



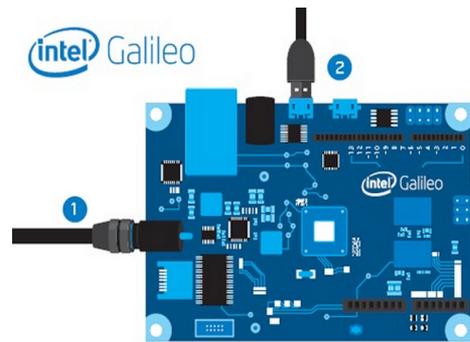
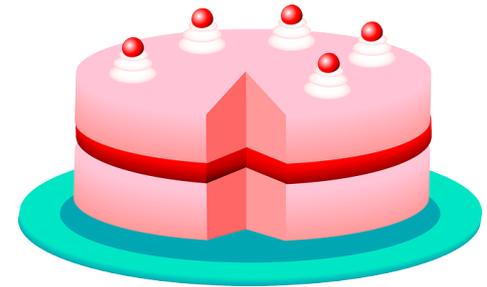
# Unlocking Possibilities with Circuits and Code

## Intel® Galileo Workshop

Version 2  
June 6th, 2014

# What does programming mean?

It is like « cooking » with an electronic board! In a kitchen, the chef writes and follows a recipe to make a cake, doesn't he? Well, an engineer does the same, he writes the program (the recipe) so that the computer executes something... but what exactly?



# Which language?

A programming language is a code of communication between human and computer (like the Galileo Board for instance). When coding, the engineer gives instructions to the machine.

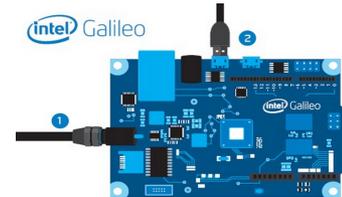


human



Programming  
= code

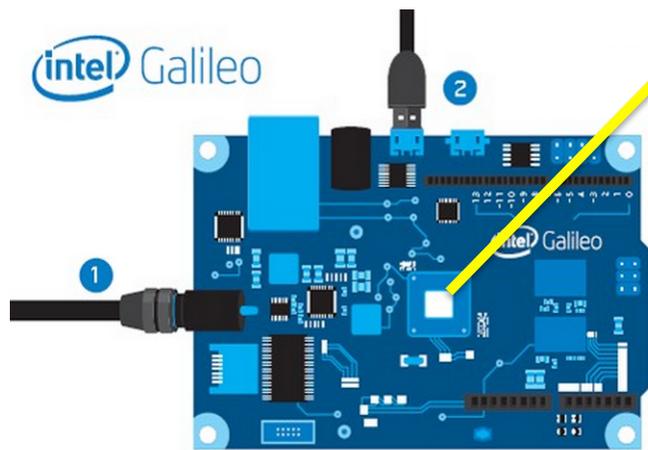
Electronic Board



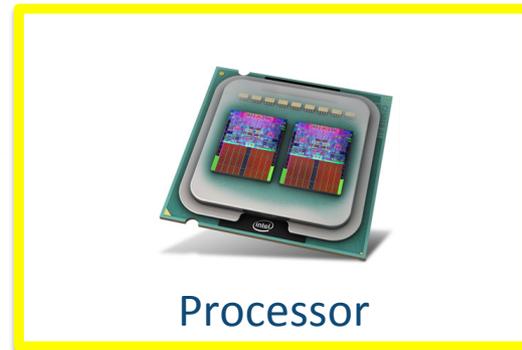
Computer

# What is a Galileo board?

A Galileo board is an electronic circuit that controls all the components of a computer. The processor is located on the heart of the board and the memory chip is on its periphery as well as a USB connection.



Circuit board (Galileo)

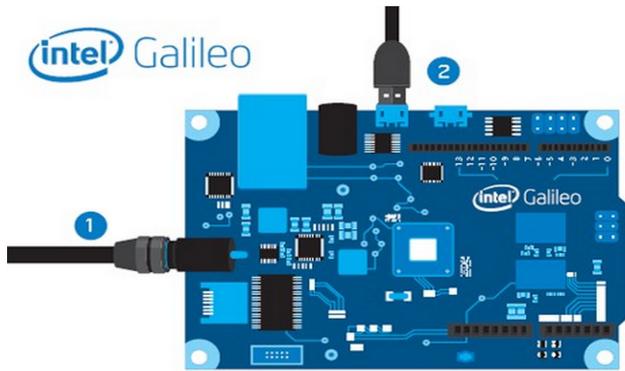


Processor



SD Card (memory)

# What could we do with a Galileo board, a Lego head... and some imagination?



Use your brain!

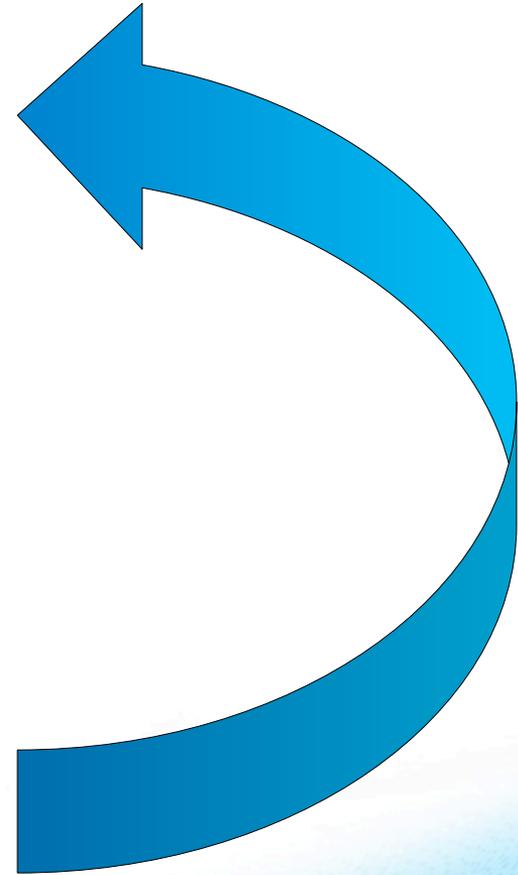
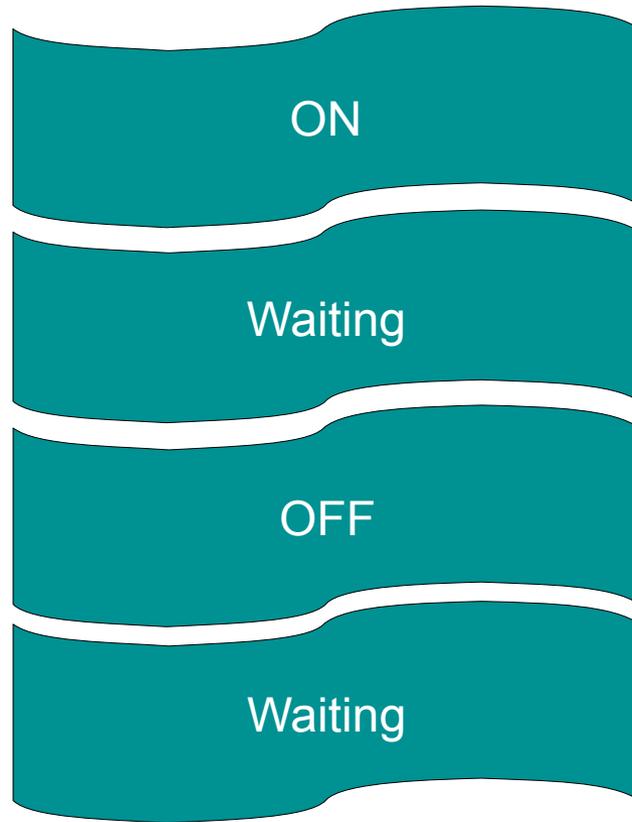
**What do you see?**



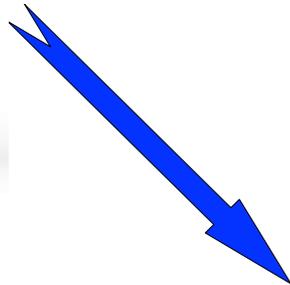
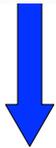
# What is happening?

- **A light is “blinking”!**  
*...What does blinking mean?*
- **The different steps of “blinking”:**
  - The light is ON
  - It stays on... for a short period of time
  - And the light is OFF
  - It stays off... for a short period of time
  - And it is starting all over again!

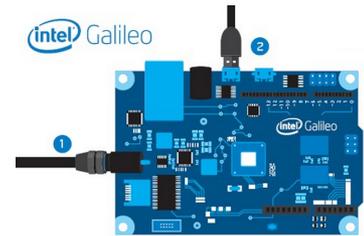
# The logical circuit of light!



# How can we instruct the Led to turn ON & OFF using codes and a Galileo board?

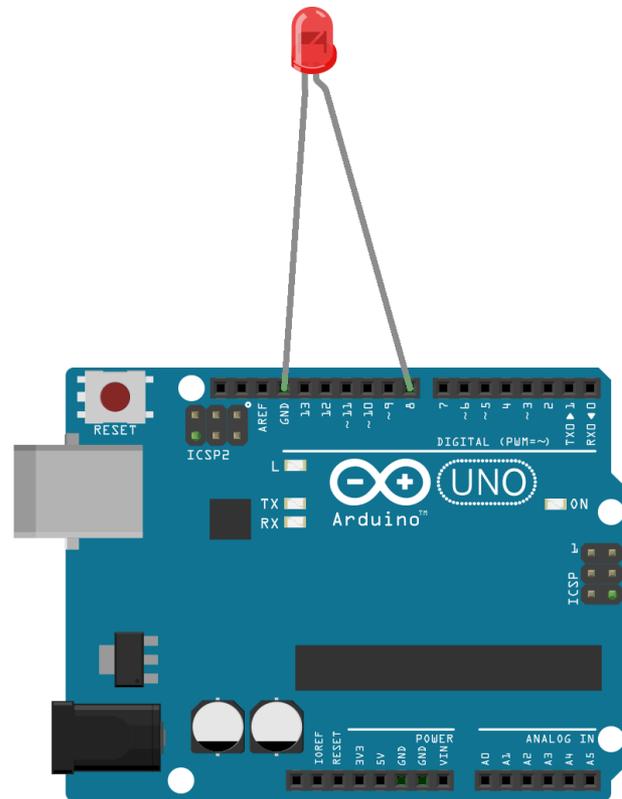


 The image cannot be displayed. Your computer may not have enough memory to open the image, or the image may have been corrupted. Restart your computer, and then open the file again. If the red x still appears, you may have to delete the image and then insert it again.

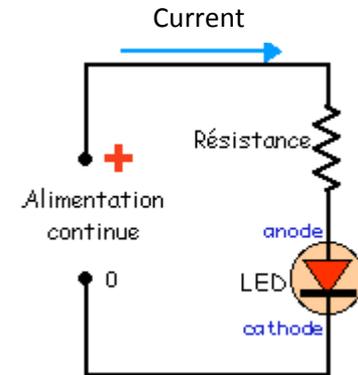


# What do we have on the hardware side?

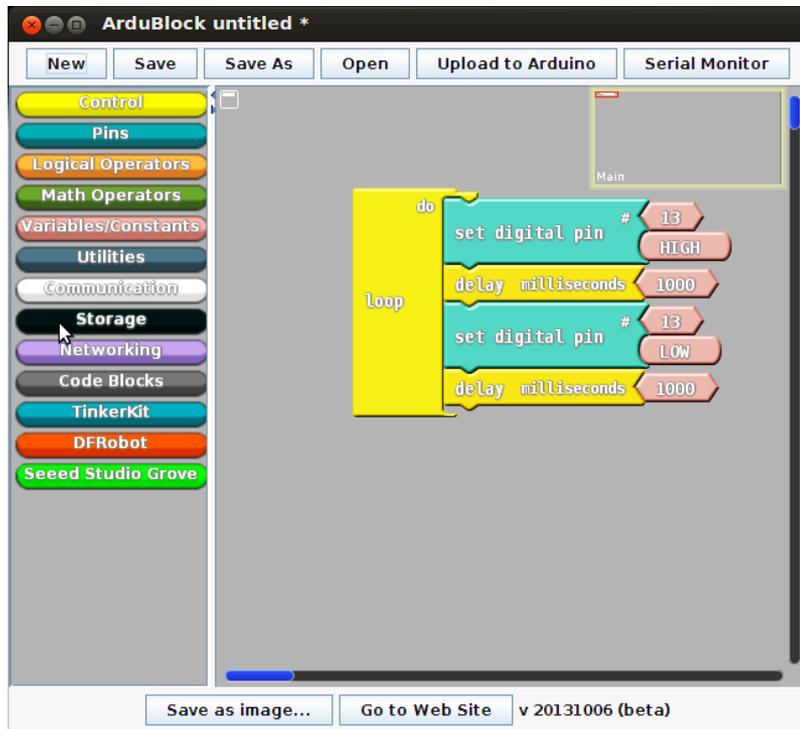
How does a LED work?



Made with  Fritzing.org



# Now how do we program on the software side?



- Led pin 13
- When you change the code you click on:



- Now you can change the waiting time and see what happens!

# Now lets try to understand...

The image displays two side-by-side windows illustrating the same logic in different formats. On the left is the Arduino IDE (version 1.5.4) showing a C++ sketch for a digital pin toggle. The sketch includes a `setup()` function to initialize pin 13 as an output and a `loop()` function that alternates the pin state between HIGH and LOW with 1000ms delays. The IDE's status bar shows the sketch is compiled and uploaded to an Arduino Uno.

```
sketch_oct30b $
void setup()
{
    pinMode( 13 , OUTPUT);
}

void loop()
{
    digitalWrite( 13 , HIGH );
    delay( 1000 );
    digitalWrite( 13 , LOW );
    delay( 1000 );
}
```

Done compiling.  
Global variables use 9 bytes (0%) of dynamic memory, leaving 2,039 bytes for local variables. Maximum is 2,048 bytes.  
Sorry, sound is not available  
13 Arduino Uno on /dev/ttyACM0

On the right is the ArduBlock environment (version 20131006 beta), which provides a visual representation of the same code. A yellow 'do' loop block contains four blocks: 'set digital pin # 13 HIGH', 'delay milliseconds 1000', 'set digital pin # 13 LOW', and 'delay milliseconds 1000'. The interface includes a 'Main' workspace, a block palette on the left, and buttons for 'Save', 'Save As', 'Open', and 'Upload to Arduino'.

# Imagine all what you can do?



**Now you are capable to turn on one Led, what else would you want to create?**

- Add more LEDs
- Alternate the blinking of several LEDs
- Add an ON and OFF button
- Use multicolor LEDs
- Make noise
- Build a robot...



Have fun with your  
Galileo and be creative!

