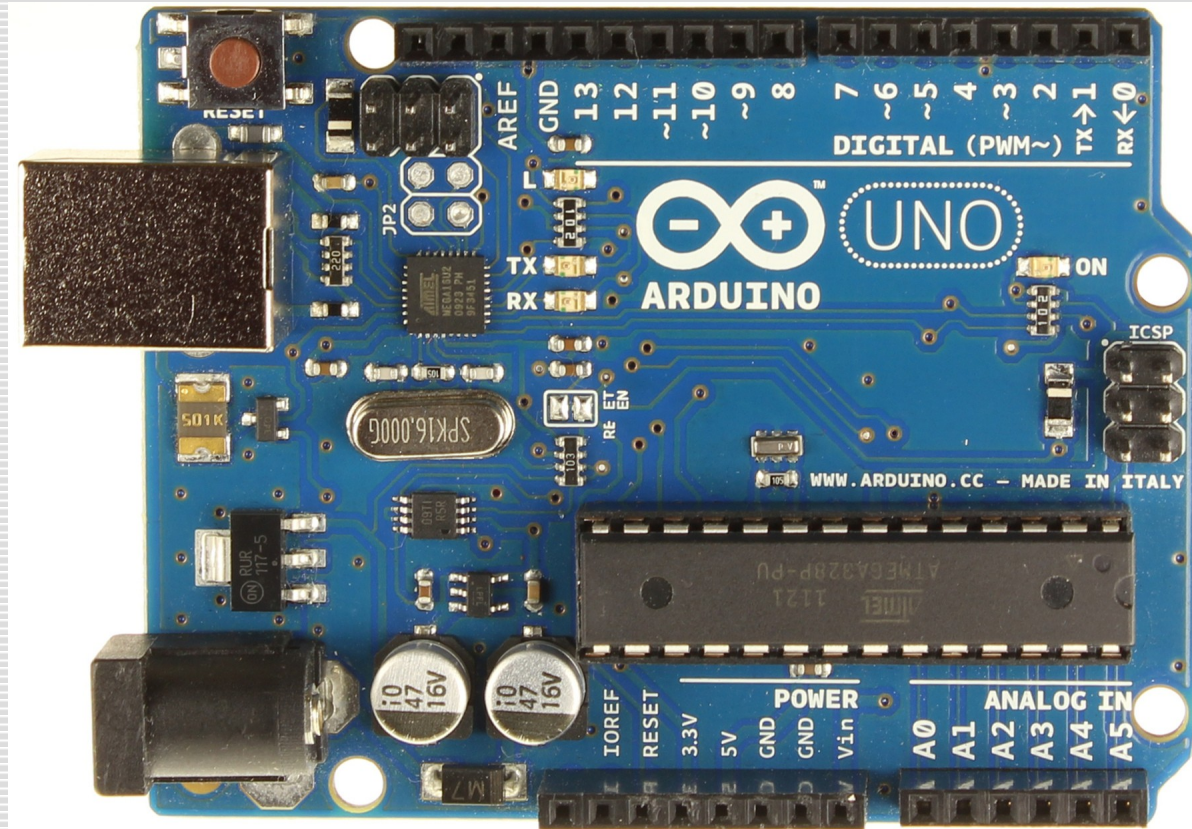


Test Driven Development in deeply embedded with Test Anything Protocol (20')

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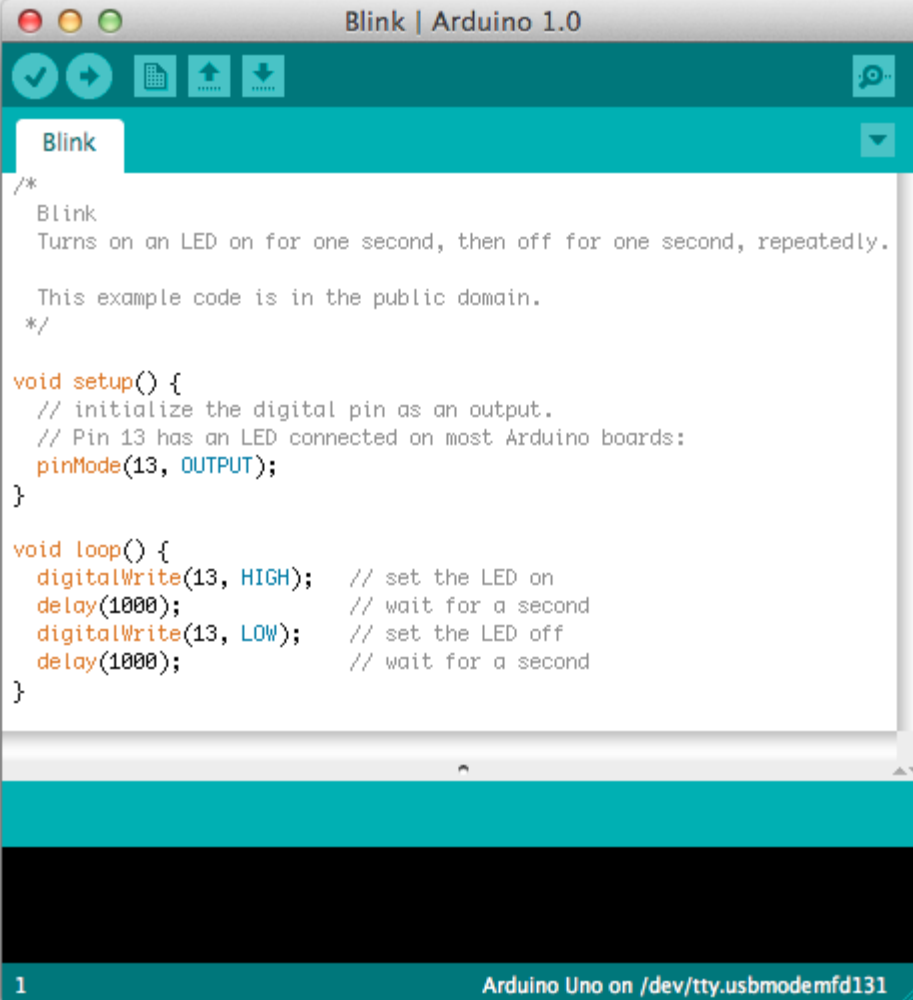
Arduino UNO Board



Arduino UNO Board

- ATMEL ATmega328 @ 16MHz
 - Flash 32 Kb
 - SRAM 2 Kb
 - 14 pins Digital I/O
 - 6 PWM
 - UART (with converter USB)
 - SPI
 - I2C
 - 6 pins Analog Input
- Schematic Open Source
- ~30 €, made in Italy

Arduino IDE



The screenshot shows the Arduino IDE window titled "Blink | Arduino 1.0". The interface includes a toolbar with icons for check, run, upload, and download. A tab labeled "Blink" is active. The main text area contains the following code:

```
/*
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
}
```

At the bottom of the window, the status bar shows "1" on the left and "Arduino Uno on /dev/tty.usbmodemfd131" on the right.

Arduino IDE

- Cross Development

- a JAVA application
 - Open Source
 - Linux, Windows, Mac OS X
 - Many libraries and examples

- baby C++ as target language
 - gcc-avr, avr-libc
 - avrdude (upload utility)

Arduino Ecosystem

- Many board :
 - Mega, Nano, LilyPad
(various AVR on various form factors)
- Many extension shields :
 - Proto, ethernet, WIFI, ...
- Many Electronic Schematics
- Many Software Libraries
- Many Projects
- Community :
<http://arduino.cc/forum/>

ArduinoTap

- a C++ library
 - Arduino.h, ArduinoTap.cpp
 - `plan`, `no_plan`, `done_testing`, `bail_out`
 - `diag`, `skip`, `todo`,
 - `ok`, `nok`, `pass`, `fail`, `is`, `isnt`
 - Works on desktop with GCC

- a Perl utility : *runino* allows to build a sketch, to upload it on an Arduino board, and to capture its output

ArduinoTap demo

```
#include <ArduinoTap.h>
void setup() {
    Serial.begin(9600);
}

void loop() {
    plan(5);
    ok(true, "true");
    ok(1, "1 is true");
    nok(false, "false");
    nok(0, "0 is false");
    is(1 + 1, 2, "addition");
    done_testing();
}
```


ArduinoTap demo

```
$ runino examples/manual/manual.ino
```

```
$ prove --exec=runino  
examples/manual/manual.ino
```

```
$ prove --exec=runino  
examples/*ok/*.ino  
examples/is*/*.ino
```

Executable ~4kb

Bibliography / Webography

- <http://www.arduino.cc/fr/>
- <http://fritzing.org/>
- <http://testanything.org/>
- <http://github.com/fperrad/ArduinoTap>
- monitoring our machine room temperature with nagios, perl and arduino
- An Arduino/Dancer-enabled mobile-enhanced door