



Co-funded by the  
Erasmus+ Programme  
of the European Union



# STEP by STEP

# ROBOTICS


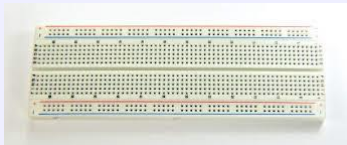
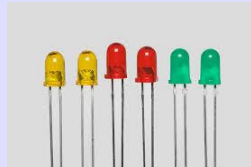

## Traffic Light







## Lesson Objectives

- Assemble a circuit with several LEDs to build a traffic light.
- Use digital output blocks with different pins
- View the traffic light on the screen of our PC.
- Learn how to change the stage scenery.
- Introduce the algorithm concept

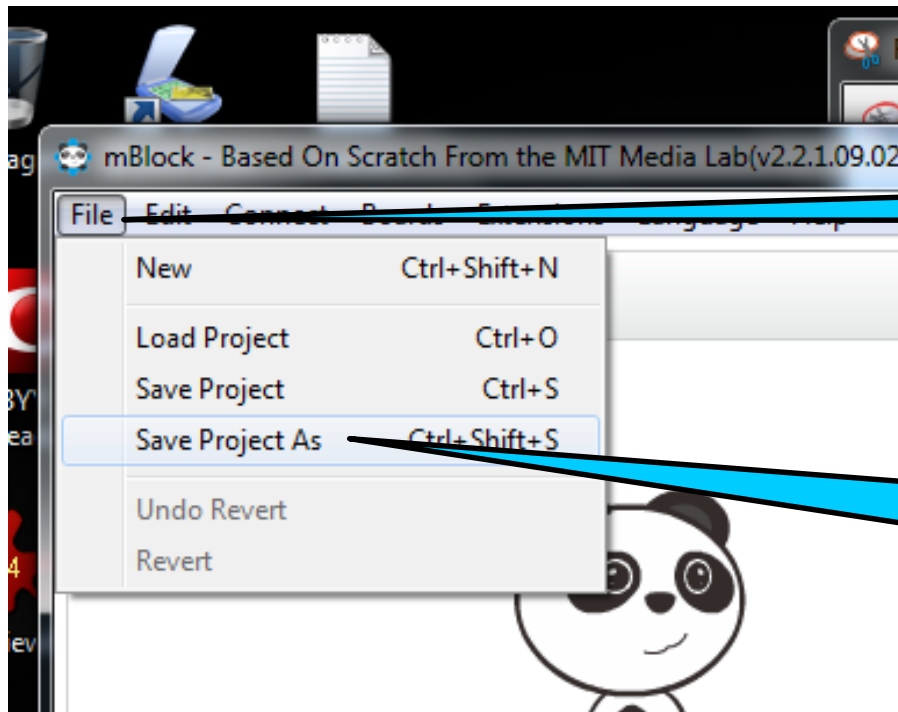
## Material and resources to use

Nome	Figura	Descrição
Arduino		Arduino Uno and USB cable
Breadboard		Breadboard with 840 pins
Led's		Led's with 3 colors: red, yellow and green verde
Electrical Resistors		Resistor of 100Ω

## Material and resources to use

Nome	Figura	Descrição
Cables		Cables to connetions
Software MBlock		Development Software
Tablet		Device build program
Computer		Device build program

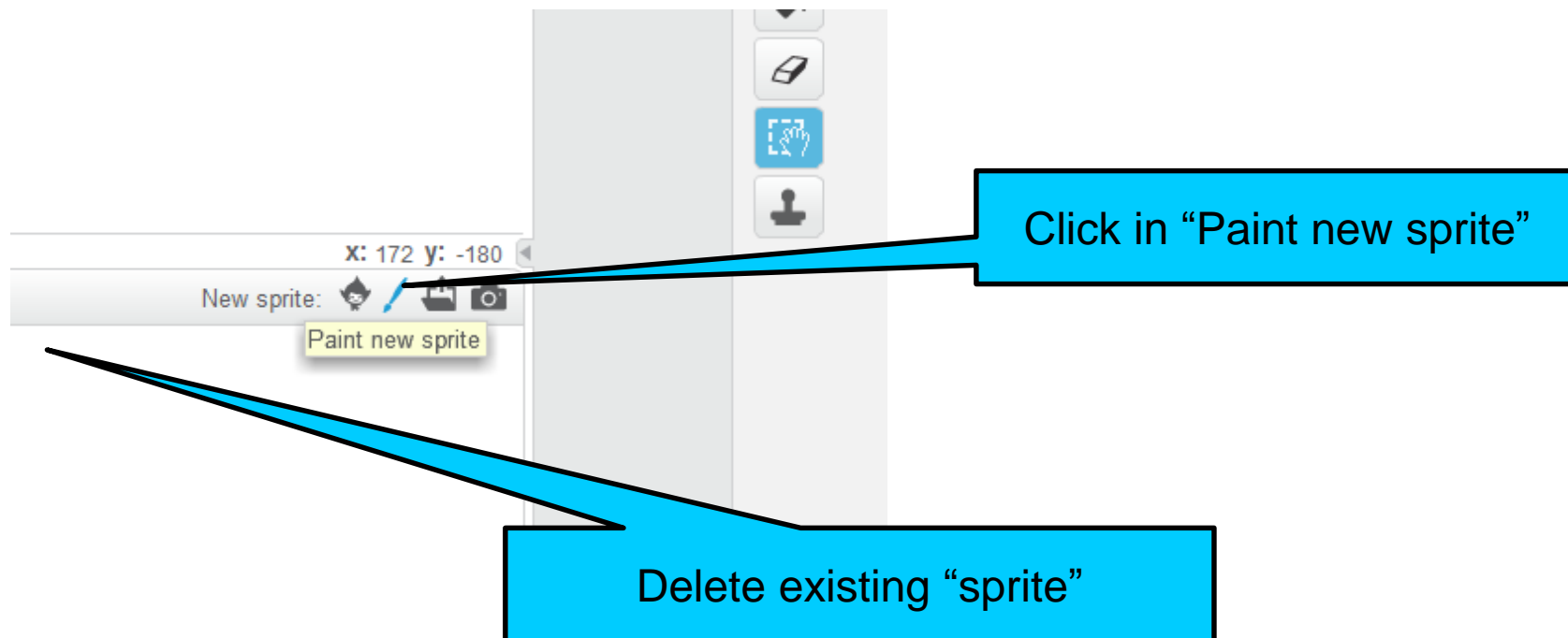
## Traffic light drawing



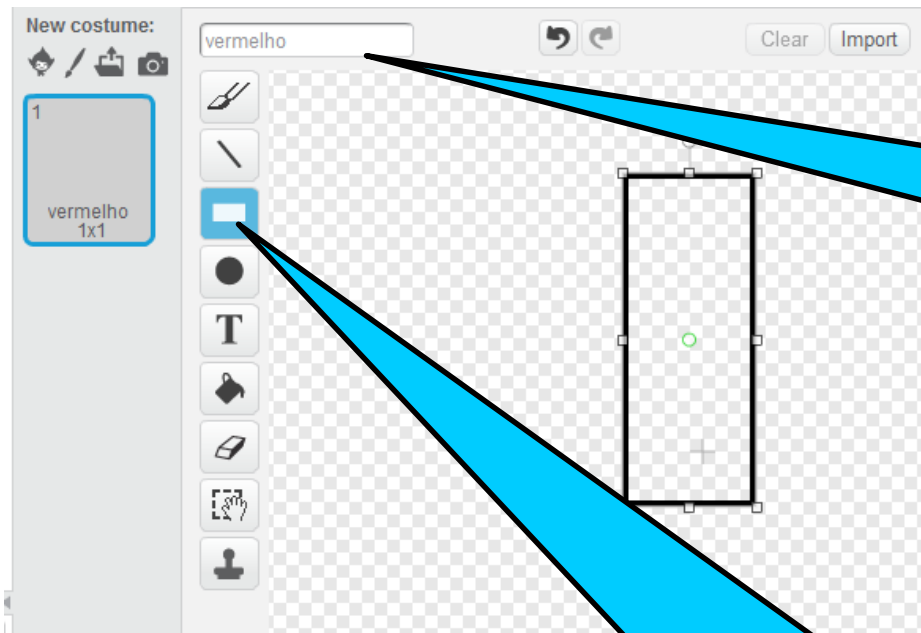
Click in "File"

Click in "Save  
Project As" with  
name *TF*

## Traffic light drawing



## Traffic light drawing



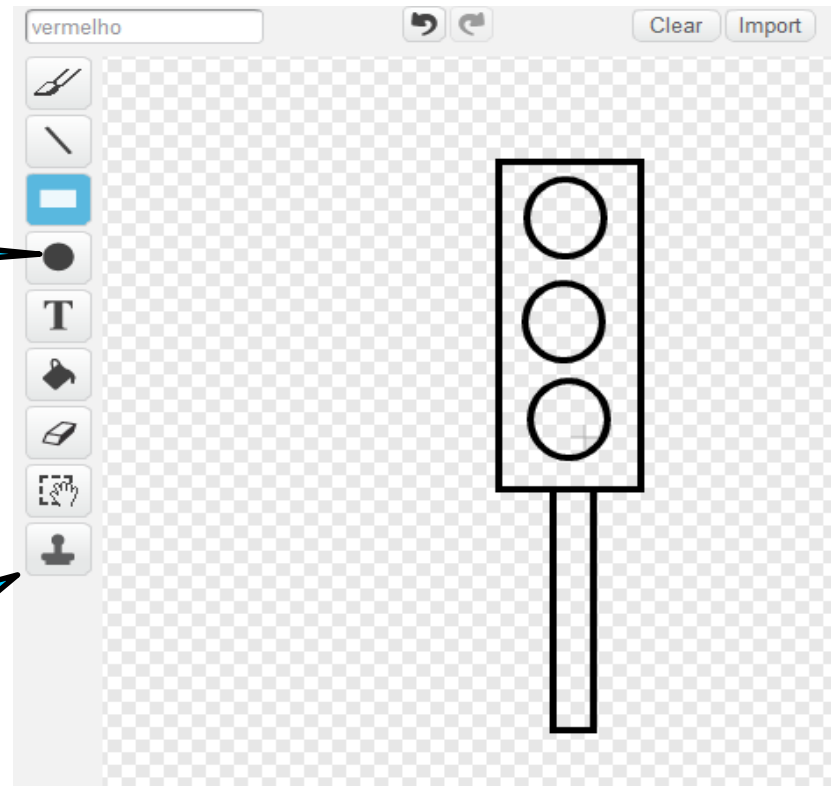
Select in the text box and type  
"red"

Select rectangle and draw in  
drawing area

## Traffic light drawing

Select circle and  
draw in drawing  
area

Select and copy. Selects the  
first circle and drags down

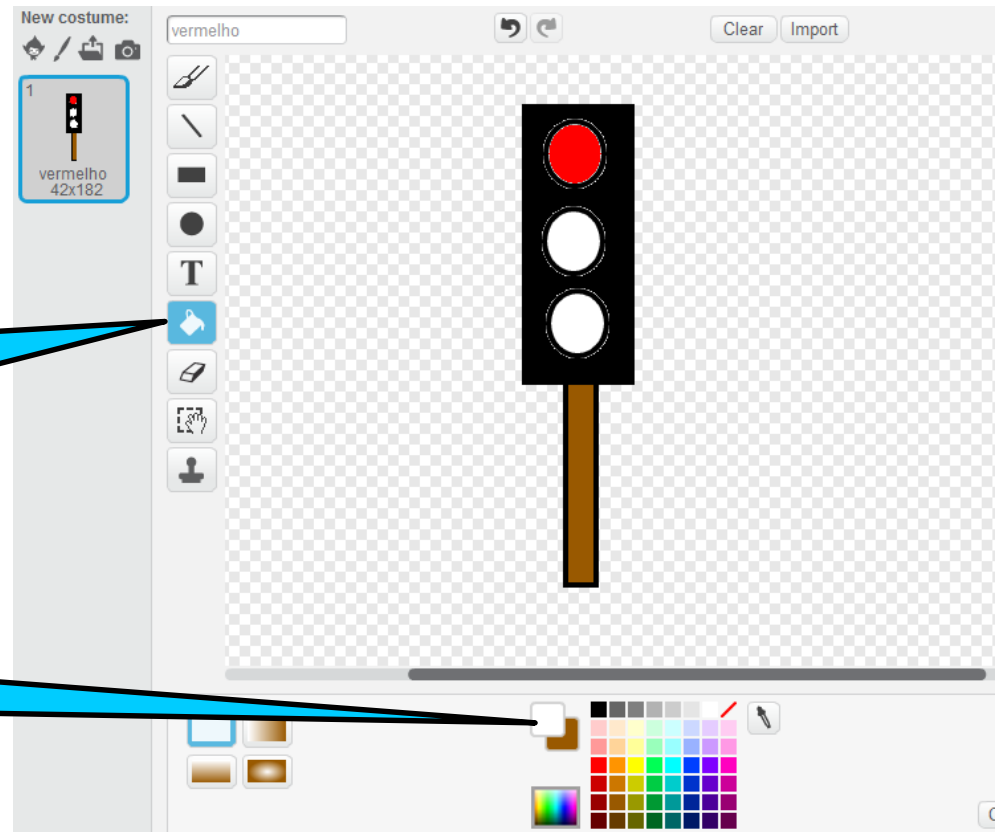




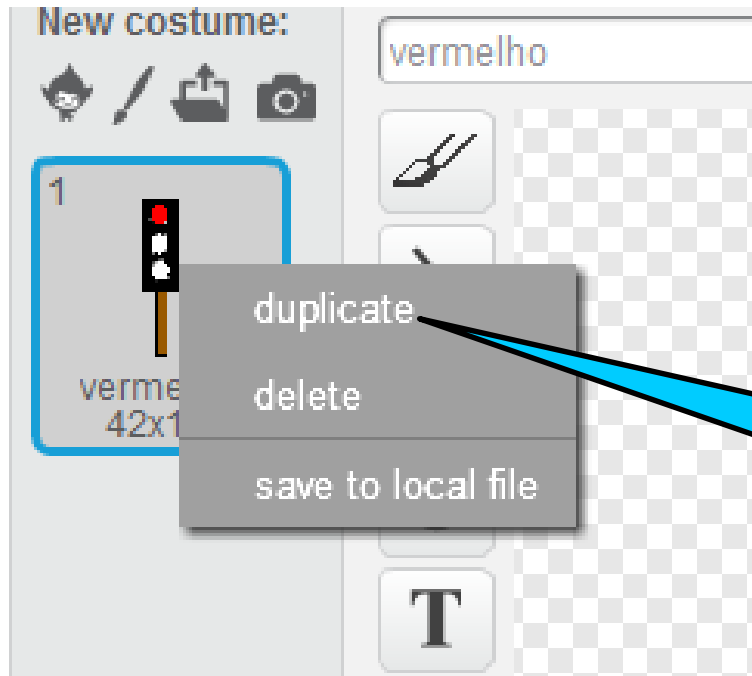
## Traffic light drawing

Select color fill

Select the desired color



## Traffic light drawing



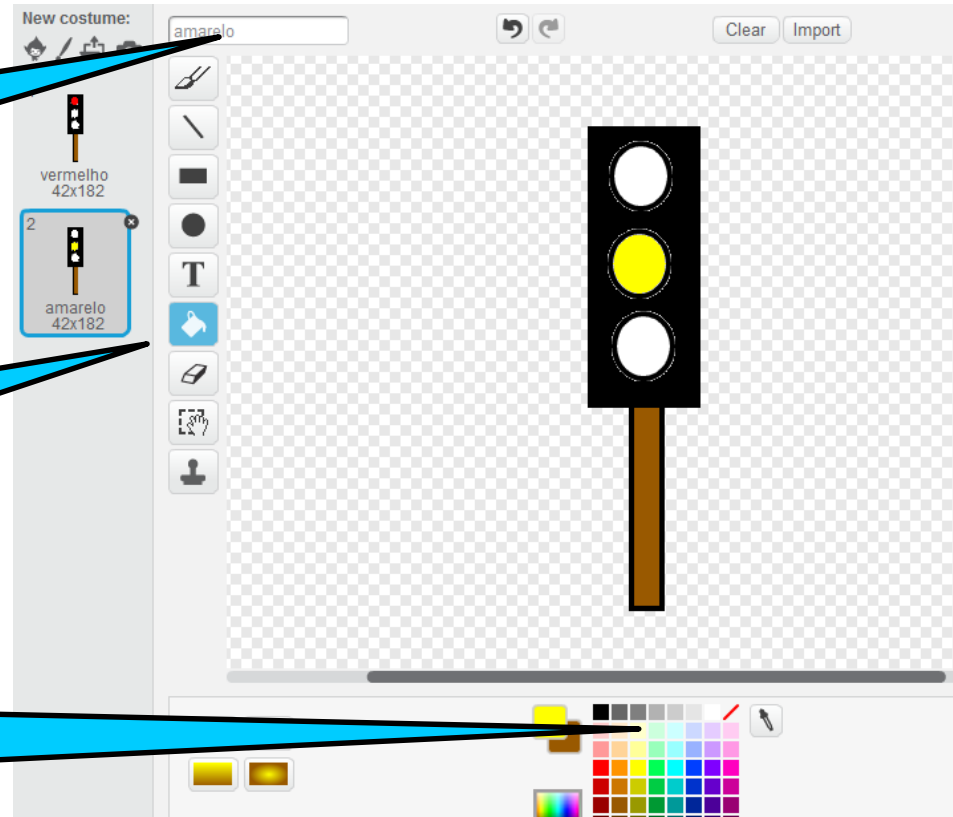
Select "red" and click on the mouse on the right and select "duplicate"

## Traffic light drawing

Select in the text box  
and type "yellow"

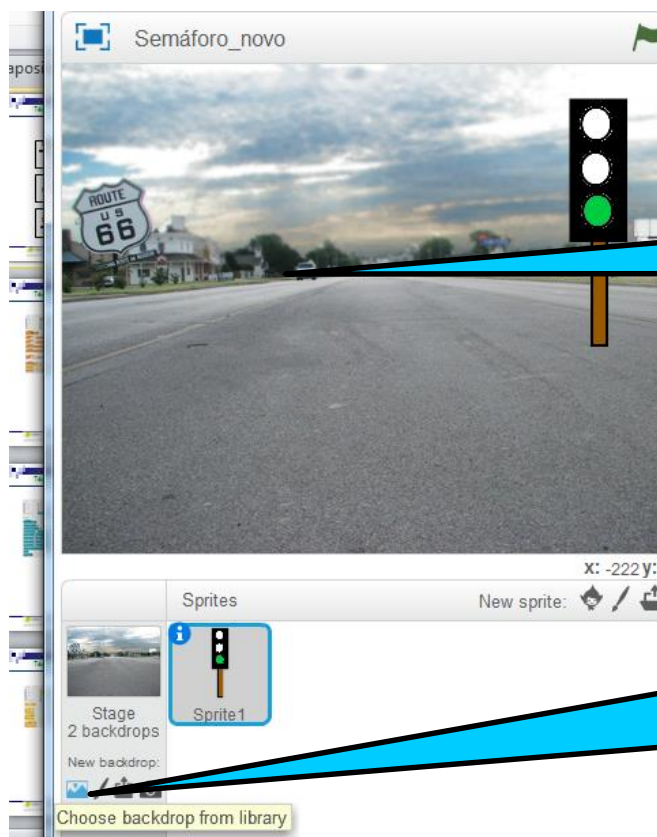
Select color fill

Select the  
desired color



Do the same for the green

## Traffic light drawing

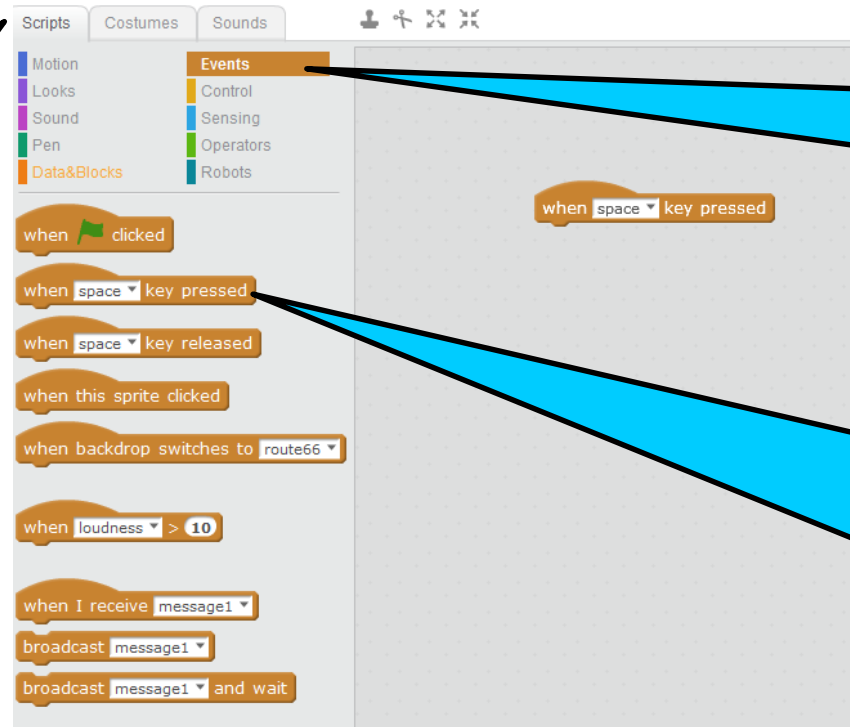


Select picture  
"route66"

Select "backdrop"

## Programming

Select“ Scripts”

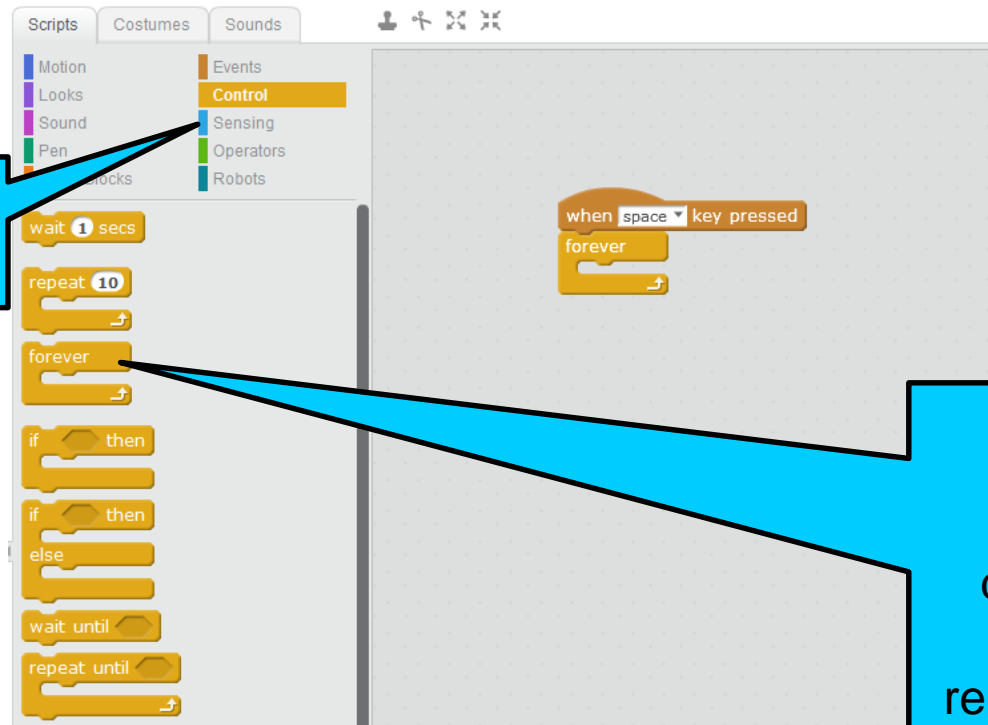


Select“ Events”

Select by left-clicking and dragging to the desktop. Then release the mouse button

## Programming

Select "Control"



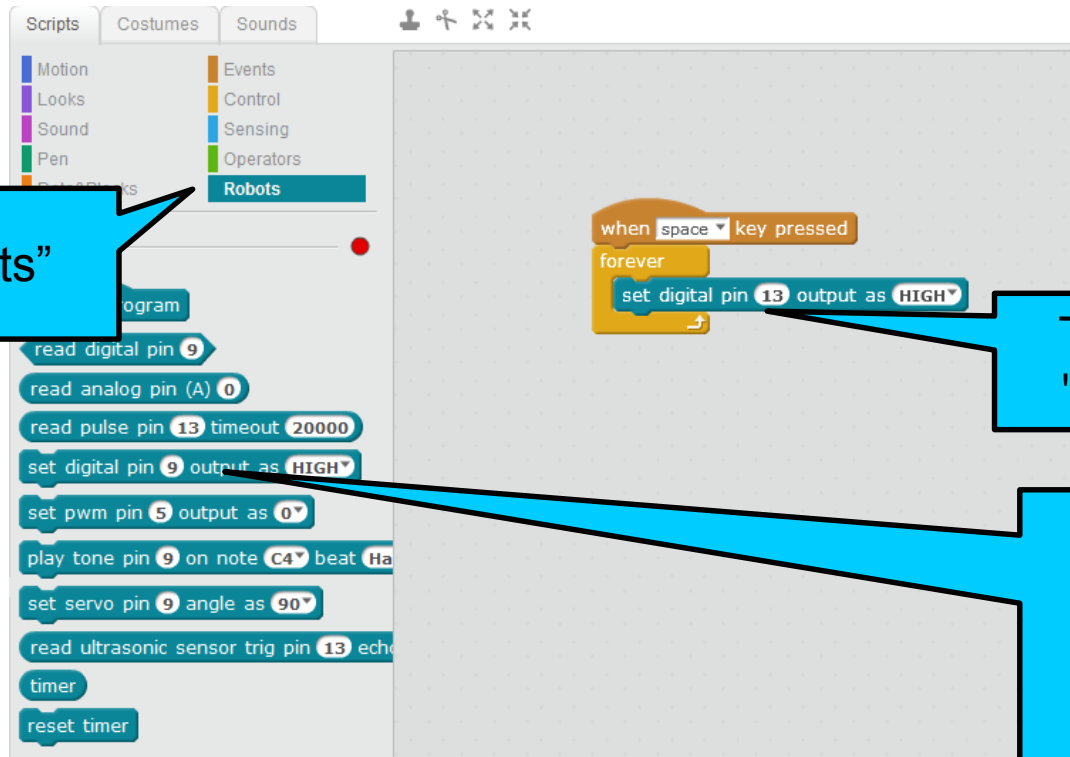
Select by left-clicking and dragging to the desktop. Then release the mouse button

## Programming

Select "Robots"

Then change the "digital pin" to 13

Select this block and drag it to the desktop.



The image shows the Scratch Robotics programming environment. On the left, the 'Scripts' tab is selected, and the 'Robots' category is highlighted in the 'Scripts' list. The main workspace contains a script starting with 'when space key pressed', followed by a 'forever' loop containing a 'set digital pin 13 output as HIGH' block. A blue callout points to this block, indicating it should be dragged to the desktop. Another blue callout points to the 'Robots' category in the 'Scripts' list, indicating it should be selected. A third blue callout points to the 'set digital pin 13 output as HIGH' block, indicating the digital pin should be changed to 13.

# ROBOTICS - Traffic Light

## Programming

The image shows the Scratch programming environment with a traffic light project. The 'Scripts' tab is selected, and the 'Looks' category is chosen from the left sidebar. A script is visible on the stage, starting with a 'when green flag clicked' event, followed by a 'say Hello! for 2 secs' block, a 'think Hmm...' block, a 'show' block, a 'hide' block, a 'switch costume to verde' block, and a 'next costume' block. A second script is visible on the right, starting with a 'when space key pressed' event, followed by a 'forever' loop containing a 'set digital pin 13 output to HIGH' block, a 'switch costume to vermelho' block, and a 'think Pare' block. Five blue callout boxes provide instructions: 'Select "Robots"' points to the 'Looks' category; 'Then change the name to "Stop"' points to the 'switch costume to vermelho' block; 'Then change the name to "red"' points to the 'set digital pin 13 output to HIGH' block; 'Select this block and drag it to the desktop.' points to the 'switch costume to verde' block; and 'Select this block and drag it to the desktop' points to the 'when space key pressed' block.

Select "Robots"

Then change the name to "Stop"

Then change the name to "red"

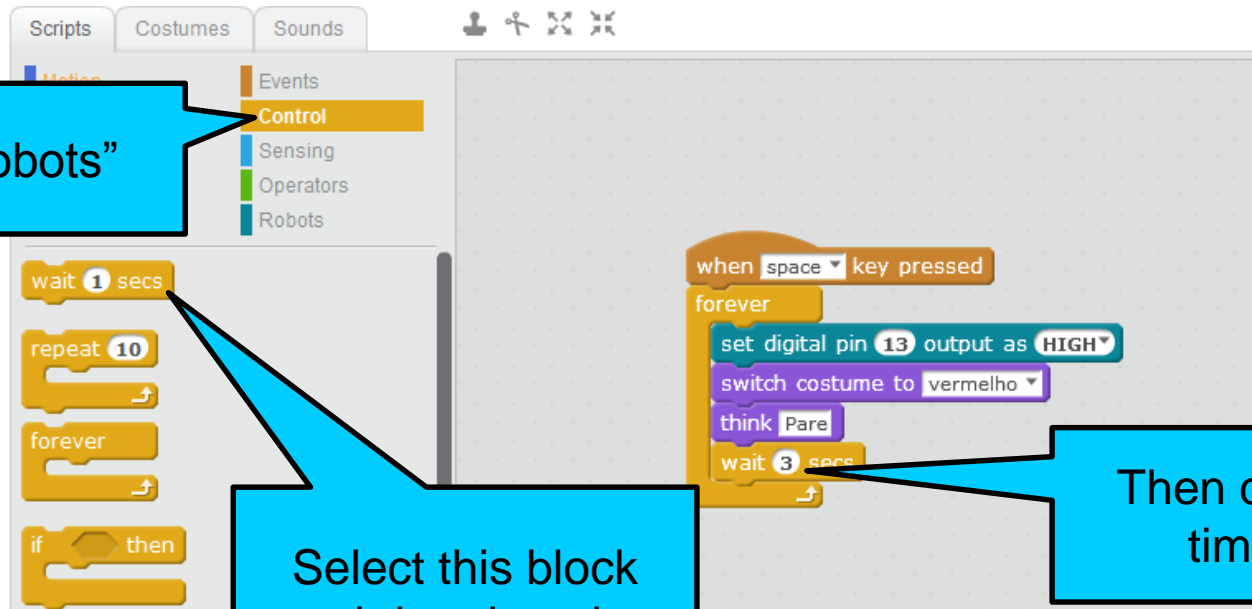
Select this block and drag it to the desktop.

Select this block and drag it to the desktop



## Programming

Select "Robots"



Select this block  
and drag it to the  
desktop

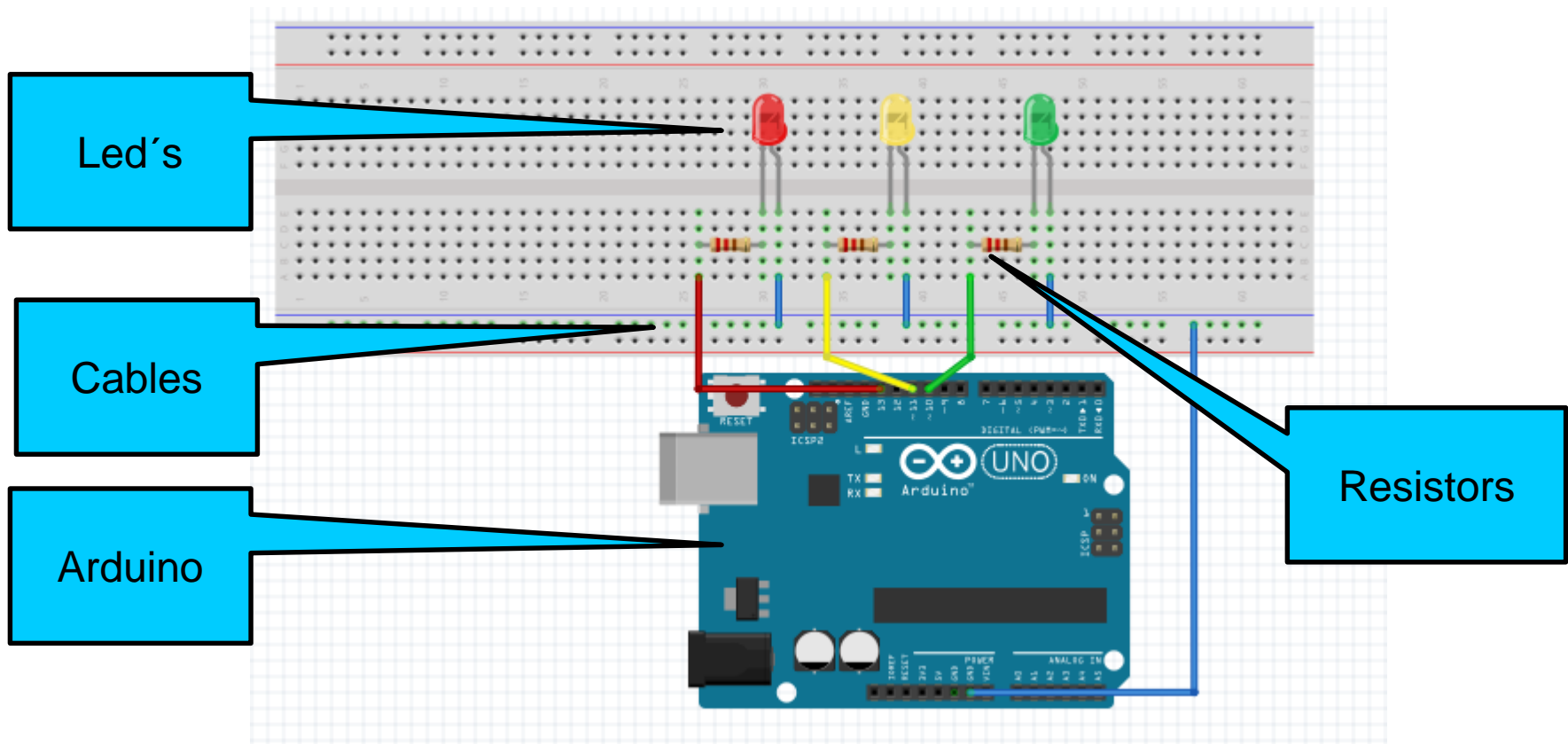
Then change the  
time to "3"

## Programming

```
when space key pressed
forever
  set digital pin 13 output as HIGH
  switch costume to vermelho
  think Pare
  wait 5 secs
  set digital pin 13 output as LOW
  set digital pin 10 output as HIGH
  switch costume to verde
  think Ande
  wait 3 secs
  set digital pin 10 output as LOW
  set digital pin 11 output as HIGH
  switch costume to amarelo
  think Abrande
  wait 2 secs
  set digital pin 11 output as LOW
```

Add the remaining  
blocks

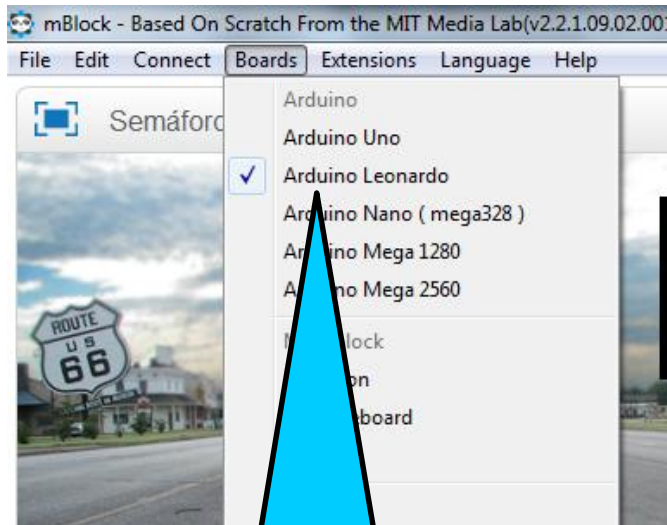
## Circuit design



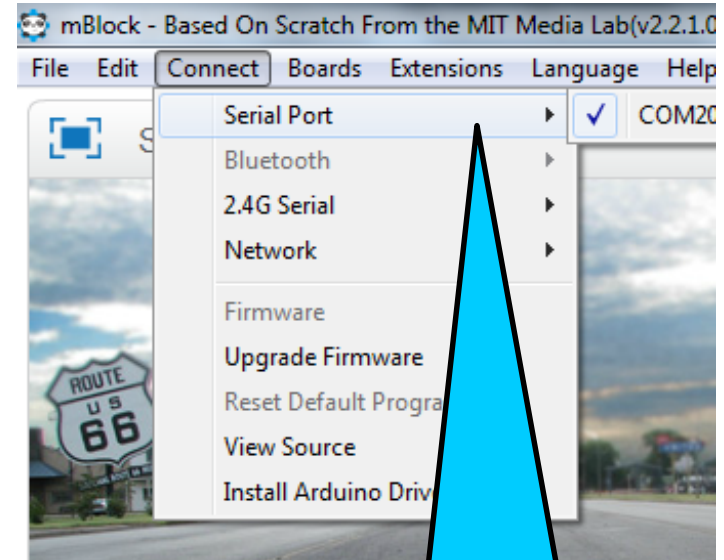
# ROBOTICS - Traffic Light



## Upload the program



Click on "Boards" and select the Arduino to use



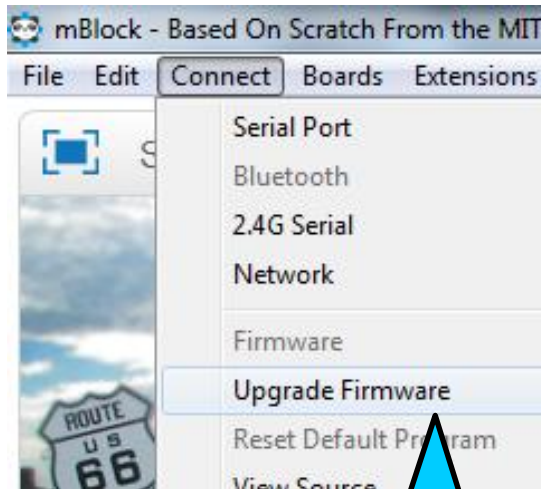
Click "Connect" and then "Serial Port" and select "COM"



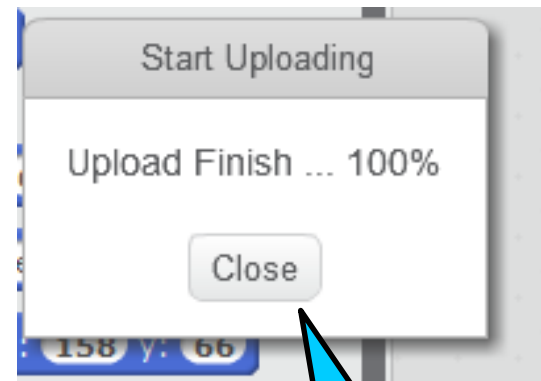
# ROBOTICS - Traffic Light



## Upload the program



Click "Connect" and select  
"Upgrade Firmware"



When you finish "Upload"  
click "Close"

# ROBOTICS - Traffic Light

