando millis()
  // Variabili
  int ledPin ;           // il numero del LED pin
  int ledState ;        // stato attuale del LED
  long interval ;       // milliseconds di intervallo nel lampeggiare
  long previousMillis ; // precedente cambio di stato

  // Constructor: come viene istanziato un oggetto facente parte della classe
public:
  Lampeggiatore(int pin, long time)
  {
    ledPin = pin;
    pinMode(ledPin, OUTPUT);
    ledState = LOW;
    previousMillis = 0;
    interval = time;
  }

  // Una funzione facente parte di una classe prende il nome di "metodo" della stessa:
  void Update () {
    // Illumina il ledB secondo un intervallo passato come argomento

    if(millis() - previousMillis > interval) {
      // save the last time you blinked the LED
      previousMillis = millis();

      // if the LED is off turn it on and vice-versa:
      ledState = !ledState ; // Inverti il LED
    }
    // set the LED with the ledState of the variable:
    digitalWrite(ledPin, ledState);
  }
};

// Instanziamo i due led dalla classe
Lampeggiatore ledA(13, 1000);
Lampeggiatore ledB(2, 500);

void setup() {
}
```

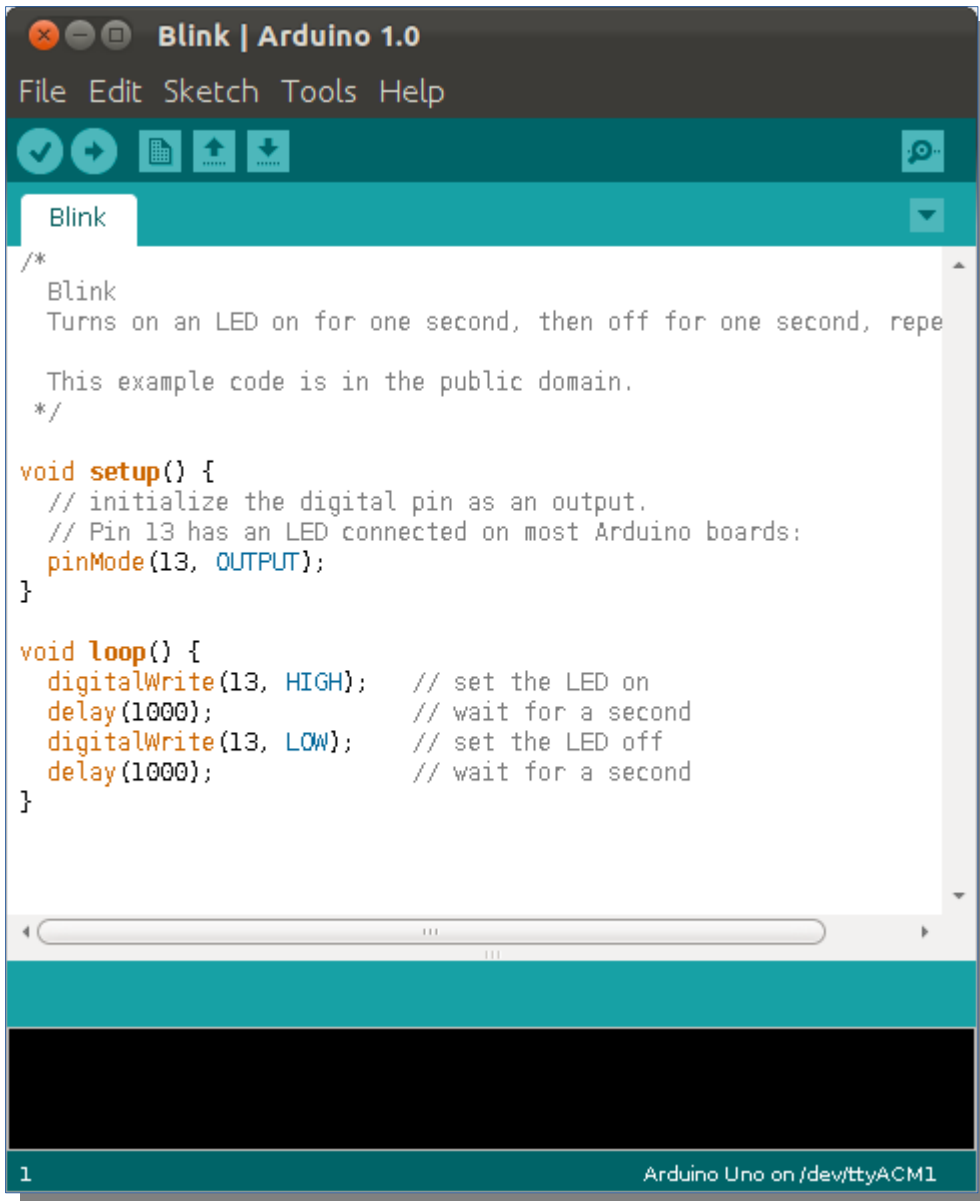
1,1

Top

lday:vim slides:oosplash multitasking:vim eaman:bash books:bash

- Vim / Nano / Emacs
- Leggero
- Portabile
- Ctags
- Sintassi

Arduino Ide



The screenshot shows the Arduino IDE interface with the following elements:

- Window title: **Blink | Arduino 1.0**
- Menu bar: **File Edit Sketch Tools Help**
- Toolbar: Contains icons for saving, undo, redo, and other IDE functions.
- Sketch name: **Blink**
- Code editor content:

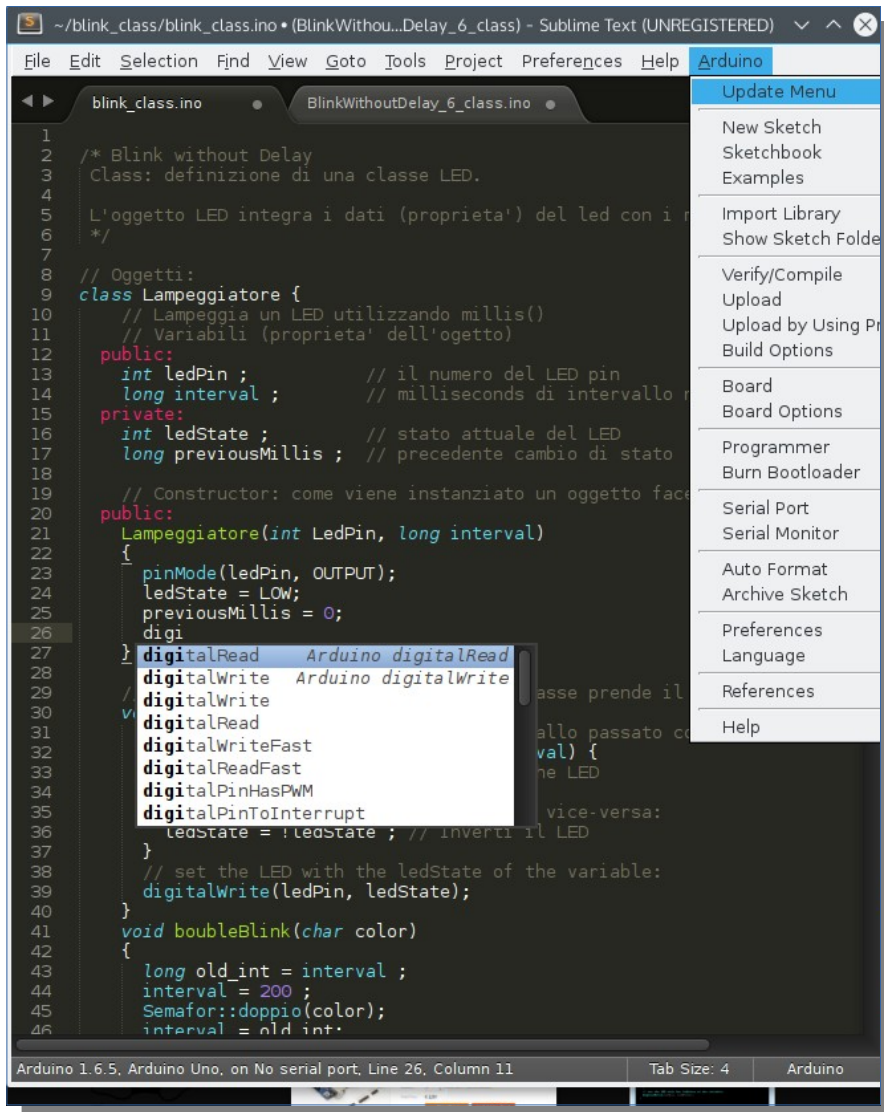
```
/*
 * Blink
 * Turns on an LED on for one second, then off for one second, repeats.
 *
 * This example code is in the public domain.
 */

void setup() {
  // initialize the digital pin as an output.
  // Pin 13 has an LED connected on most Arduino boards:
  pinMode(13, OUTPUT);
}

void loop() {
  digitalWrite(13, HIGH); // set the LED on
  delay(1000);           // wait for a second
  digitalWrite(13, LOW); // set the LED off
  delay(1000);           // wait for a second
}
```
- Status bar: **1** (line number) and **Arduino Uno on /dev/ttyACM1** (serial port information).

- Multipiattaforme
- Basato su Processing (Java)
- Gestisce le schede
- No completamente
- Tutto integrato
- Molto semplice

SublimeText

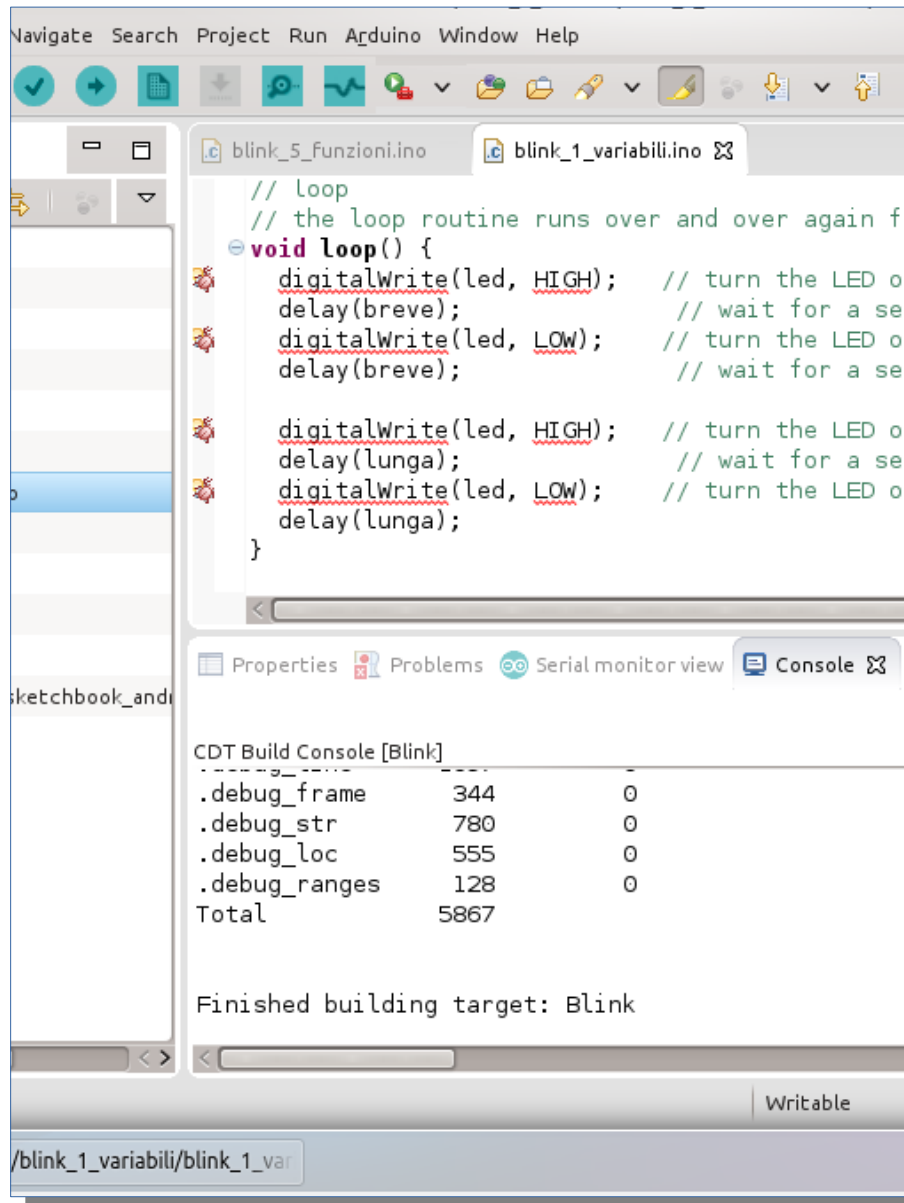


The screenshot shows the Sublime Text editor interface. The main window displays an Arduino sketch named 'blink_class.ino'. The code is written in C++ and defines a class 'Lampeggiatore' for controlling an LED. The code includes comments in Italian and uses standard Arduino functions like 'pinMode', 'digitalWrite', and 'delay'. The 'Arduino' menu is open, showing options such as 'Update Menu', 'New Sketch', 'Sketchbook', 'Examples', 'Import Library', 'Show Sketch Folder', 'Verify/Compile', 'Upload', 'Upload by Using PlatformIO', 'Build Options', 'Board', 'Board Options', 'Programmer', 'Burn Bootloader', 'Serial Port', 'Serial Monitor', 'Auto Format', 'Archive Sketch', 'Preferences', 'Language', 'References', and 'Help'. A tooltip is visible over the 'digitalRead' function, listing related functions like 'digitalWrite', 'digitalWriteFast', 'digitalReadFast', 'digitalPinHasPWM', and 'digitalPinToInterrupt'. The status bar at the bottom indicates 'Arduino 1.6.5, Arduino Uno, on No serial port, Line 26, Column 11'.

```
1
2 /* Blink without Delay
3 Class: definizione di una classe LED.
4
5 L'oggetto LED integra i dati (proprietà) del led con i
6 */
7
8 // Oggetti:
9 class Lampeggiatore {
10 // Lampeggia un LED utilizzando millis()
11 // Variabili (proprietà) dell'oggetto
12 public:
13 int ledPin ; // il numero del LED pin
14 long interval ; // milliseconds di intervallo
15 private:
16 int ledState ; // stato attuale del LED
17 long previousMillis ; // precedente cambio di stato
18
19 // Constructor: come viene istanziato un oggetto fatto
20 public:
21 Lampeggiatore(int LedPin, long interval)
22 {
23 pinMode(ledPin, OUTPUT);
24 ledState = LOW;
25 previousMillis = 0;
26 digi
27 } digitalRead Arduino digitalRead
28 digitalWrite Arduino digitalWrite
29 // digitalWrite
30 // digitalWrite
31 // digitalWrite
32 digitalWriteFast
33 digitalReadFast
34 digitalPinHasPWM
35 digitalPinToInterrupt
36 ledState = !ledState ; // inverti il LED
37 }
38 // set the LED with the ledState of the variable:
39 digitalWrite(ledPin, ledState);
40 }
41 void boubleBlink(char color)
42 {
43 long old_int = interval ;
44 interval = 200 ;
45 Semafor::doppio(color);
46 interval = old_int ;
47 }
```

- Freeware
- Completamento automatico
- Sintassi
- Espandibile

IDE Avanzate



- Eclipse
- Plugin AVR / Arduino
- Editor completo
- Compilazione
- Upload

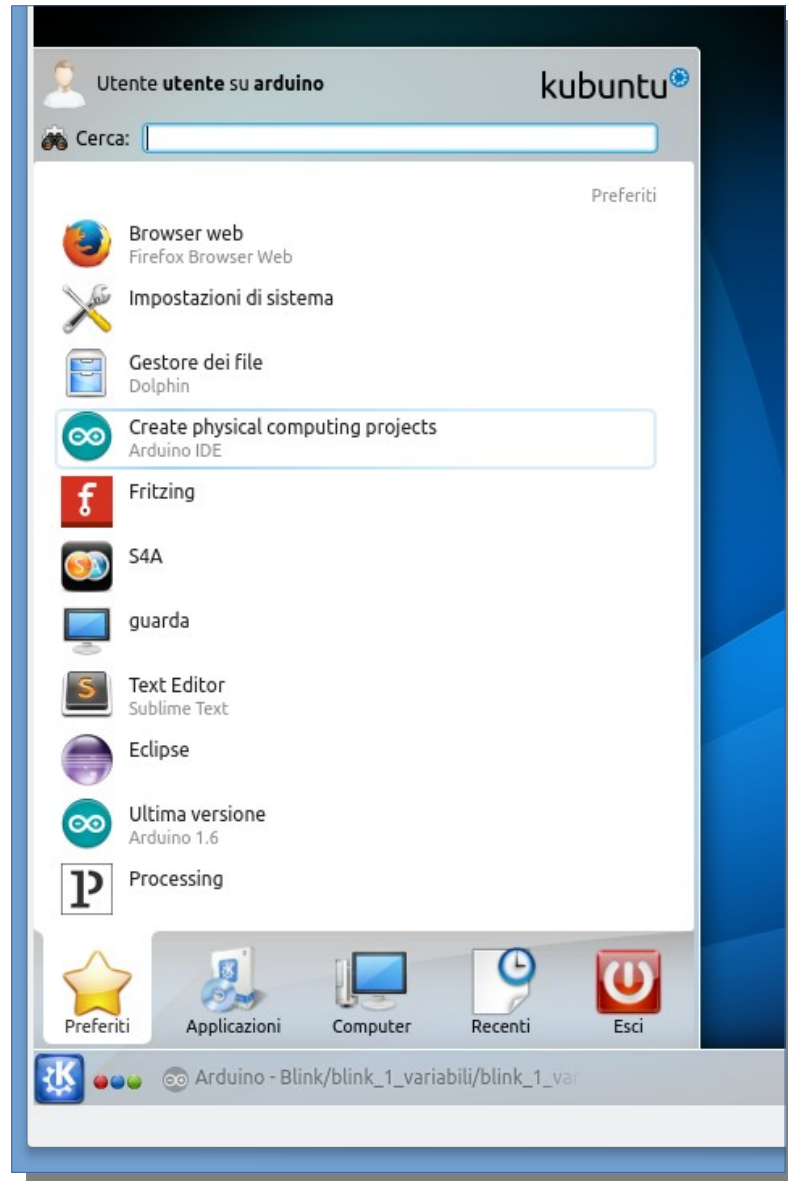
IDE per bambini

Scratch for Arduino

- Programmazione visuale
- Versione custom Arduino
- Dai 6 anni in su



Arduino Live



- Arduino IDE v. 1.x e 1.6
- ESPtool e NodeMCU firmware
- Sublime Text + Steno
- S4a Scratch For Arduino
- Processing:
- Eclipse for Arduino:
- Git con esempi di Andrea
- Logic Digital Analyzer
- ...

http://lab.piffa.net



The screenshot shows the website interface for Lab.piffa.net. At the top left, there is a green header with the text "Lab.piffa.net »". Below this is a navigation menu with several items: "Tabella dei contenuti", "Lab Arduino" (with sub-items: Argomenti Lezioni, Risorse, Altri formati scaricabili, Ricerca nei testi), "Argomento successivo" (with sub-item: 1 Lista materiali), "Questa pagina" (with sub-item: Mostra sorgente), and "Ricerca veloce" (with a search input field and a "Vai" button). The main content area is titled "Lab Arduino" and contains the following text: "Documentazione e materiali per il corso di elettronica: esercizi, gli eventuali schemi dei circuiti per breadboard...". Below this, it states: "E' stato attivato un forum di discussione e una mailing list". A list of links follows: "Esercizi di esempio tramite GIT", "Schemi degli esercizi.", "Scratch esempi per Scratch for Arduino", "Forum di discussione", and "Wiki". The next section is "Argomenti Lezioni" with sub-items: "Lezioni del Lunedì" and "Lezioni del Giovedì". The final section is "Risorse" with sub-items: "Lista componenti utili", "Kit base per studenti da 5euro", "Kit base per studenti da 25euro", "Accessori e strumenti utili", "Testi consigliati", "Linux Live Kubuntu con software per Arduino", "Slides della Presentazione del corso:", and "Argomenti lezioni".

- Arduino Live: adatta a laboratori e corsi
- Esercizi Arduino
- Esercizi Scratch
- Forum
- Wiki
- Corsi