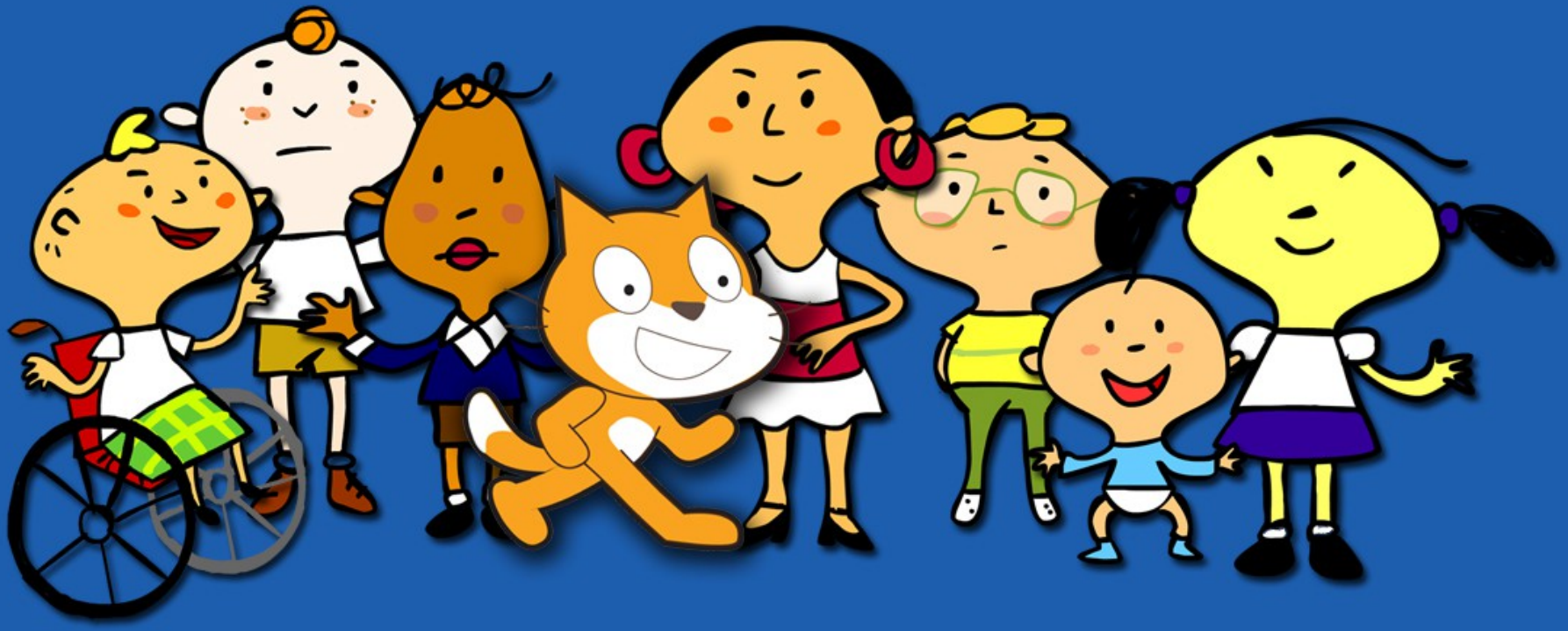
TANGIBLE DIGITAL ENVIRONMENT
SHARED GEOMETRY

Joan Gelabert & Jesús Arbués

INDEX

0. INTRODUCTION

OBJECTIVES:
DIGITAL INCLUSION

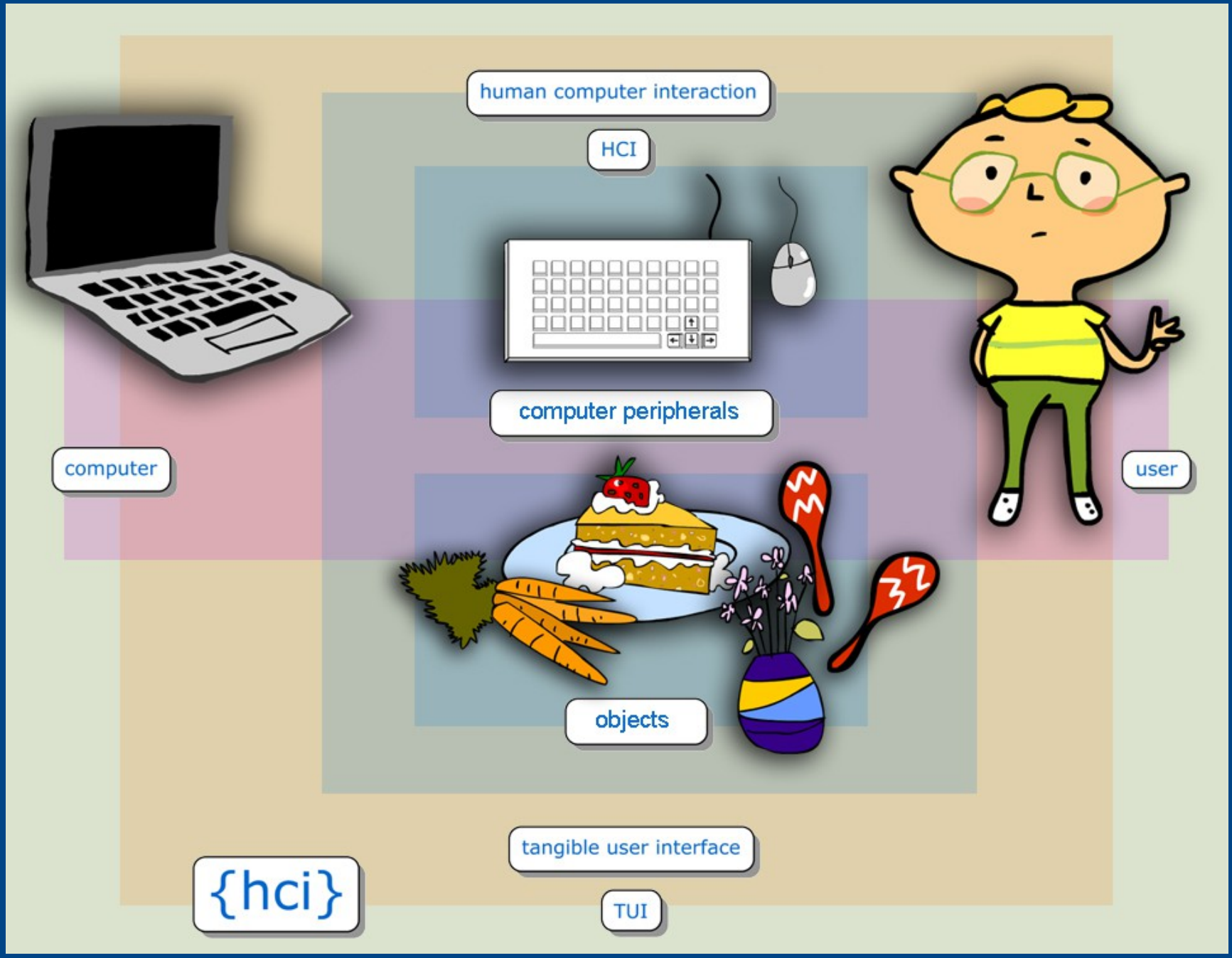


INTRODUCTION
0

INCLUSIÓN DIGITAL

DIGITAL INCLUSION

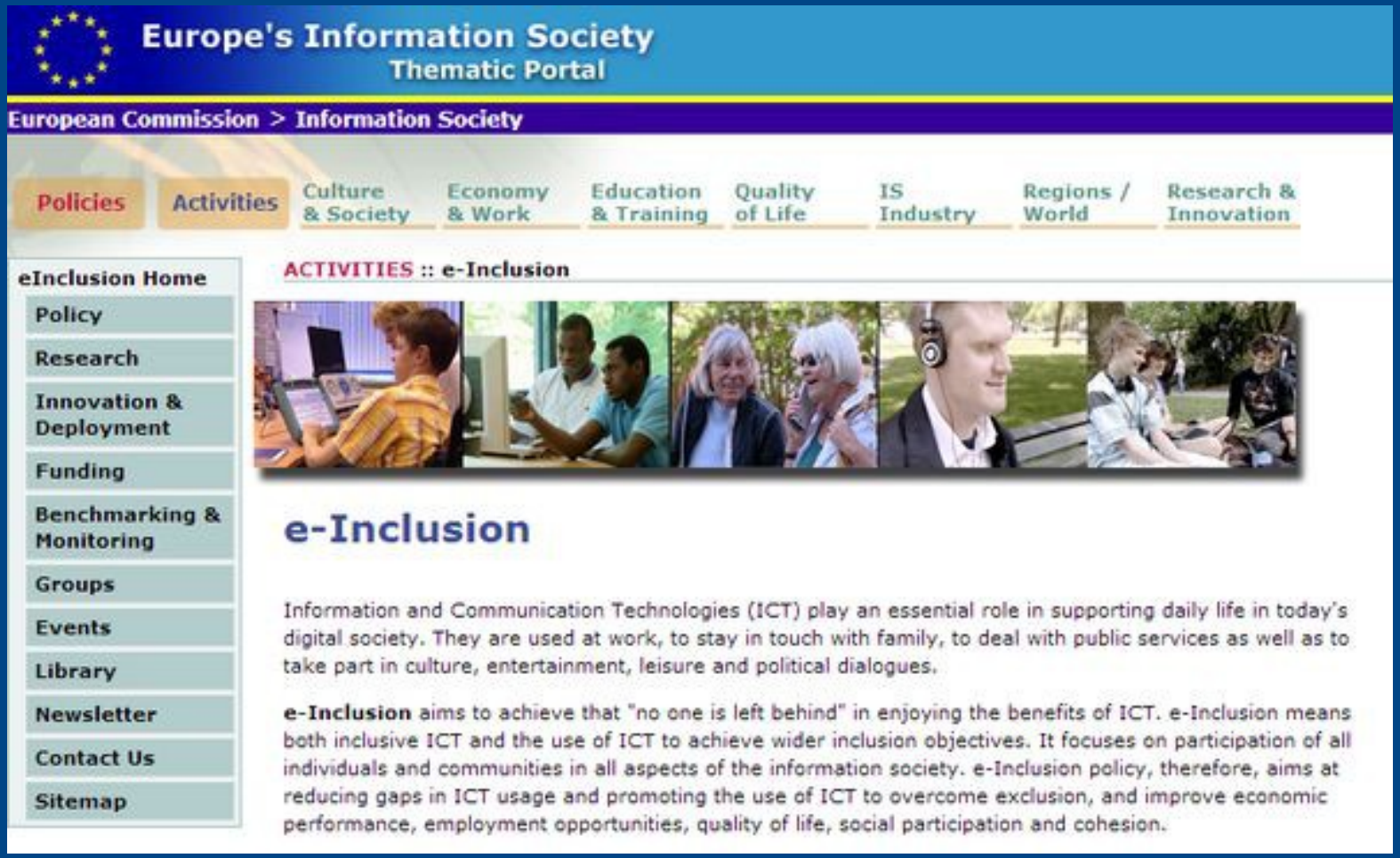
INCLUSIÓN DIGITAL



APLICACIÓN MULTIMÉDIA ACCESIBLE

ACCESSIBLE MULTIMEDIA APPLICATION

e-Inclusion

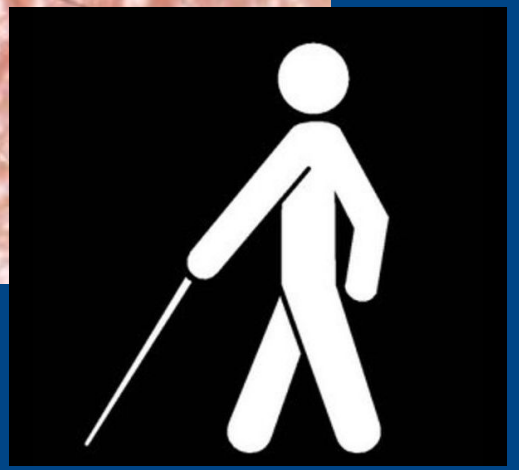


LINK

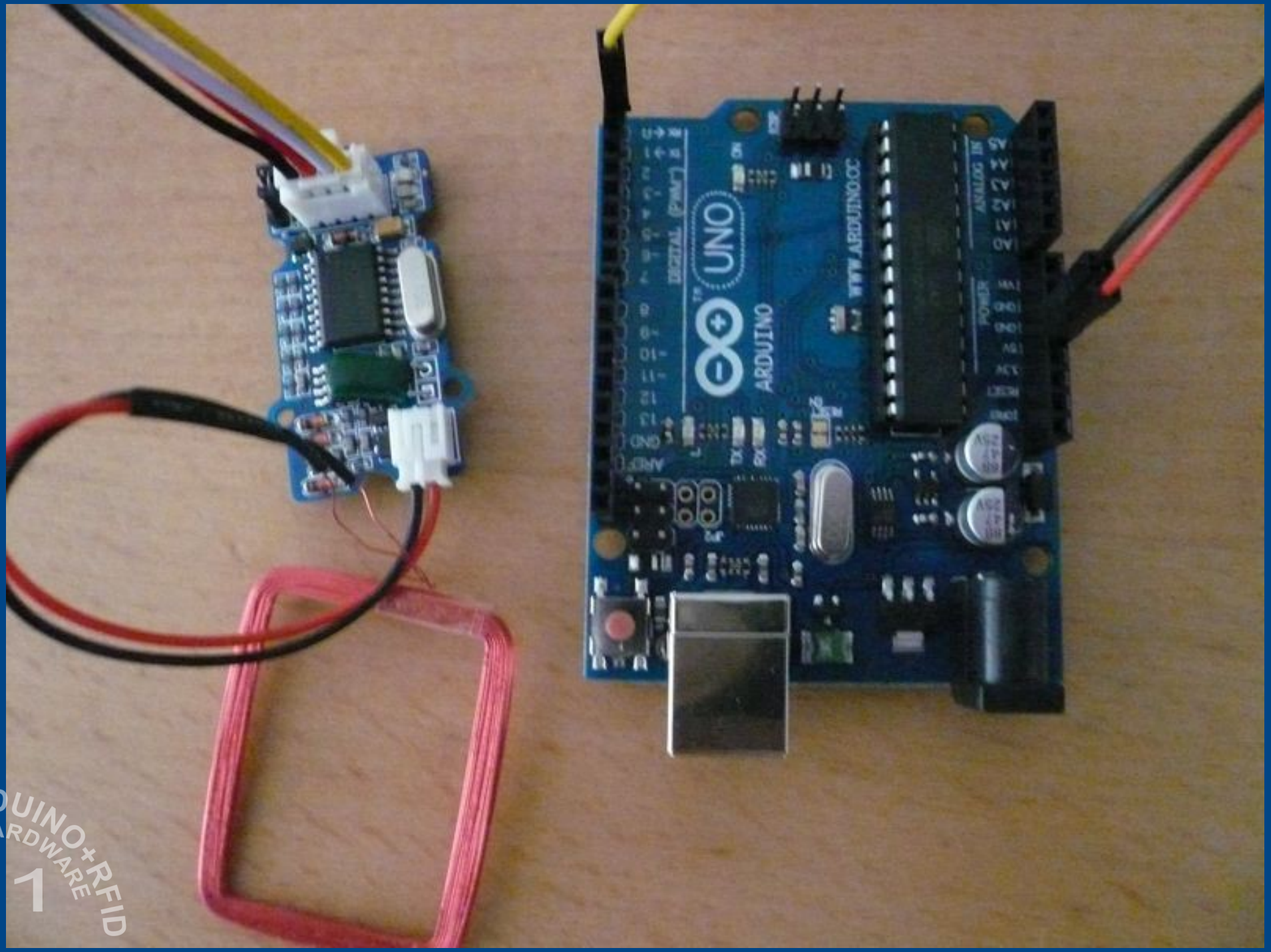
WE ATTEMPT TO INTEGRATE BLIND AND VISUALLY IMPAIRED PEOPLE IN ...

INTRODUCTION

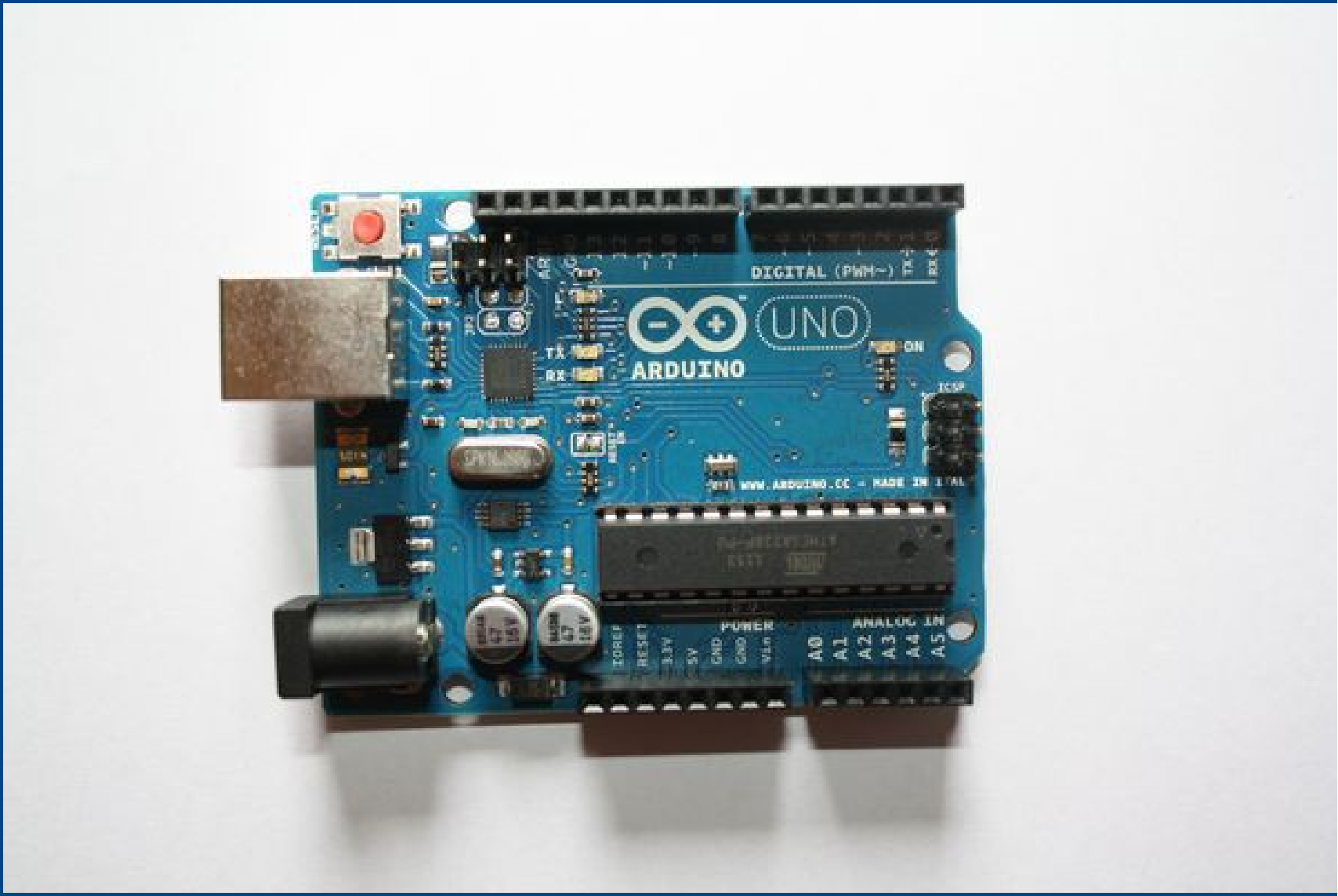
...HOBBIES AND LEISURE ACTIVITIES SO THEY CAN PARTICIPATE ON EQUAL TERMS WITH THE COMMUNITY MEMBERS



1. HARDWARE: ARDUINO + RFID



PLACA/BOARD
ARDUINO UNO

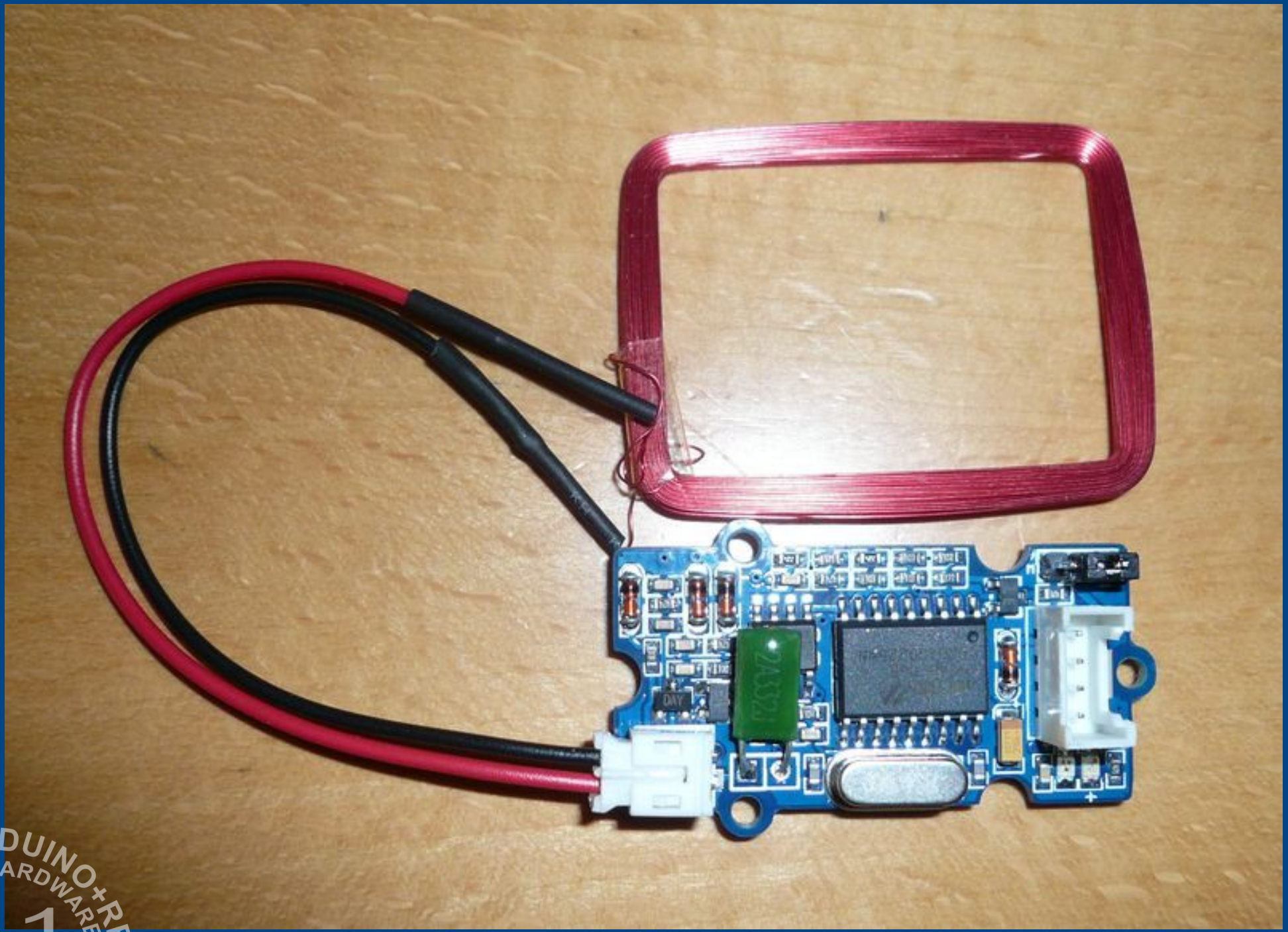


SONADOR/BUZZER

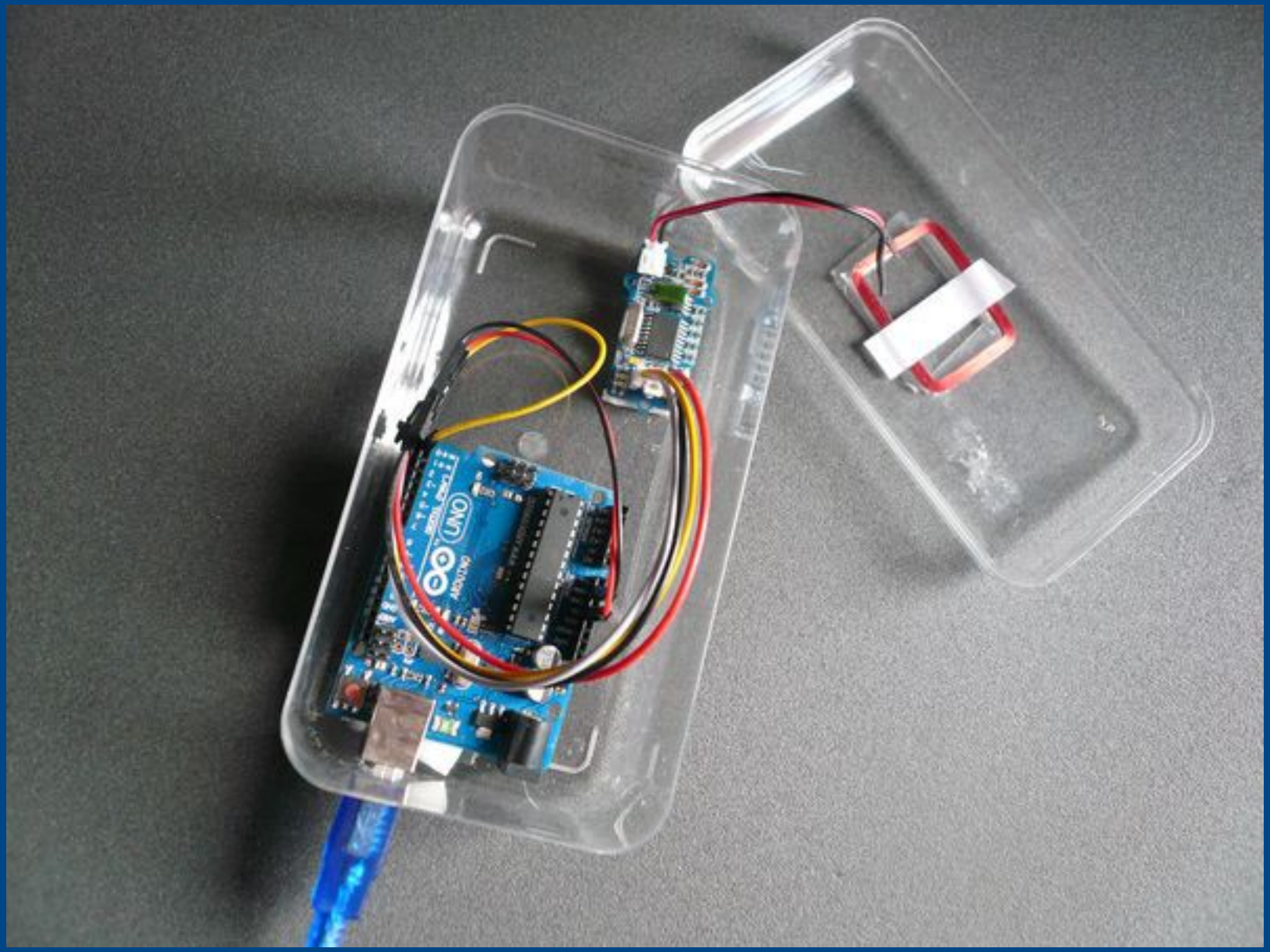
Necesario para personas con ceguera o baja visión.
Confirma que el lector RFID ha recibido información

Required for people with blindness or low vision.
Confirms that the RFID reader has received information

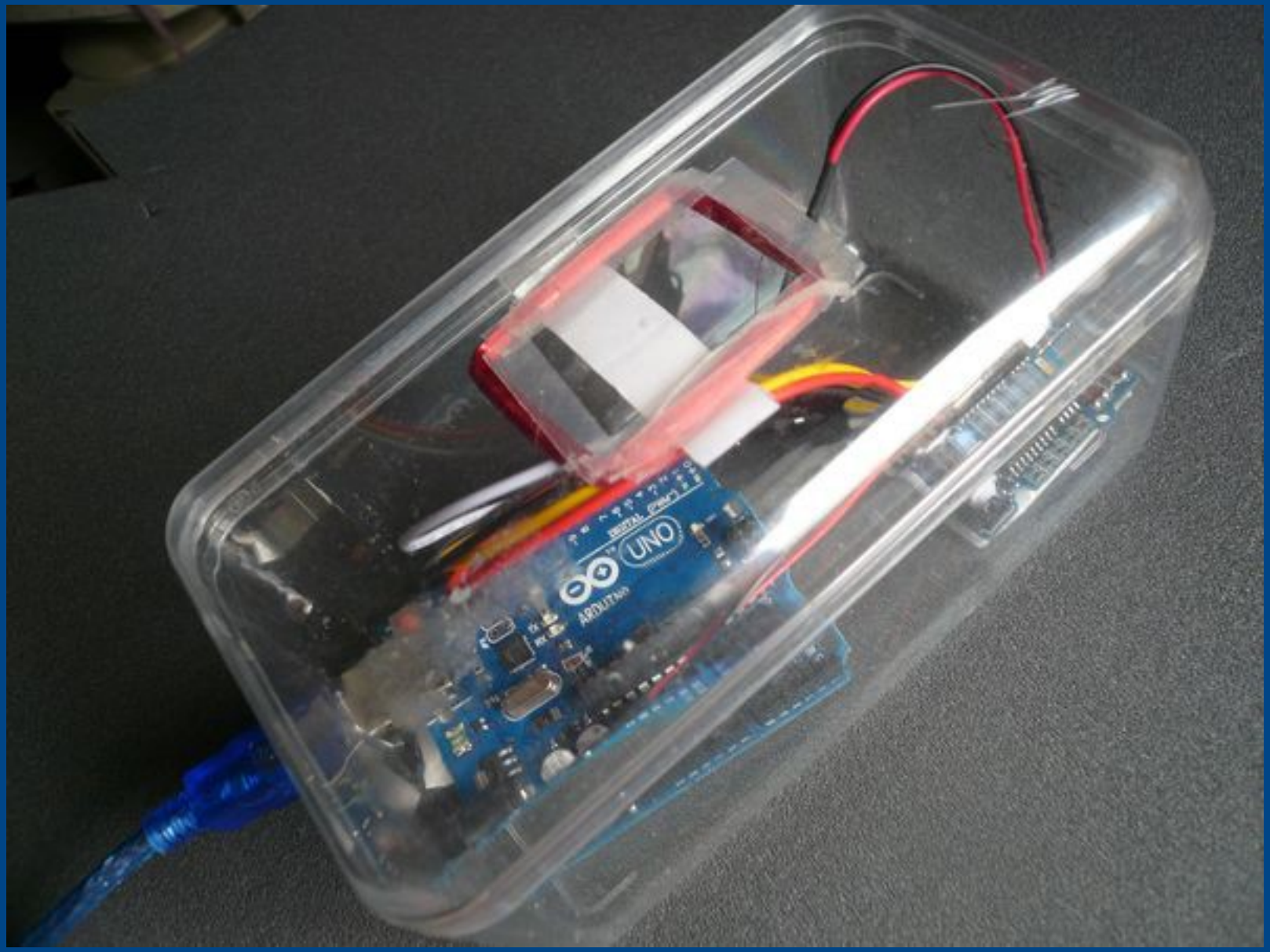
LECTOR/READER RDIF



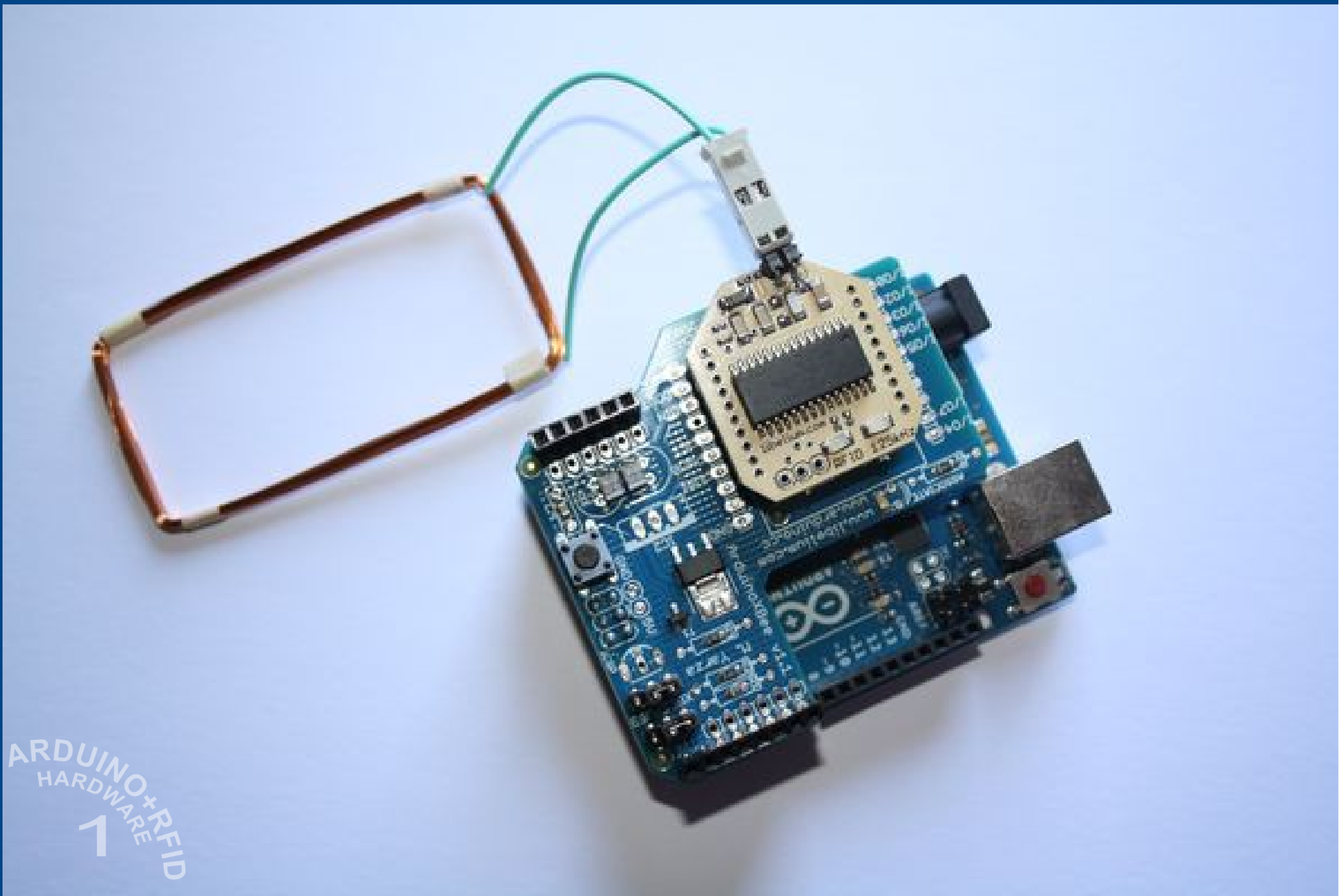
PACK



PACK



Otras versiones de Hardware/Other versions of Hardware
Arduino + Xbee + RFID reader



2. ARDUINO + COMPUTER (DRIVERS)
ARDUINO ENVIRONMENT

ARDUINO + COMPUTER DRIVERS 2

WWW.ARDUINO.CC link

ARDUINO

search

Compra | Descarga | Primeros Pasos | Aprende | Referencia | Hardware | FAQ | Blog » | Forum » | Playground »

IMPORTANTE: EL 26 DE SEPTIEMBRE DE 2010, EL SITIO WEB OFICIAL EN INGLÉS DE ARDUINO FUE ACTUALIZADO CON NUEVO CONTENIDO SOBRE LAS PLACAS UNO Y MEGA, ASÍ COMO CON TODA UNA SERIE DE TUTORIALES. ¡LA MAYORÍA DE ESTOS MATERIALES NECESITAN SER TRADUCIDOS AL ESPAÑOL, TODAVÍA!

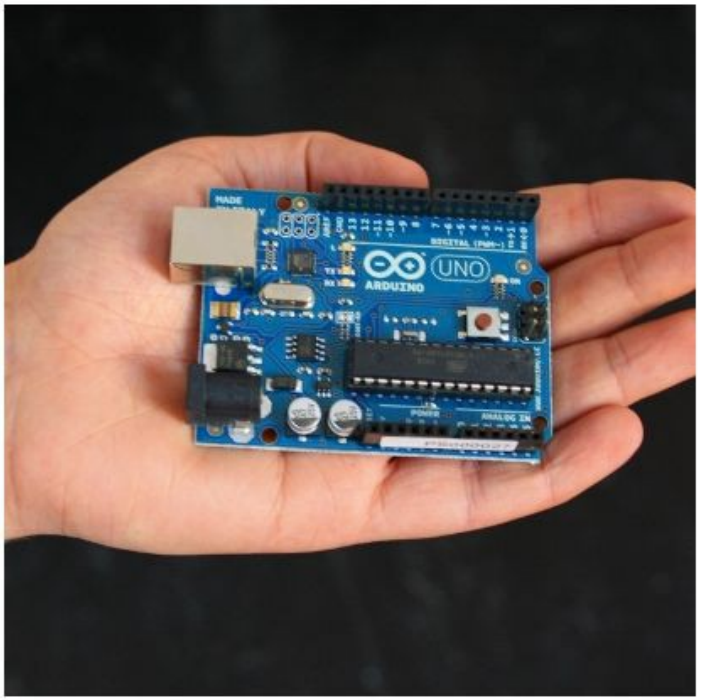


Foto por el A-Team

Arduino es una plataforma de electrónica abierta para la creación de prototipos basada en software y hardware flexibles y fáciles de usar. Se creó para artistas, diseñadores, aficionados y cualquiera interesado en crear entornos u objetos interactivos.

Arduino puede tomar información del entorno a través de sus pines de entrada de toda una gama de sensores y puede afectar aquello que le rodea controlando luces, motores y otros actuadores. El microcontrolador en la placa Arduino se programa mediante el lenguaje de programación Arduino (basasdo en Wiring) y el entorno de desarrollo Arduino (basado en Processing). Los proyectos hechos con Arduino pueden ejecutarse sin necesidad de conectar a un ordenador, si bien tienen la posibilidad de hacerlo y comunicar con diferentes tipos de software (p.ej. Flash, Processing, MaxMSP).

ARDUINO+ COMPUTER DRIVERS 2

SOFTWARE

Descarga el Software de Arduino

El entorno de cÃ³digo abierto Arduino hace fÃ¡cil escribir cÃ³digo y cargarlo a la placa E/S. Funciona en Windows, Mac OS X y Linux. El entorno estÃ¡ escrito en Java y basado en Processing, avr-gcc y otros programas tambiÃ©n de cÃ³digo abierto.

EL SOFTWARE Arduino SE PROPORCIONA "COMO ES" Y NOSOTROS NO MANIFESTAMOS NI IMPLICA NINGUNA GARANTÃA CON RESPECTO A SU FUNCIONALIDAD, OPERATIVA O USO, INCLUYENDO, NINGUNA LIMITACIÃ"N NI IMPLICACIÃ"N RESPECTO GARANTÃAS DE COMERCIALIZACIÃ"N, ADECUACIÃ"N PARA PROPÃ"SITOS PARTICULARES O INFRINGIMIENTO. EXPRESAMENTE NOS DESVINCULAMOS DE CUALQUIER CONSECUENCIA, INCIDENTE O DAÃ'O DIRECTO O INDIRECTO INCLUYENDO, SIN LIMITE, PERDIDA DE BENEFICIOS, INTERRUPCIONES DE SERVICIO O PERDIDA DE DATOS, INDEPENDIENTEMENTE DEL FORMATO DE ACCIÃ"N O TEORÃA LEGAL EN QUE SE REALICE DICHA DEMANDA, INCLUSO SI HUBIERA ADVERTENCIA DE LA POSIBILIDAD O SIMILITUD DE DICHOS DAÃ'OS.

Descargando el software desde esta pÃ¡gina se aceptan los tÃ©rminos anteriormente citados.

Descarga

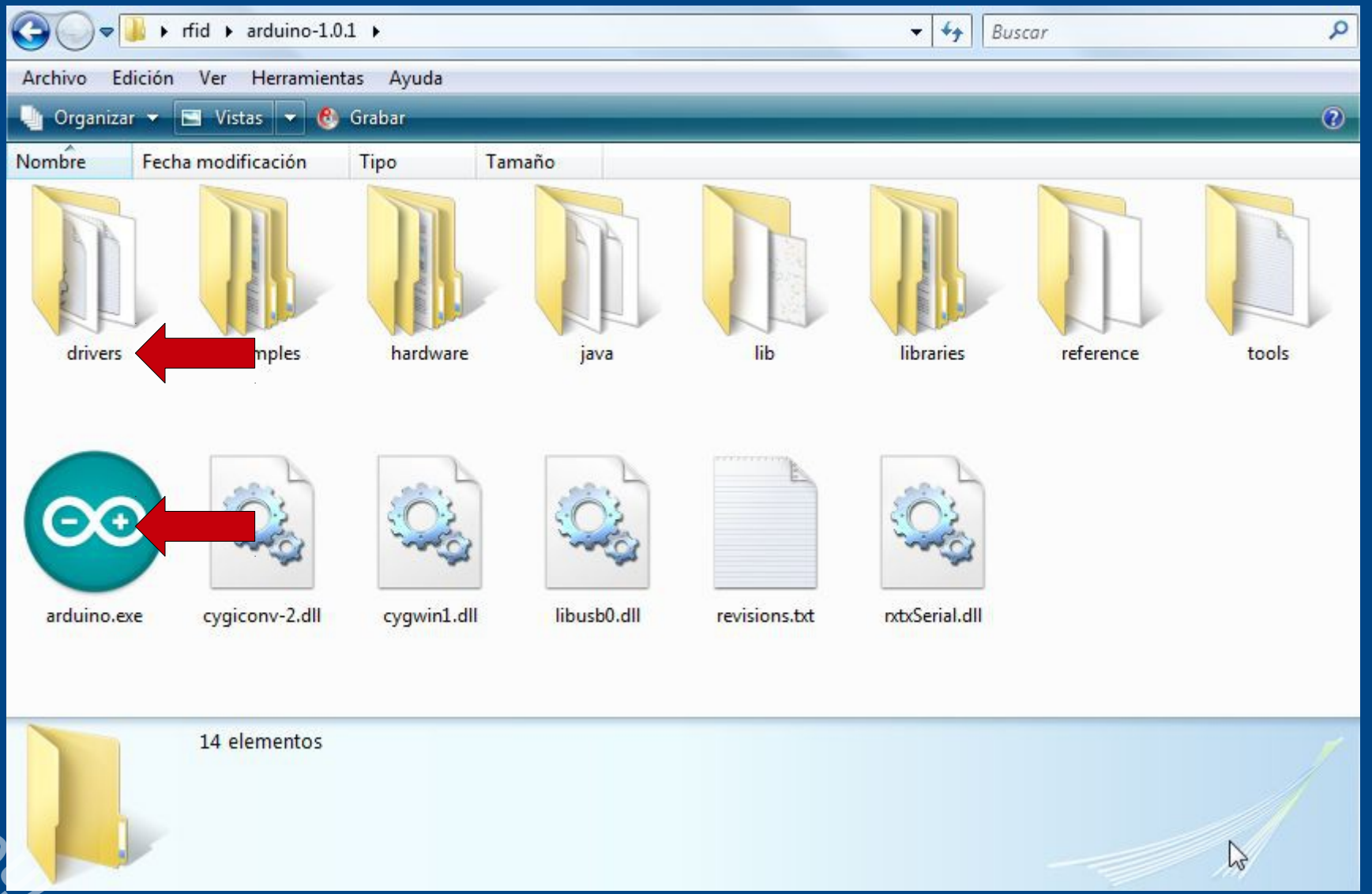
Arduino 0019 (notas de la versiÃ³n), hospedado en Google Code:

- Windows
- Mac OS X
- Linux: 32 bit - comprueba aqui las compatibilidades.

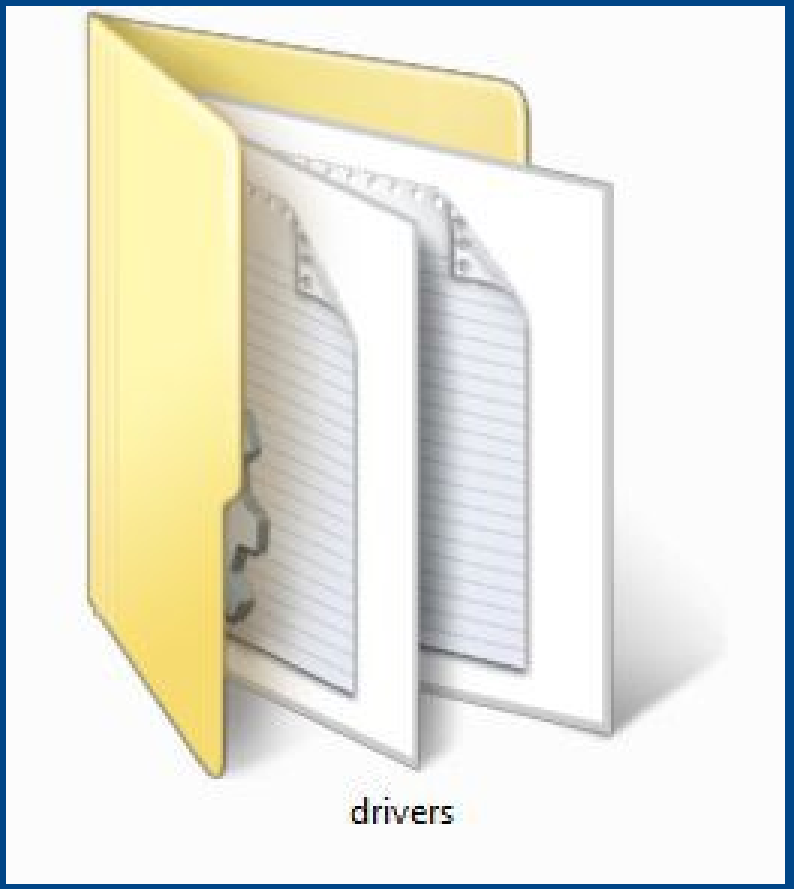
Siguientes pasos

Empezando
Referencias
Entorno
Ejemplos
Fundamentos

ARDUINO ENVIRONMENT



ARBUINO BOARD + DRIVERS



ARDUINO+ COMPUTER DRIVERS 2

3. ARDUINO + SCRATCH (FIRMWARE)

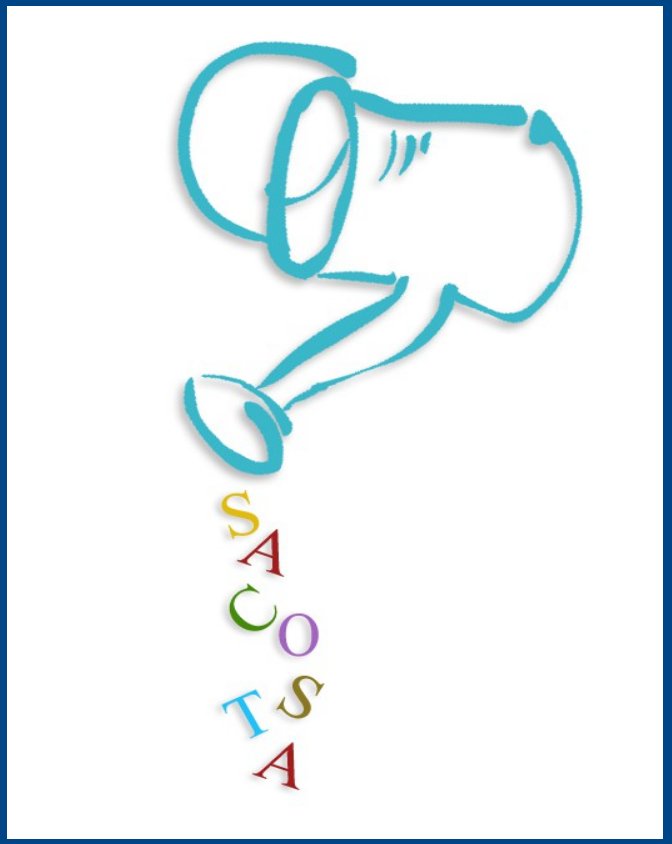
LINK FIRMWARE ARDUINO

CITILAB HA DESARROLLADO S4A
NOSOTROS HEMOS MODIFICADO SU FIRWARE

S4A DEVELOPED BY CITILAB
WE HAVE MODIFIED YOUR FIRWARE

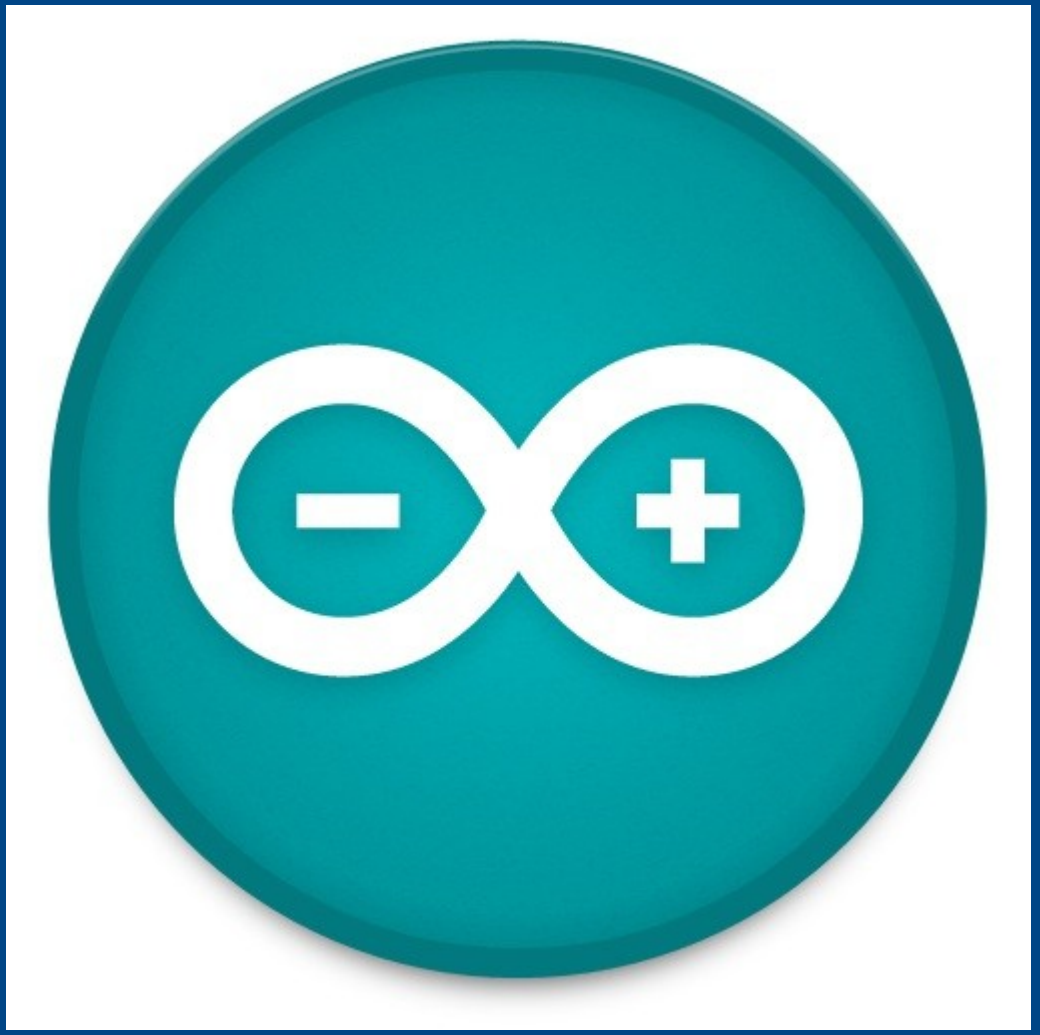
ARDUINO+
SCRATCH
FIRMWARE
3

LINK FIRMWARE ARDUINO SACOSTA.ORG

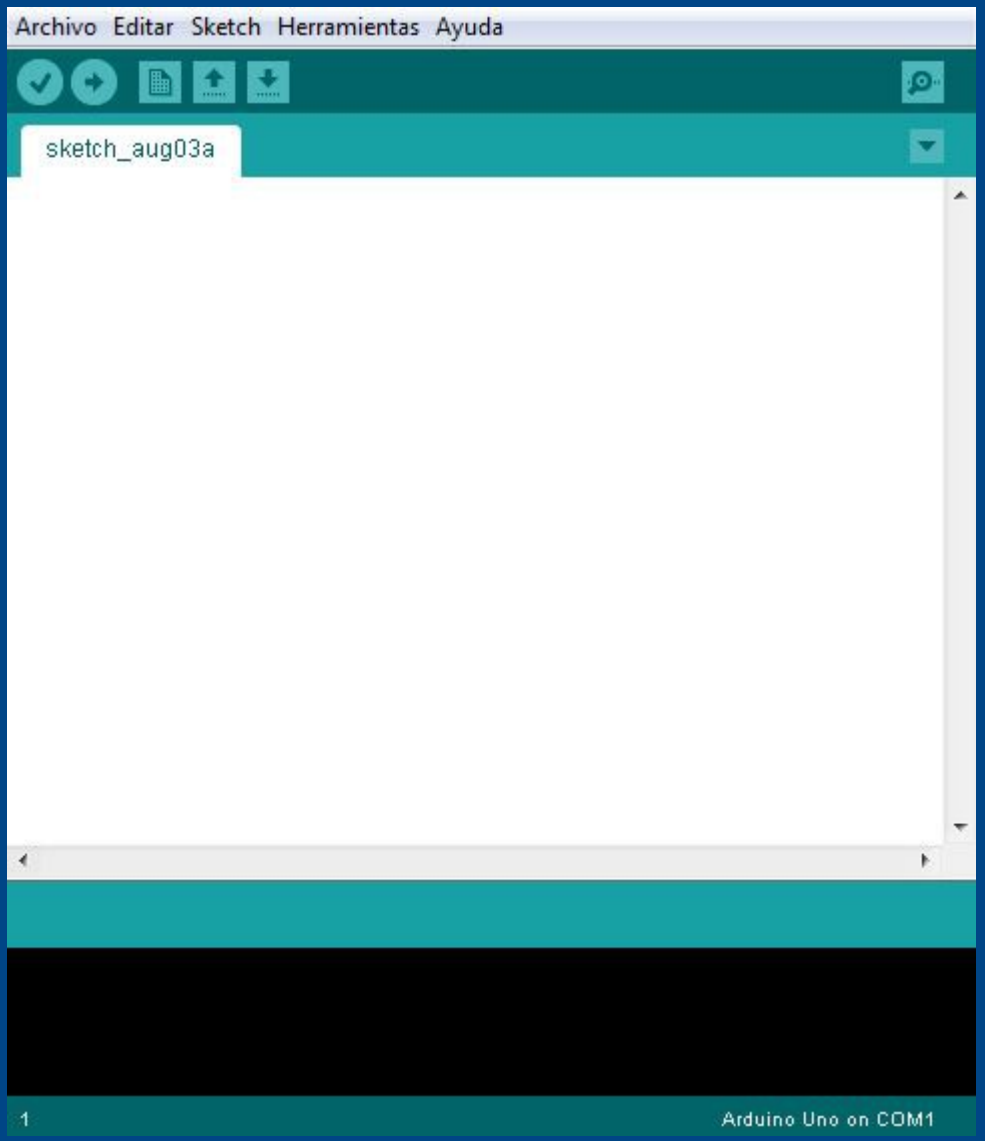


ARDUINO+
SCRATCH
FIRMWARE
3

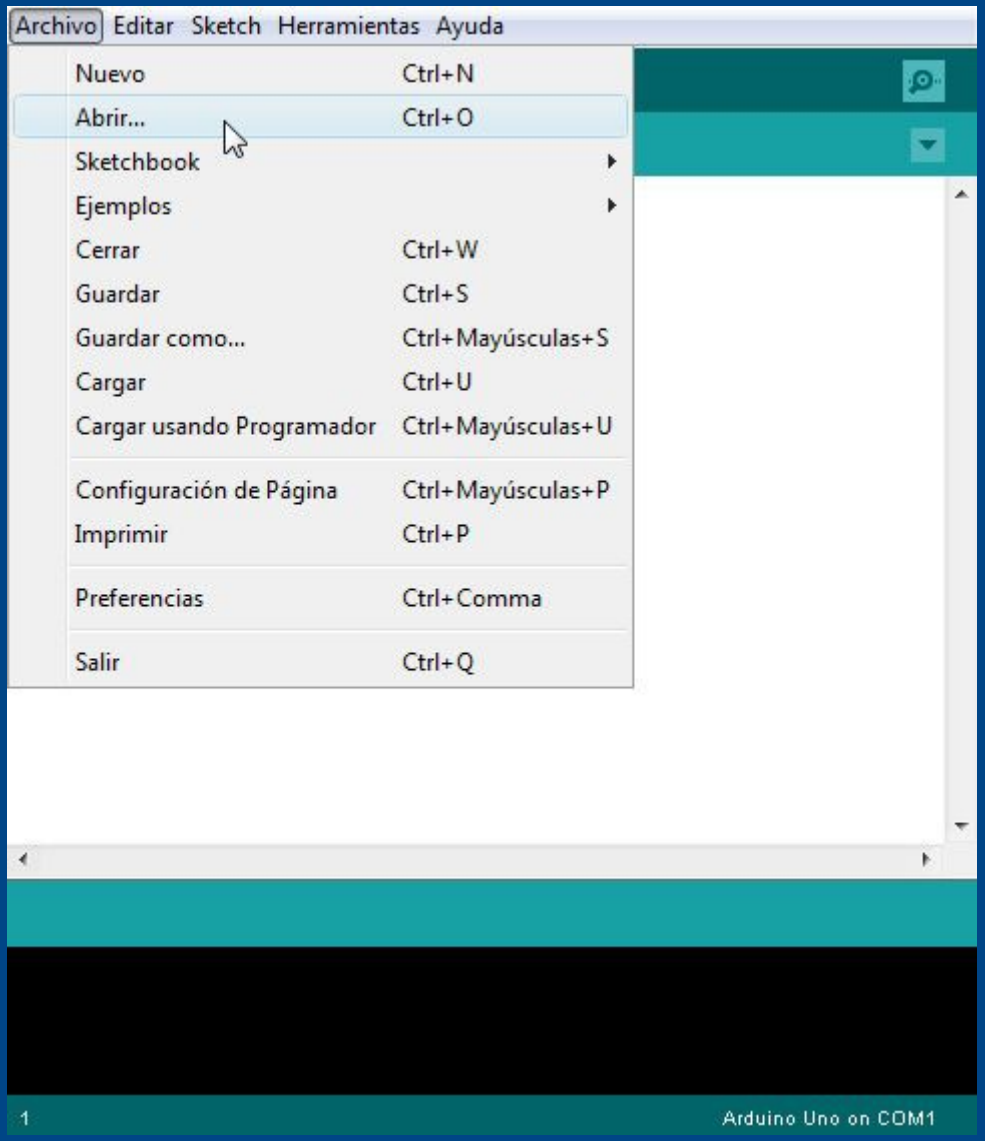
ARDUINO.EXE > FIRMWARE > ARDUINO BOARD



ARDUINO.EXE

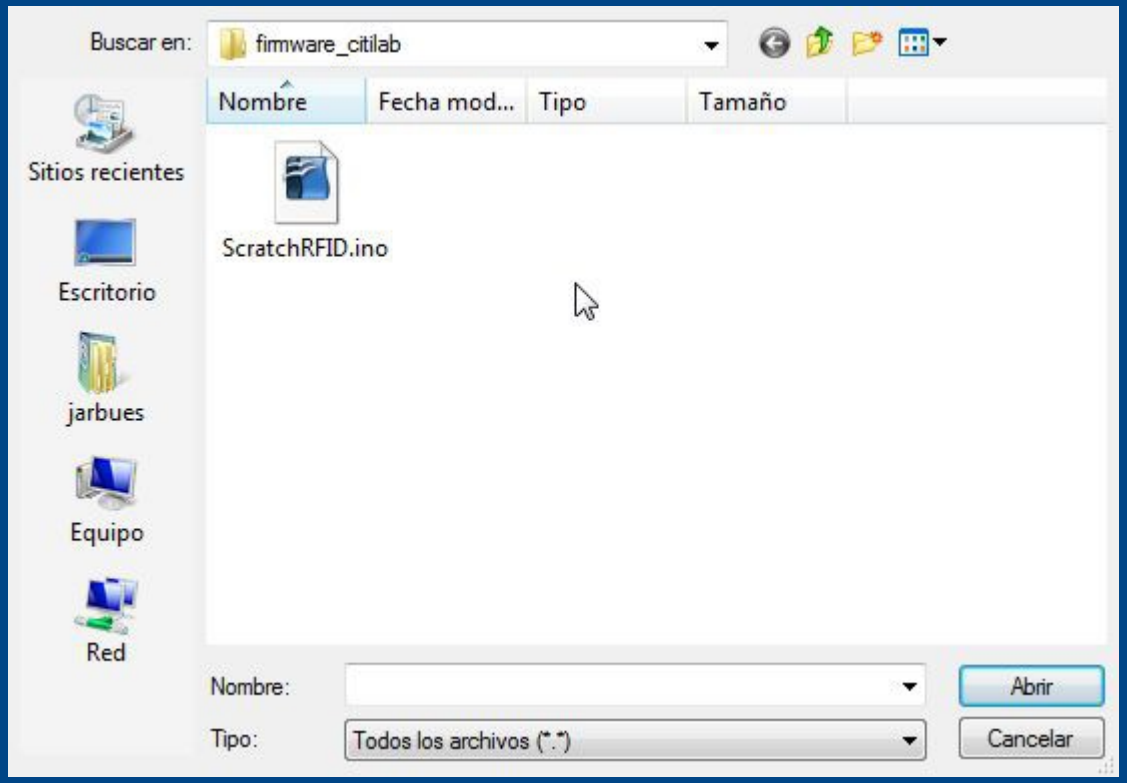

Archivo Editar Sketch Herramientas Ayuda
sketch_aug03a
1
Arduino Uno on COM1

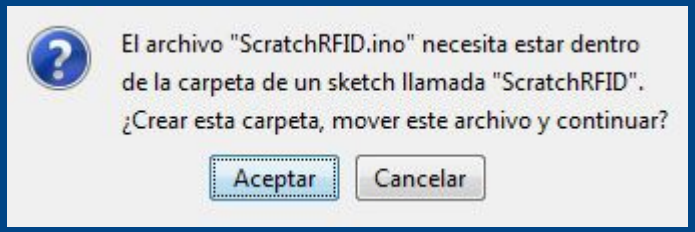
OPEN FIRMWARE



ARDUINO+ SCRATCH FIRMWARE 3

OPEN FIRMWARE

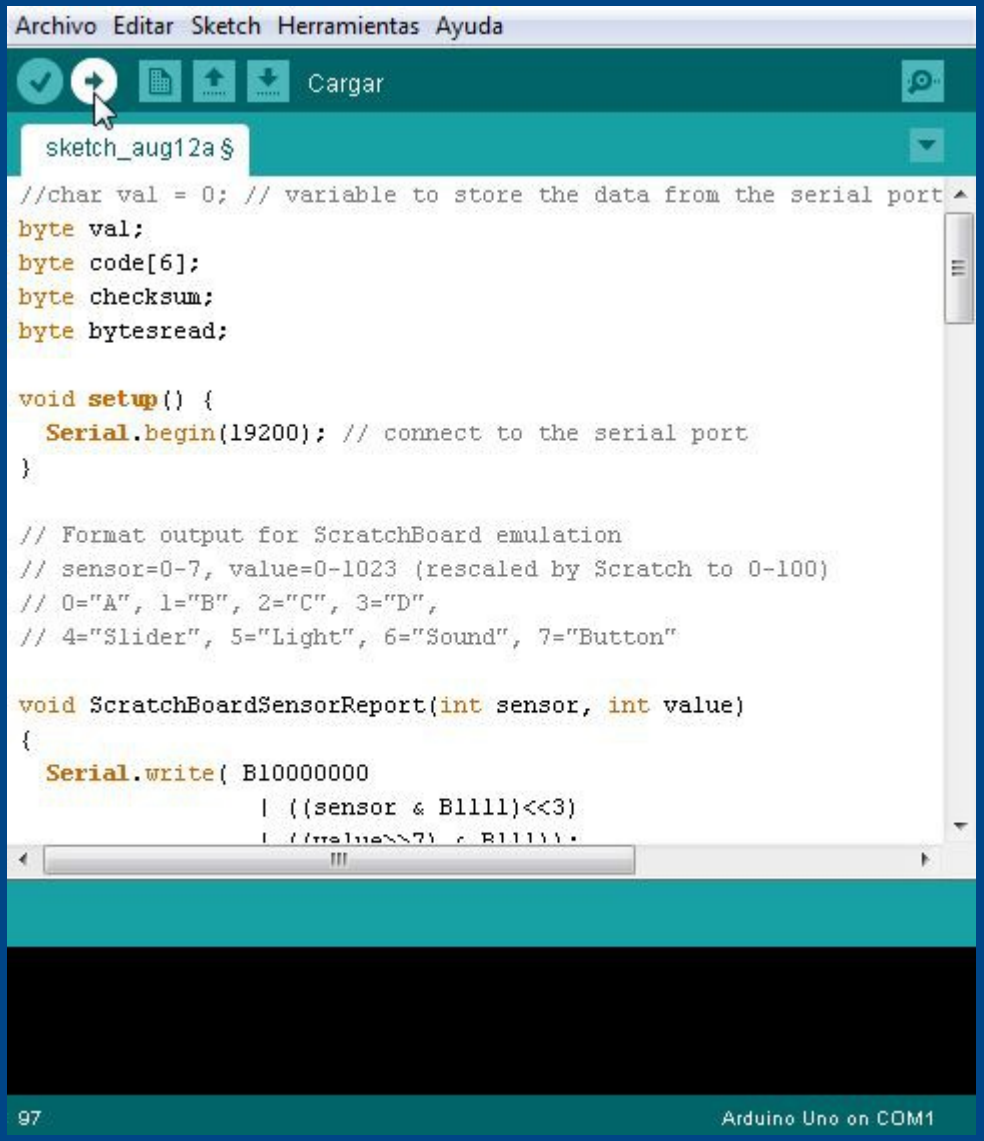




ARDUINO+ SCRATCH FIRMWARE 3

```
// Basado en ArduinoBoard de Rai and Mike McKenzie modificado por Francesc Galbany
//============================================================================

//#include <Wire.h>
char rfid[12];
int pos=0;
void ScratchBoardSensorReport(int sensor, int value)
{
  Serial.write( B10000000
    | ((sensor & B1111)<<3)
    | ((value>>7) & B111));
  Serial.write( value & B1111111);
}

void setup()
{
  Serial.begin(9600);
  pinMode(4, INPUT);
}

int map3a1(char a, char b, char c){
  int val = 255*hexVal(a) + hexVal(b)*16 + hexVal(c);
  return map(val, 0, 4095, 0, 1023); // Passem de 4k a 1k perdent precisi´
}

int hexVal(char c){
  char ret = 0;
  if((c >= '0') && (c <= '9')){
    ret = c - '0';
  }else if((c >= 'A') && (c <= 'F')){
    ret = c - 'A' + 10;
  }
  return ret;
}
```

```
void loop()
{
  //Si hi ha dades RFID...
  if(Serial.available())
  {
    while(Serial.available()){
      delay(10);
      char c = (char)Serial.read();
      if( ((int)c >= 48) && ((int)c <=70)){
        rfid[pos]=c;
        pos++;
      }
      if(pos == 12){
       break;
      }
    }
    //Cal comprovar que i==12
    if(pos == 12){
      pos = 0;
      Serial.end();
      Serial.begin(38400);
      ScratchBoardSensorReport(0, map3a1(rfid[0],rfid[1],rfid[2]));
      ScratchBoardSensorReport(1, map3a1(rfid[3],rfid[4],rfid[5]));
      ScratchBoardSensorReport(2, map3a1(rfid[6],rfid[7],rfid[8]));
      ScratchBoardSensorReport(3, map3a1(rfid[9],rfid[10],rfid[11]));
      ScratchBoardSensorReport(4, 0);
      ScratchBoardSensorReport(5, 0);
      ScratchBoardSensorReport(6, 0);
      ScratchBoardSensorReport(7, digitalRead(4)?1023:0);
      tone(11,4000,200);
      delay(1000);
      ScratchBoardSensorReport(0, 0);
      ScratchBoardSensorReport(1, 0);
      ScratchBoardSensorReport(2, 0);
      ScratchBoardSensorReport(3, 0);
      delay(30);
      Serial.end();
      Serial.begin(9600);
    }
  }
  // Let Scratch catch up with us
  delay(30);
}
```



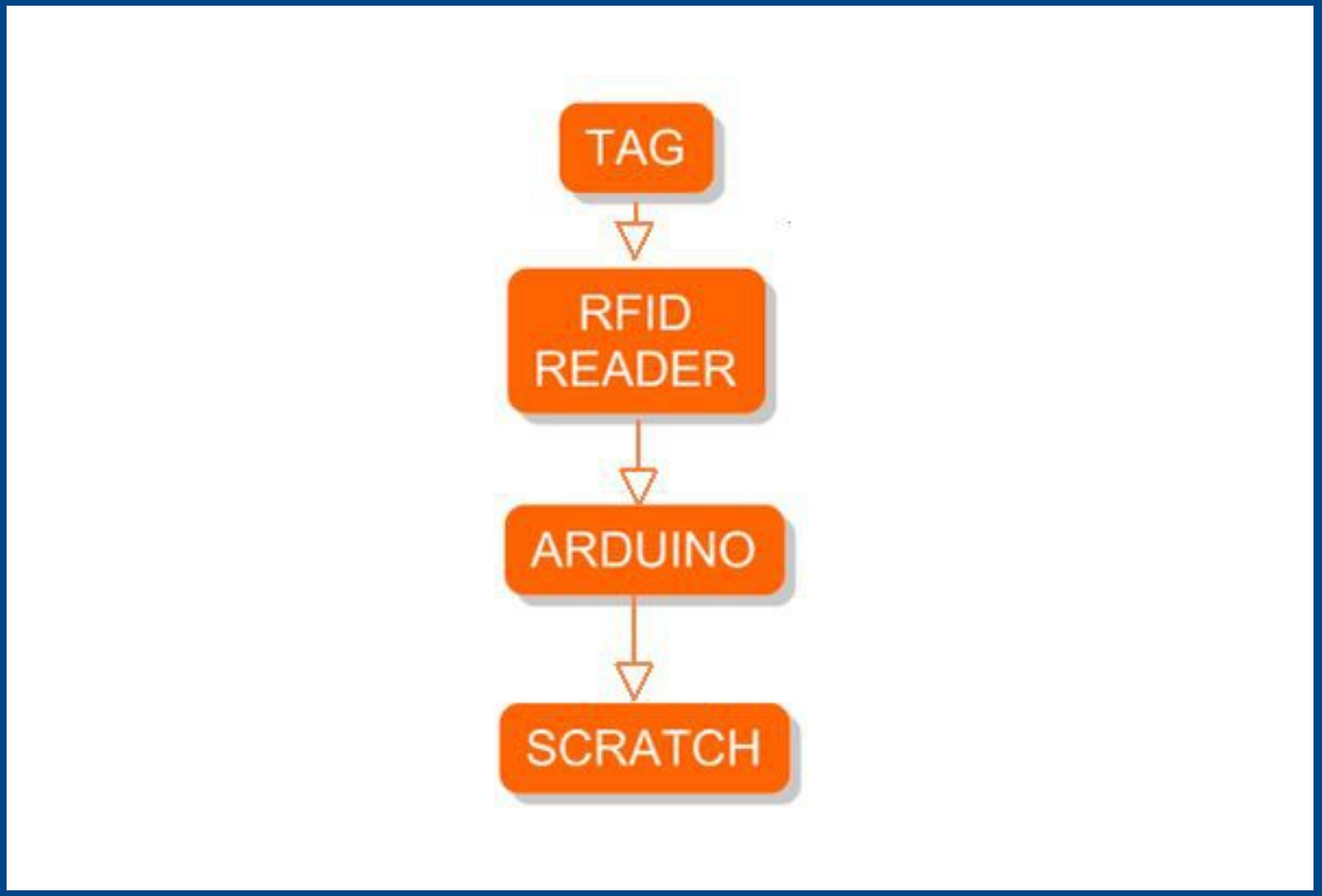
ARDUINO+ SCRATCH FIRMWARE 3

4. RFID

Radio-frequency identification (RFID) is the wireless non-contact use of radio-frequency electromagnetic fields to transfer data, for the purposes of automatically identifying and tracking tags attached to objects.

RFID: RADIO FREQUENCY IDENTIFICATION 4

RFID



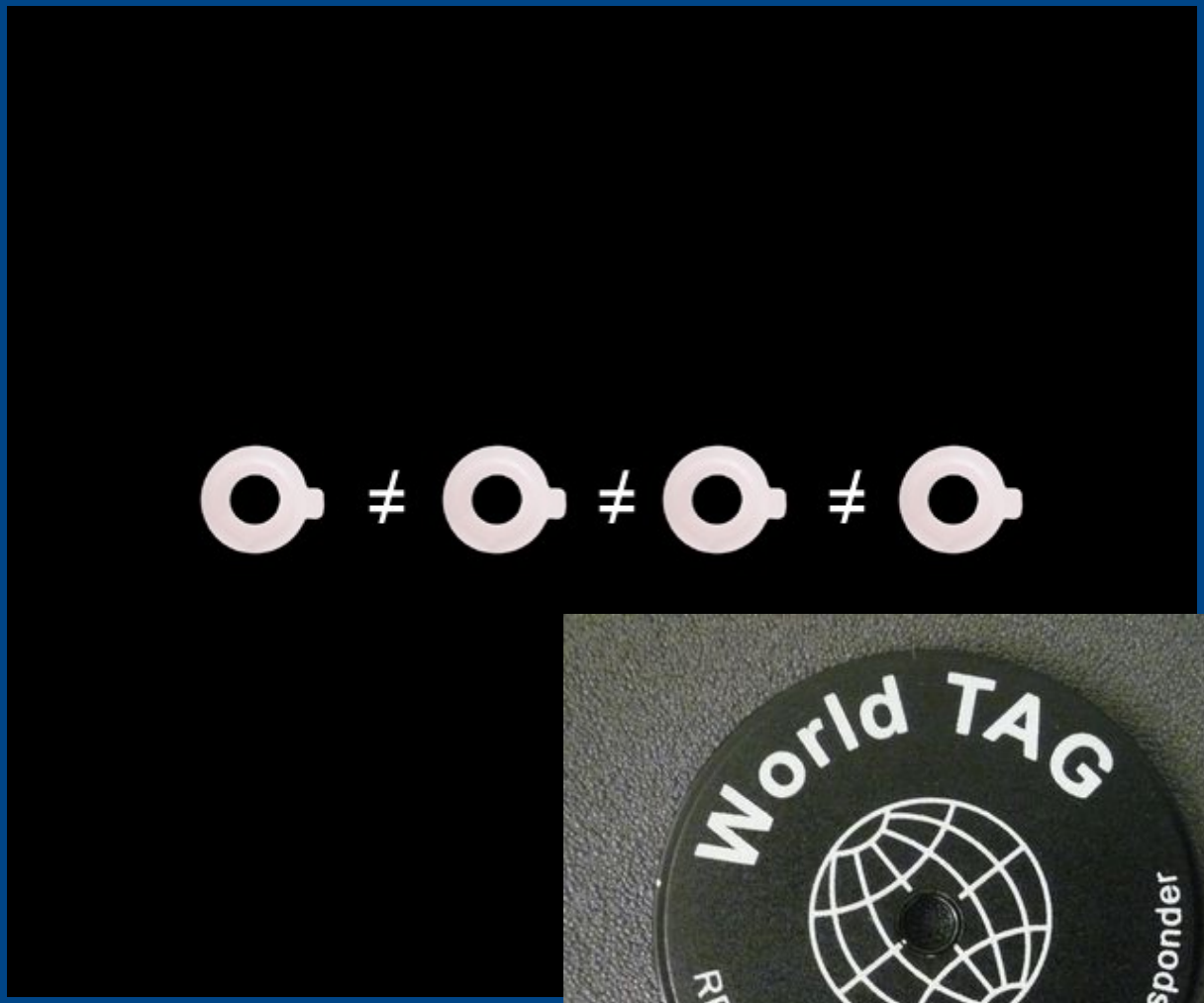
RFID: RADIO FREQUENCY IDENTIFICATION 4

Tags RFID


World TAG
RFID - Logistic and Industrial Transponder
Unique
World TAG
World TAG
RFID - Logistic and Industrial Transponder
Unique
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

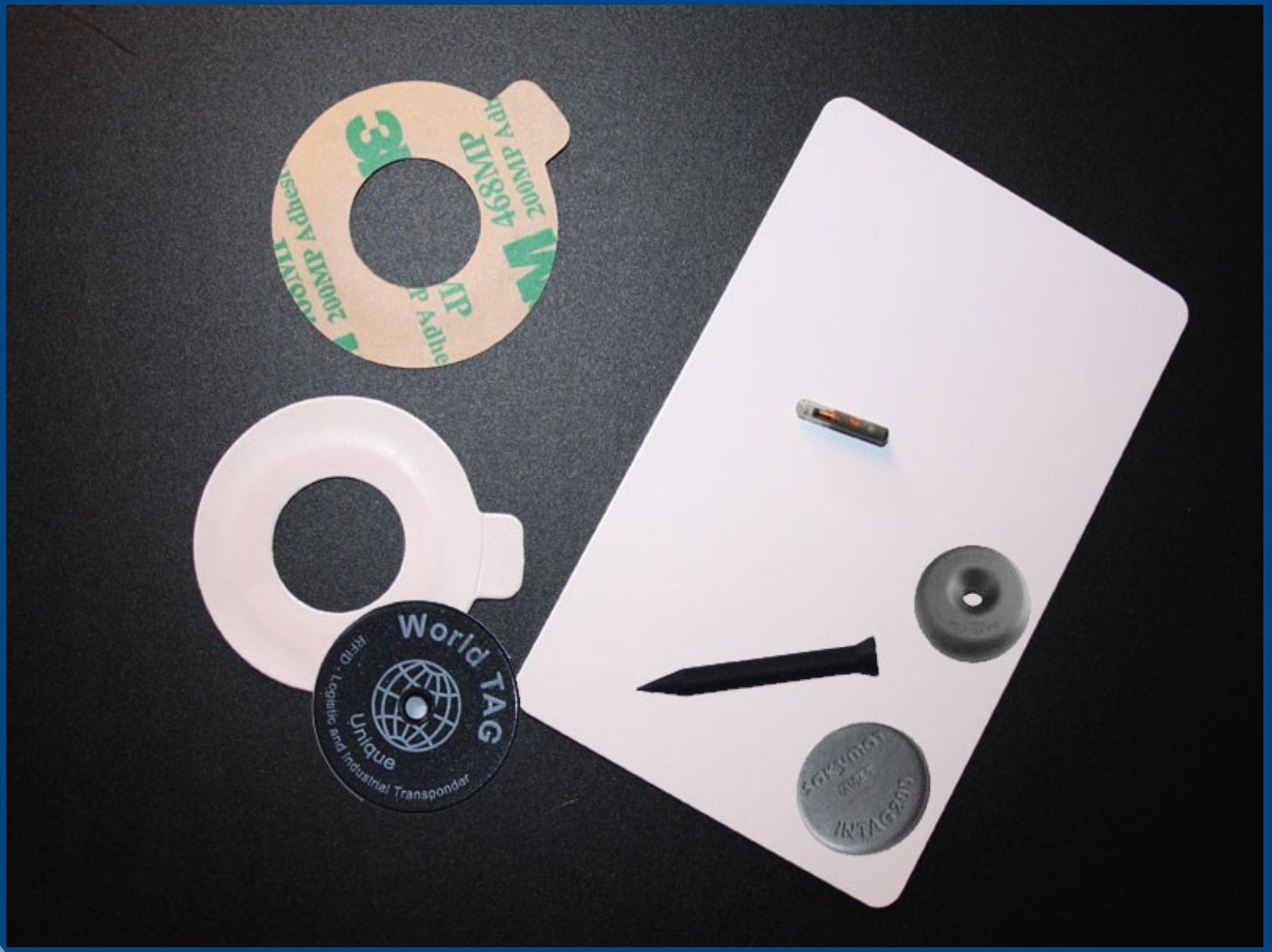
Tags RFID

ÚNICA / UNIQUE

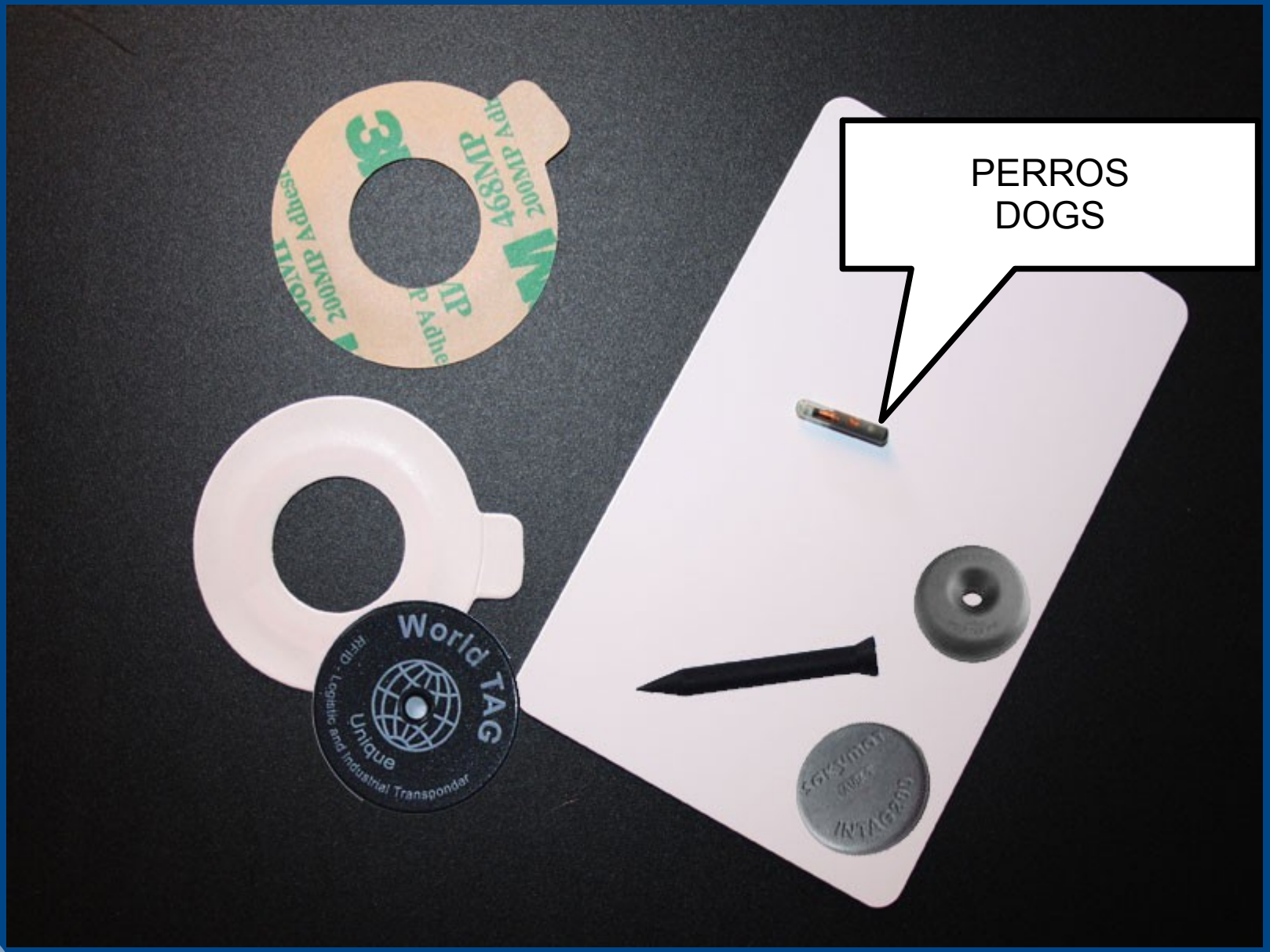


RFID: RADIO FREQUENCY IDENTIFICATION 4

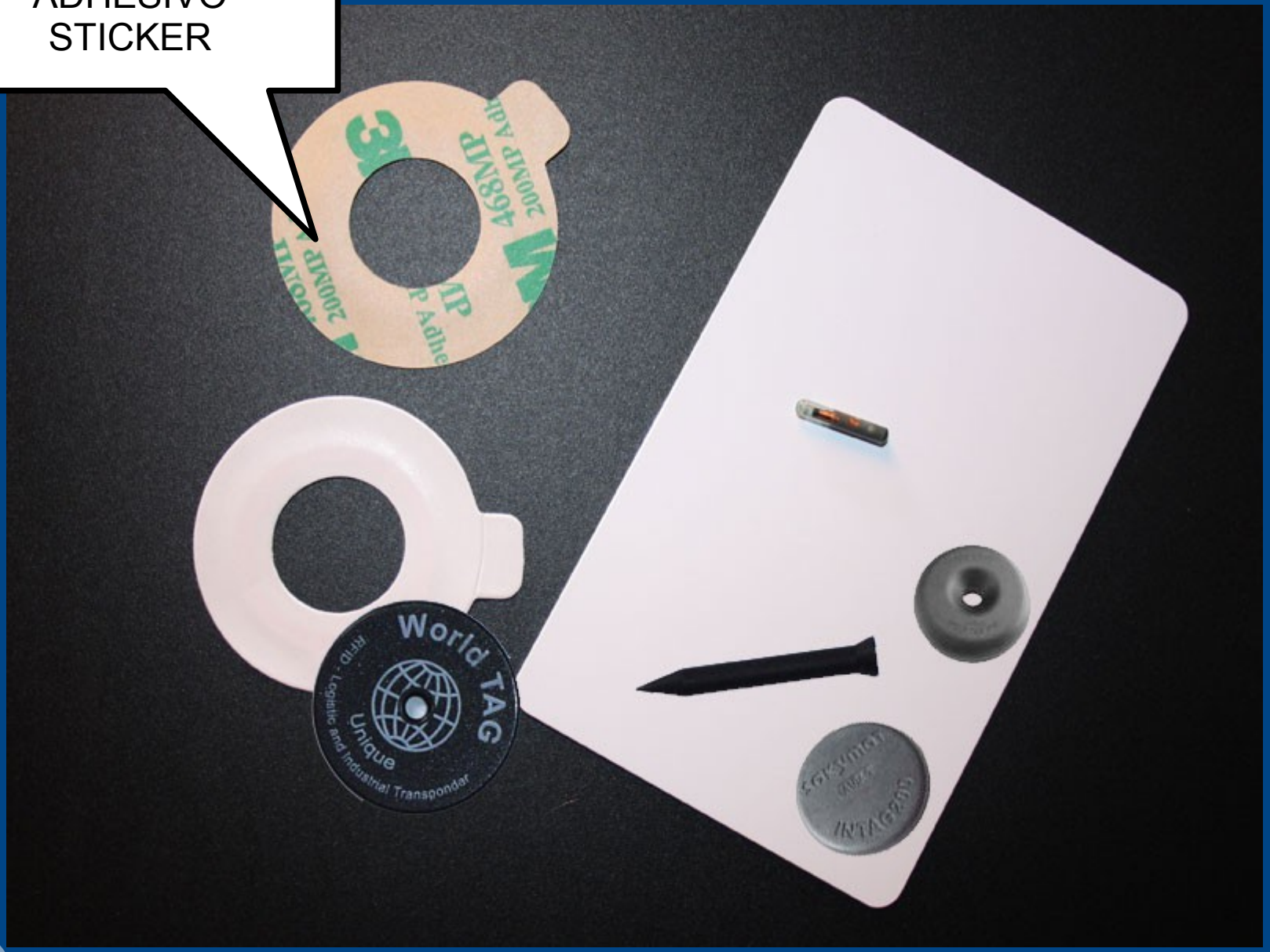
Tags RFID


World TAG
Unique
RFID - Logistic and Industrial Transponder

Tags RFID


PERROS
DOGS
World TAG
RFID - Logistic and Industrial Transponder
Unique

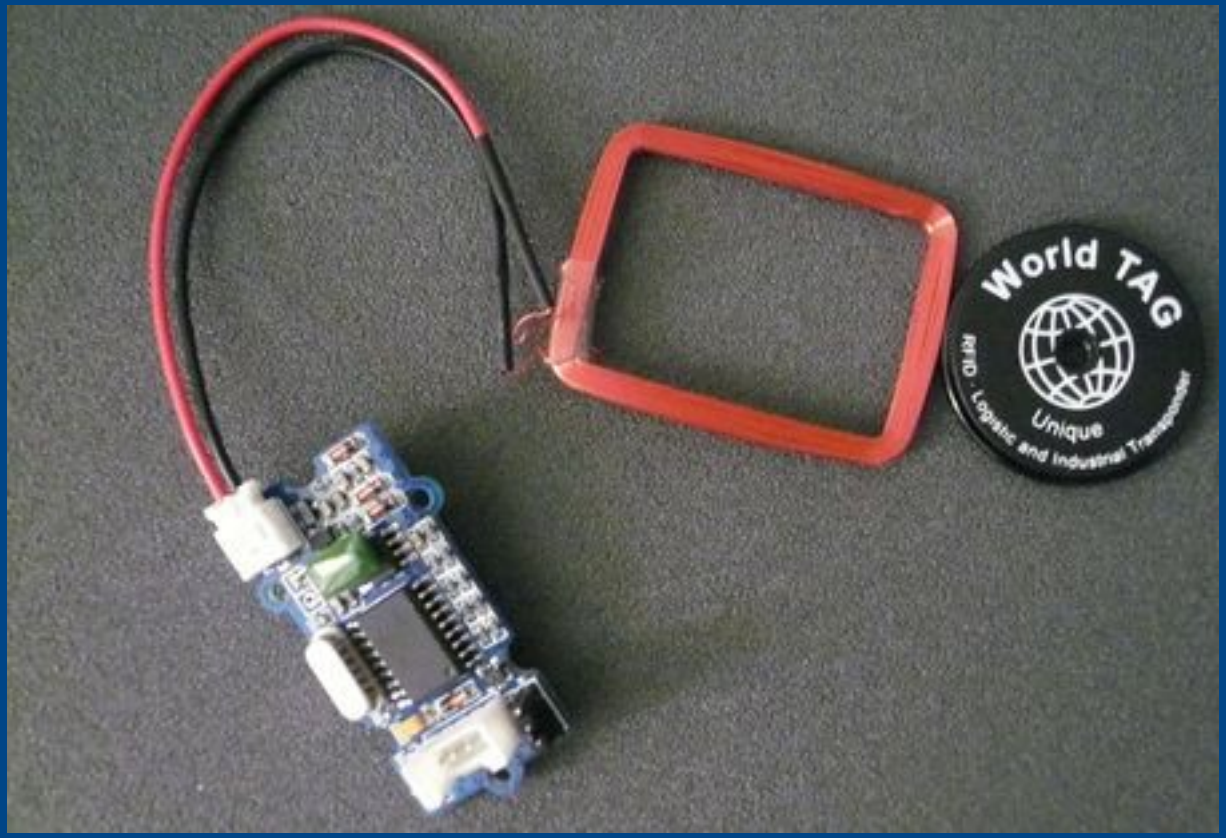
Tags RFID


ADHESIVO
STICKER
World TAG
Unique
RFID - Logistic and Industrial Transponder

Tags RFID

Tags RFID


ALMACÉN
STORE
World TAG
RFID - Logistic and Industrial Transponder
Unique

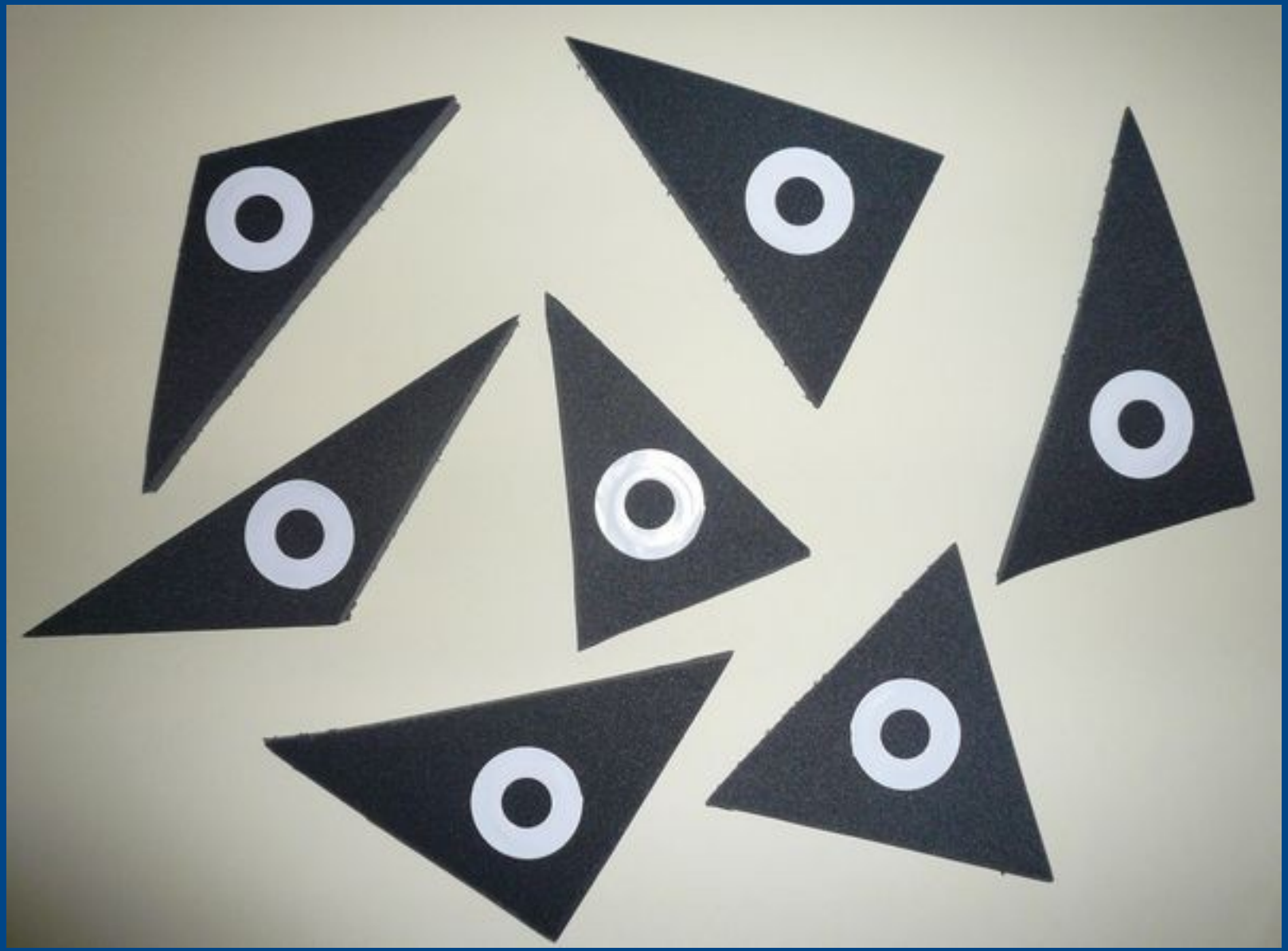


RFID: RADIO FREQUENCY IDENTIFICATION 4

5. PHISYCAL OBJECTS

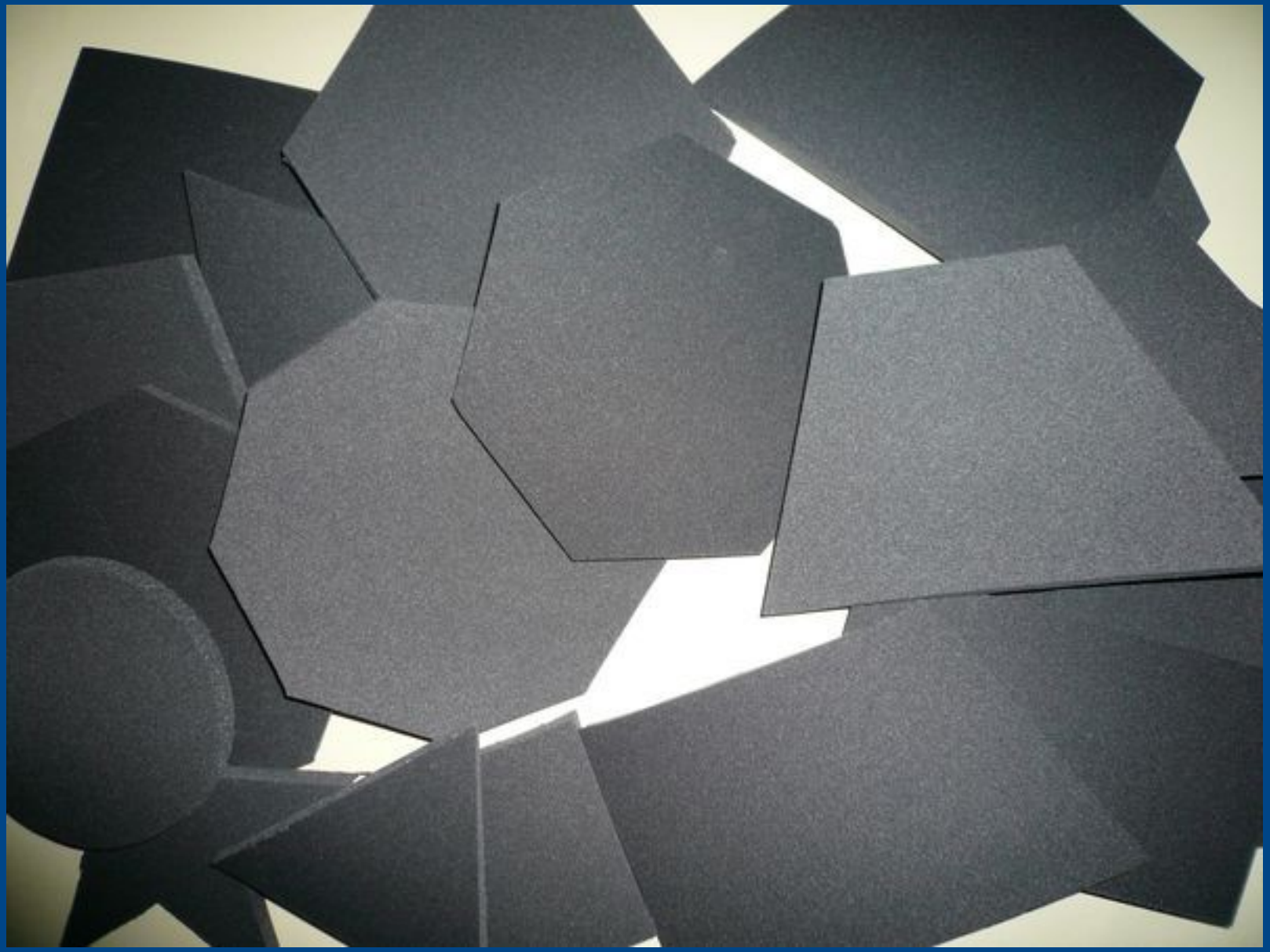
PHISYCAL OBJECTS 5

MATERIALES/MATERIALS



PHISYCAL OBJECTS 5

TACTO, TEXTURA, SEGURIDAD, MEDIDA/FEEL, TEXTURE, SIZE, SAFETY

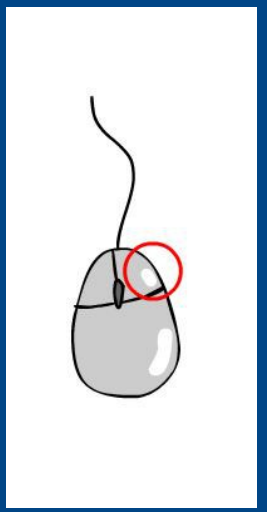


PHISYCAL OBJECTS 5

6. SCRATCH
PORT COM
SCRATCH BOARD

SCRATCH CONFIGURATION 6

SENSING > SENSOR VALUE

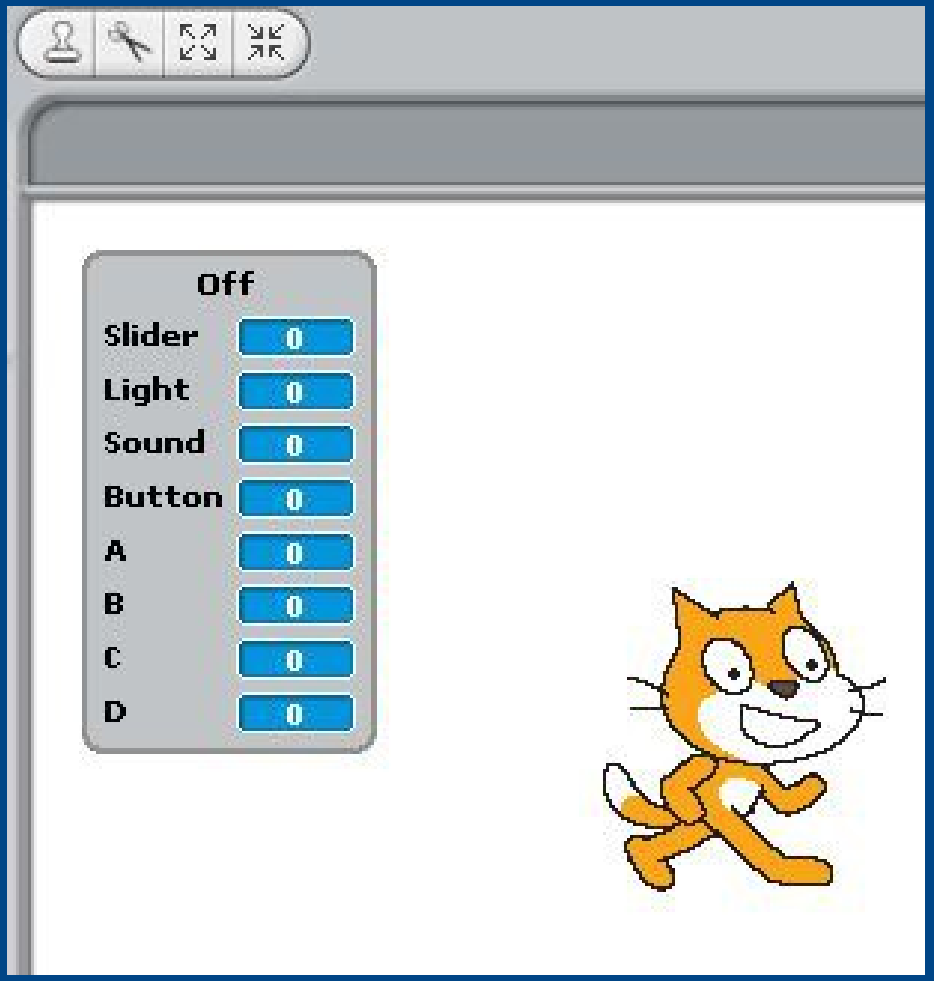


SCRATCH CONFIGURATION 6

SCRATCHBOARD

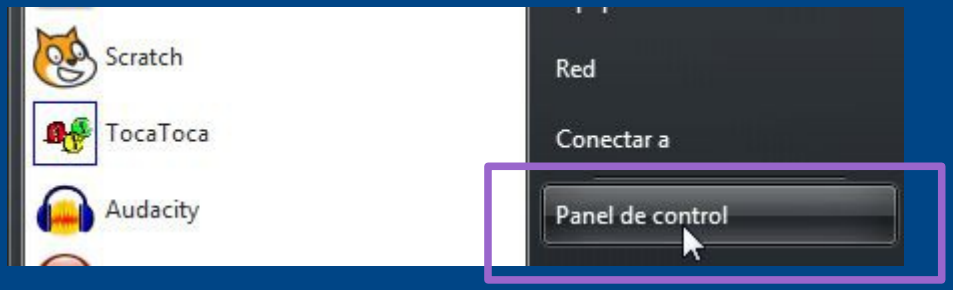
SCRATCH CONFIGURATION 6

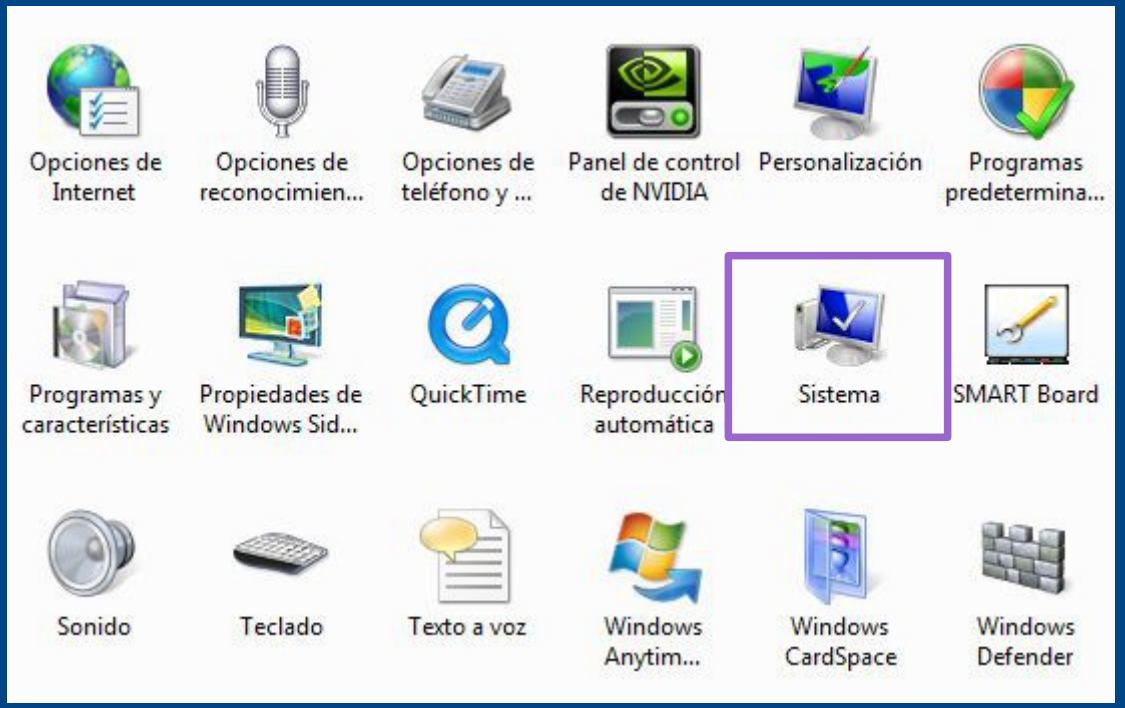
SCRATCHBOARD WATCHER



SCRATCH CONFIGURATION 6

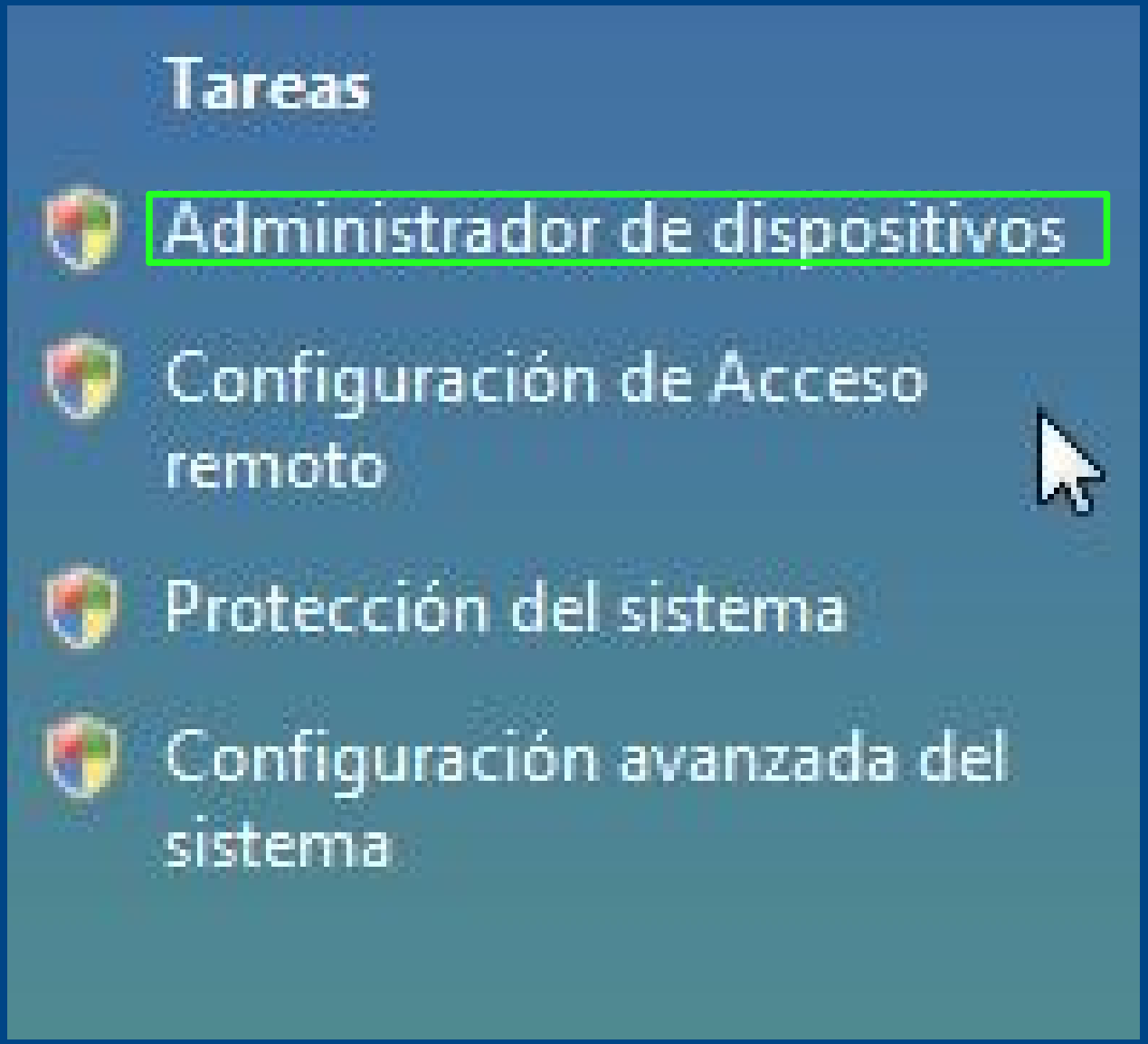
SEARCH PORT COM
CONTROL PANEL SYSTEM





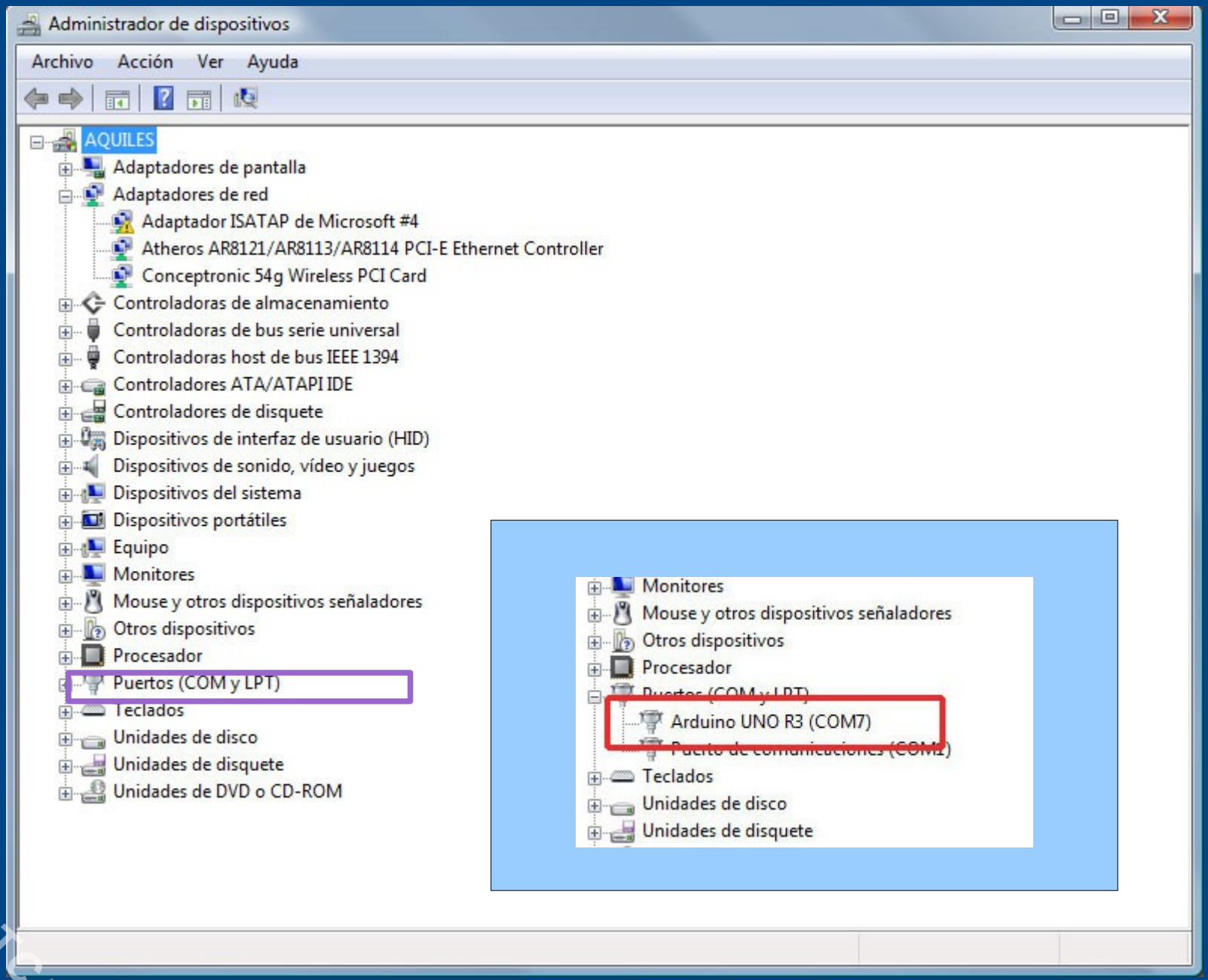
SCRATCH CONFIGURATION 6

DECIVE MANAGER



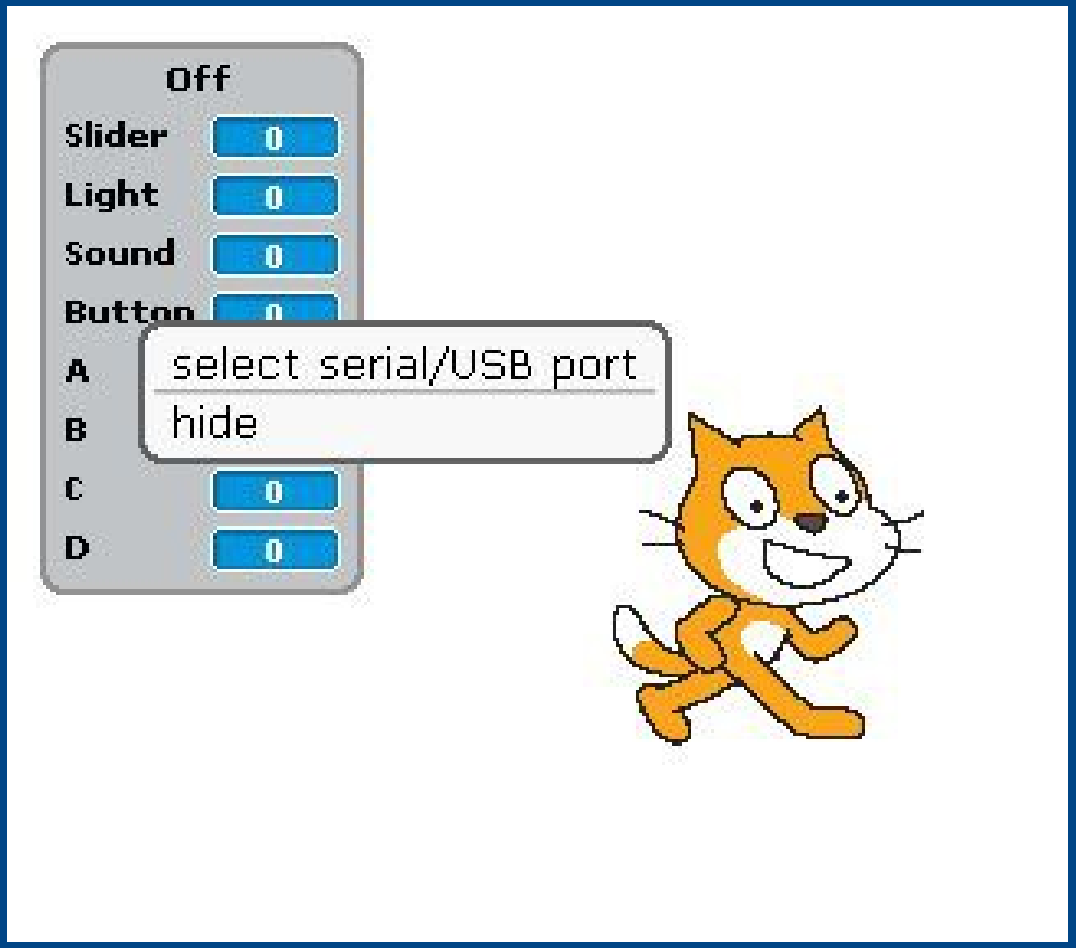
SCRATCH CONFIGURATION 6

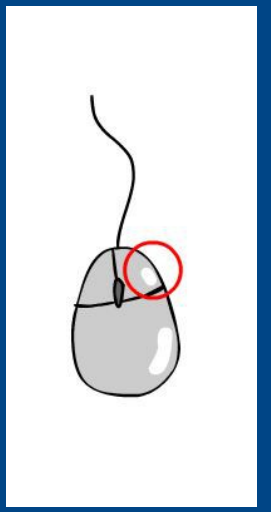
COM



SCRATCH CONFIGURATION 6

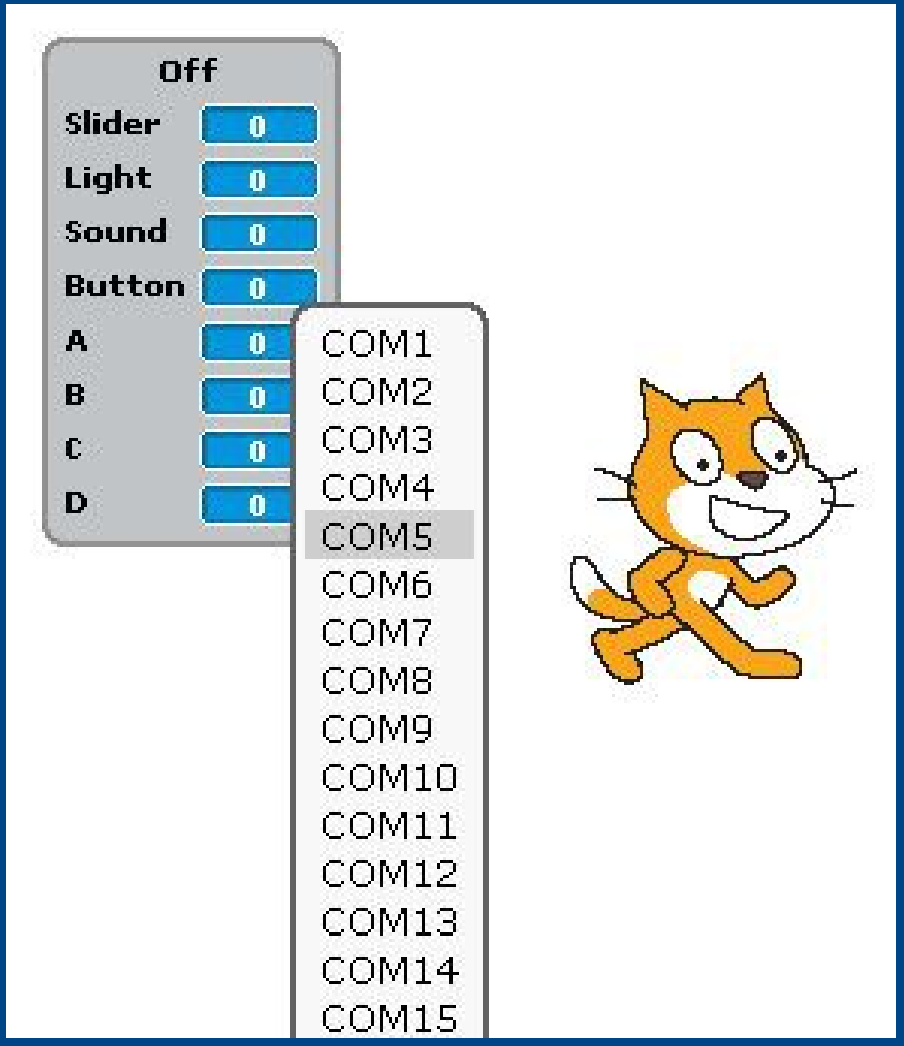
SELECT USB PORT





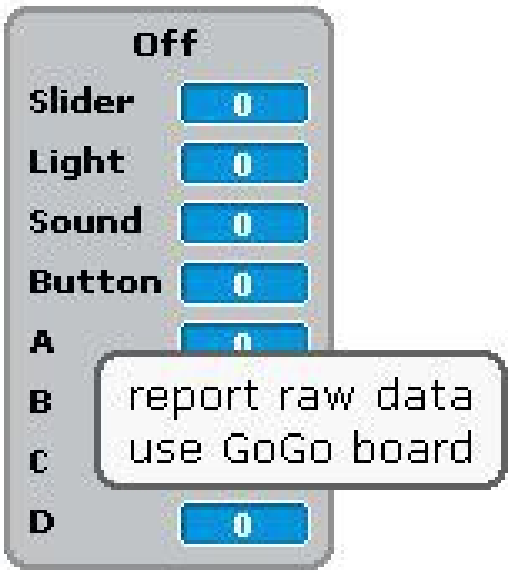
SCRATCH CONFIGURATION 6

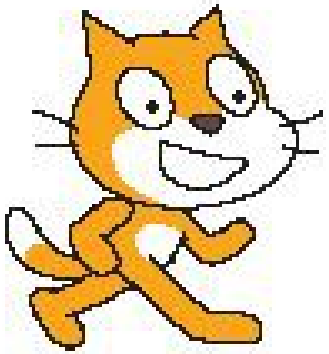
SELECT USB PORT

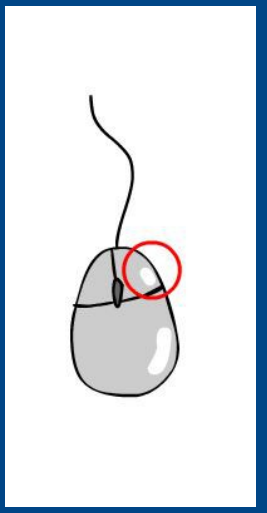


SCRATCH CONFIGURATION 6

RIGHT BUTTOM + SHIFT: REPORT RAW DATA



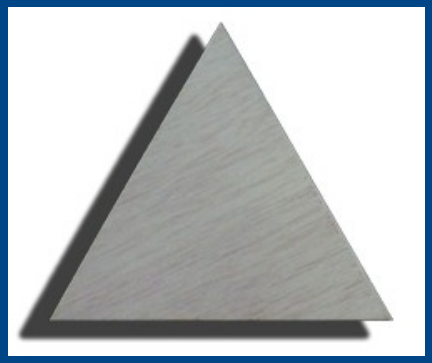




SCRATCH CONFIGURATION 6

VARIABLES
EASY CUSTOMIZATION

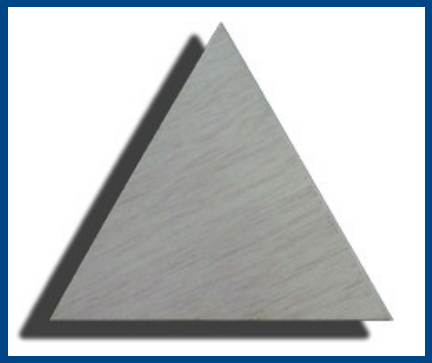
SCRATCH CUSTOMIZATION 6



PHISYCAL OBJECT + TAG RFID

SCRATCHBOARD WATCHER

SCRATCH CUSTOMIZATION 6

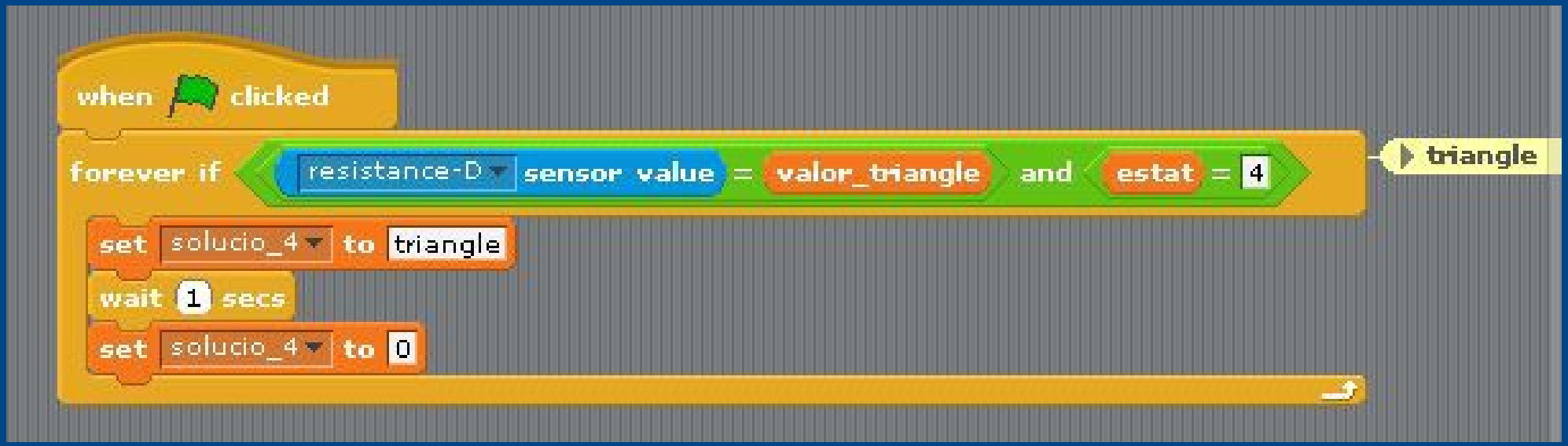


PHISYCAL OBJECT + TAG RFID

SCRATCHBOARD WATCHER

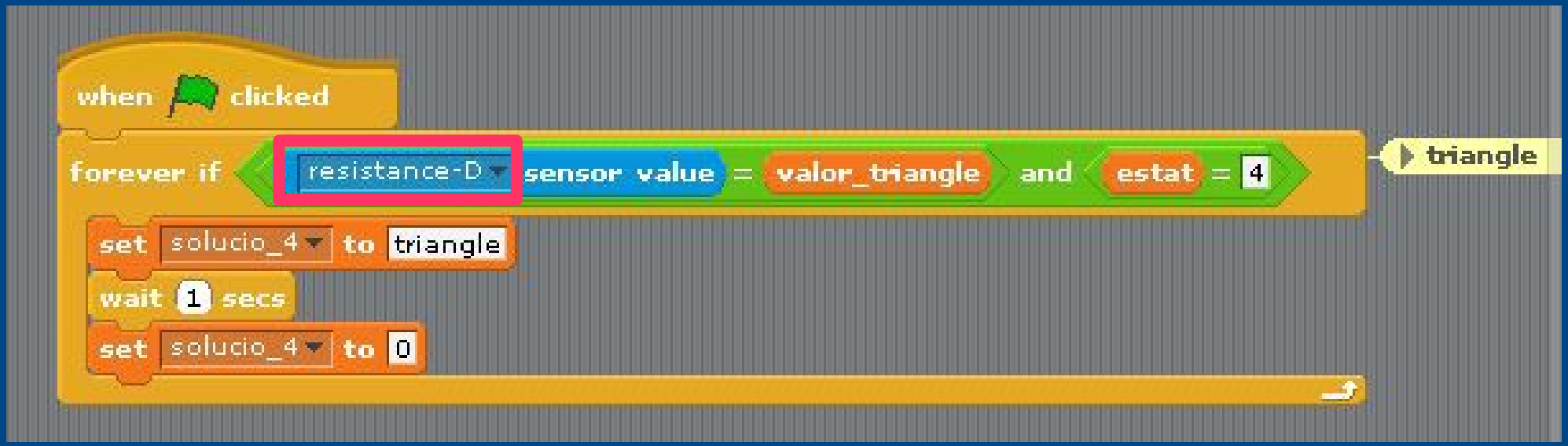
SCRATCH CUSTOMIZATION 6

RELATIONSHIP BETWEEN OBJECTS AND VARIABLES



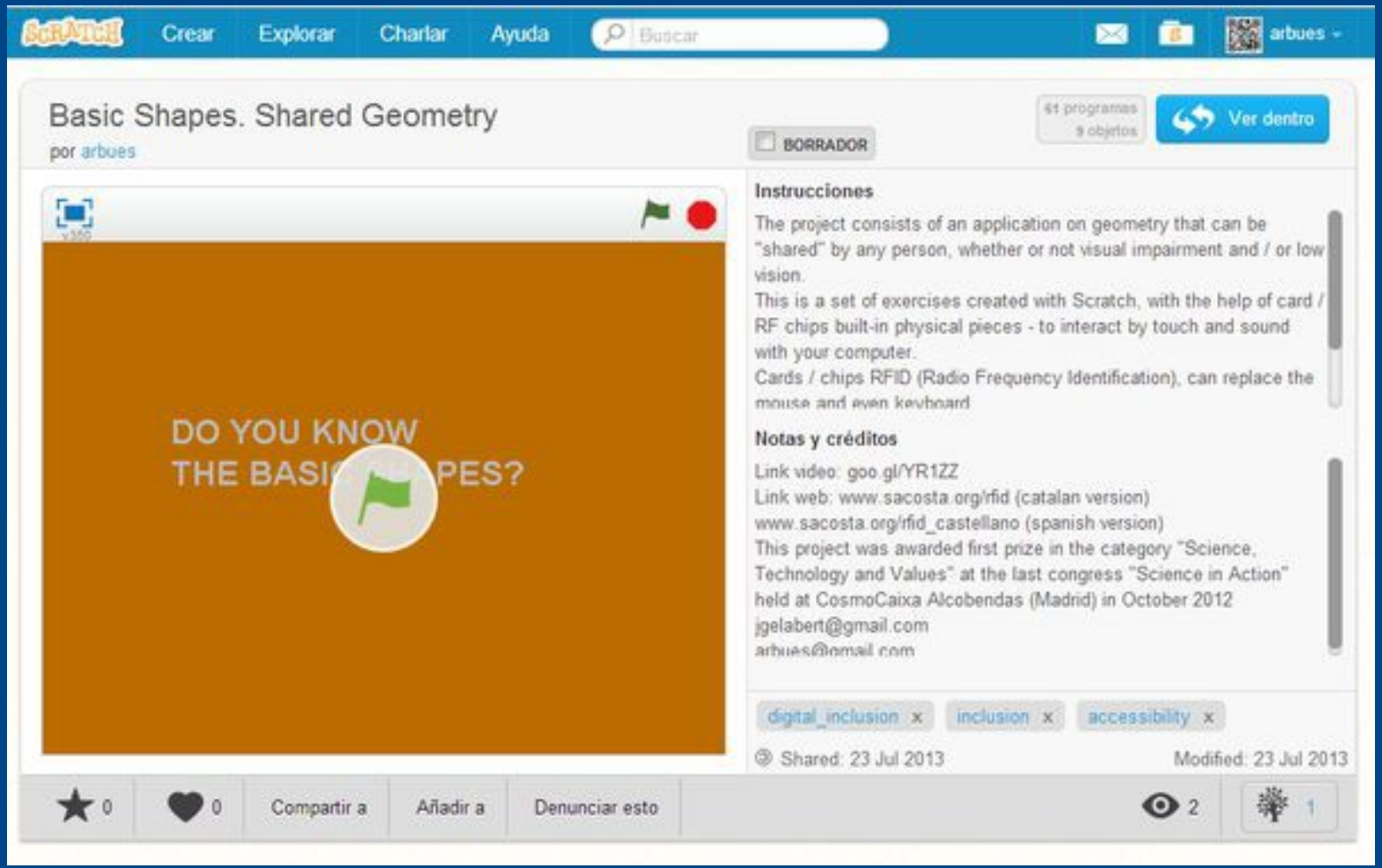
SCRATCH CUSTOMIZATION 6

RELATIONSHIP BETWEEN OBJECTS AND VARIABLES



SCRATCH CUSTOMIZATION 6

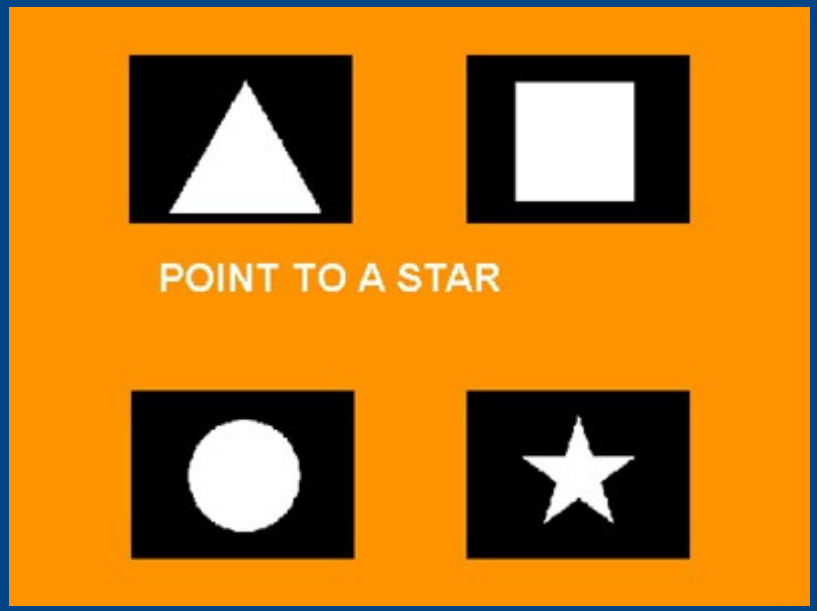
SCRATCH.MIT.EDU



LINK

SCRATCH CUSTOMIZATION 6

CUSTOMIZATION EXAMPLE

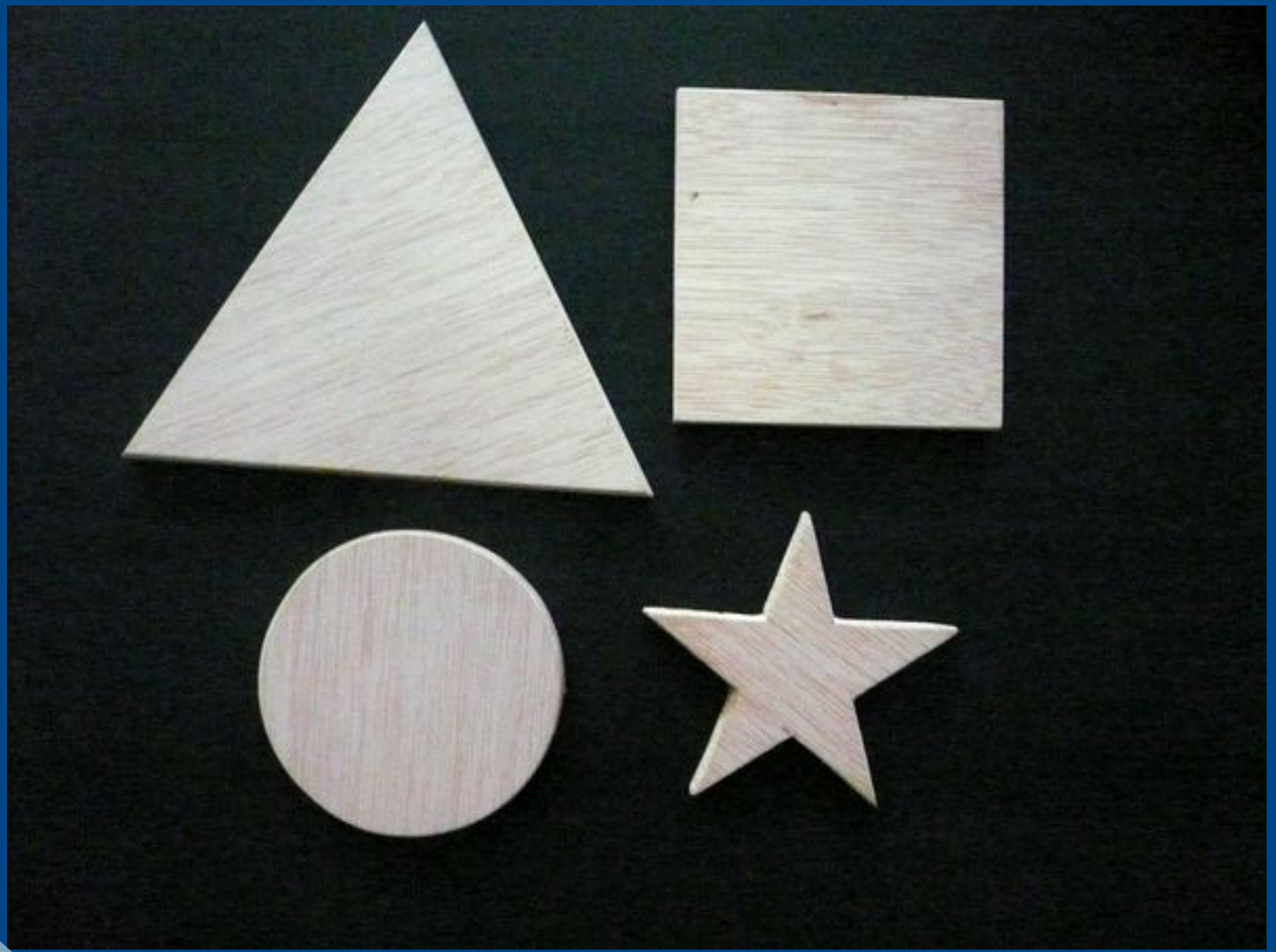


SCRATCH CUSTOMIZATION 6

GEOMETRIA COMPARTIDA
SHARED GEOMETRY

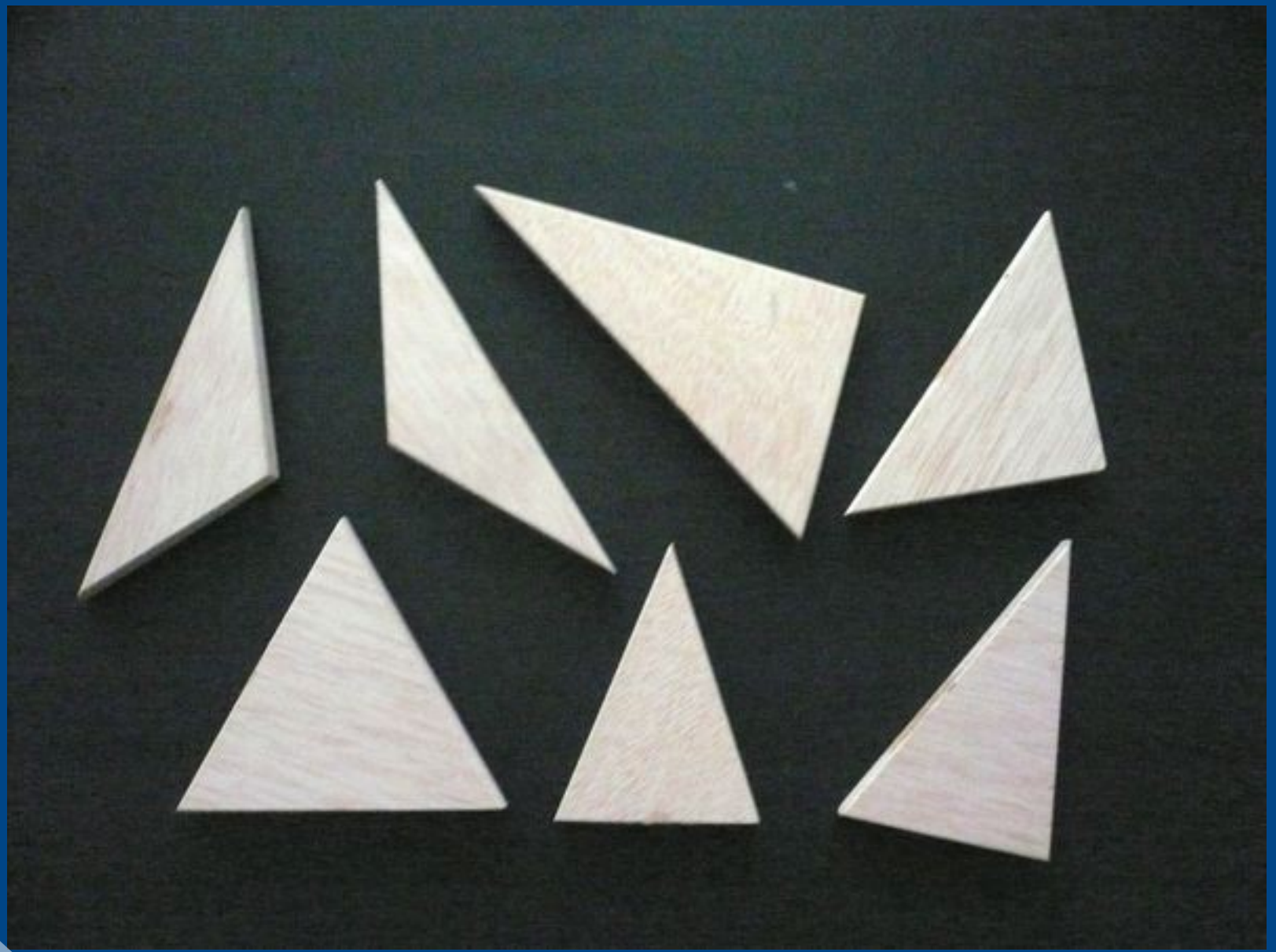
SCRATCH DEMOSTRATION 6

ACTIVITIES: BASIC SHAPES



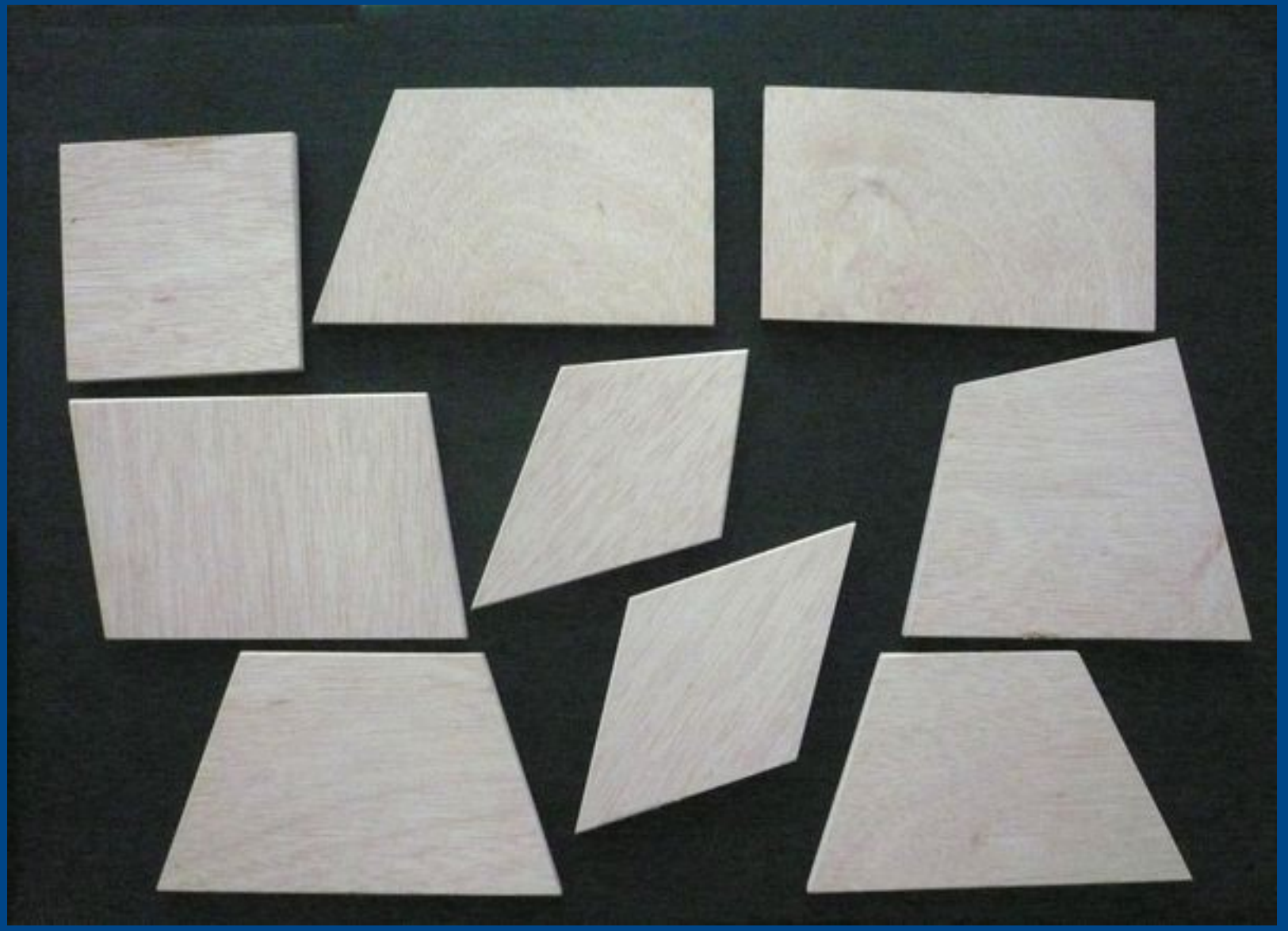
SCRATCH DEMOSTRATION 6

ACTIVITIES: TRIANGLES



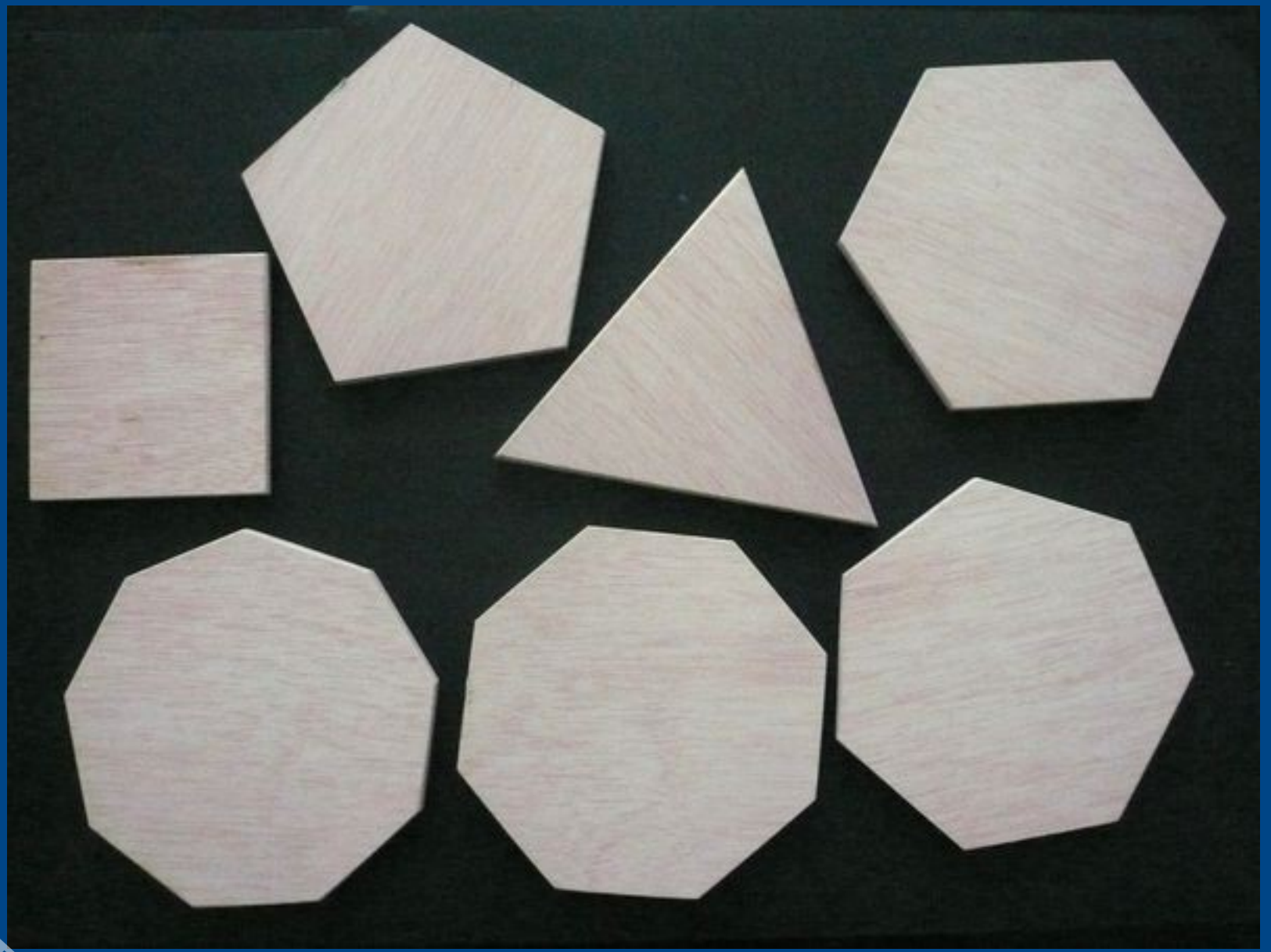
SCRATCH DEMOSTRATION 6

ACTIVITIES: QUADRILATERALS



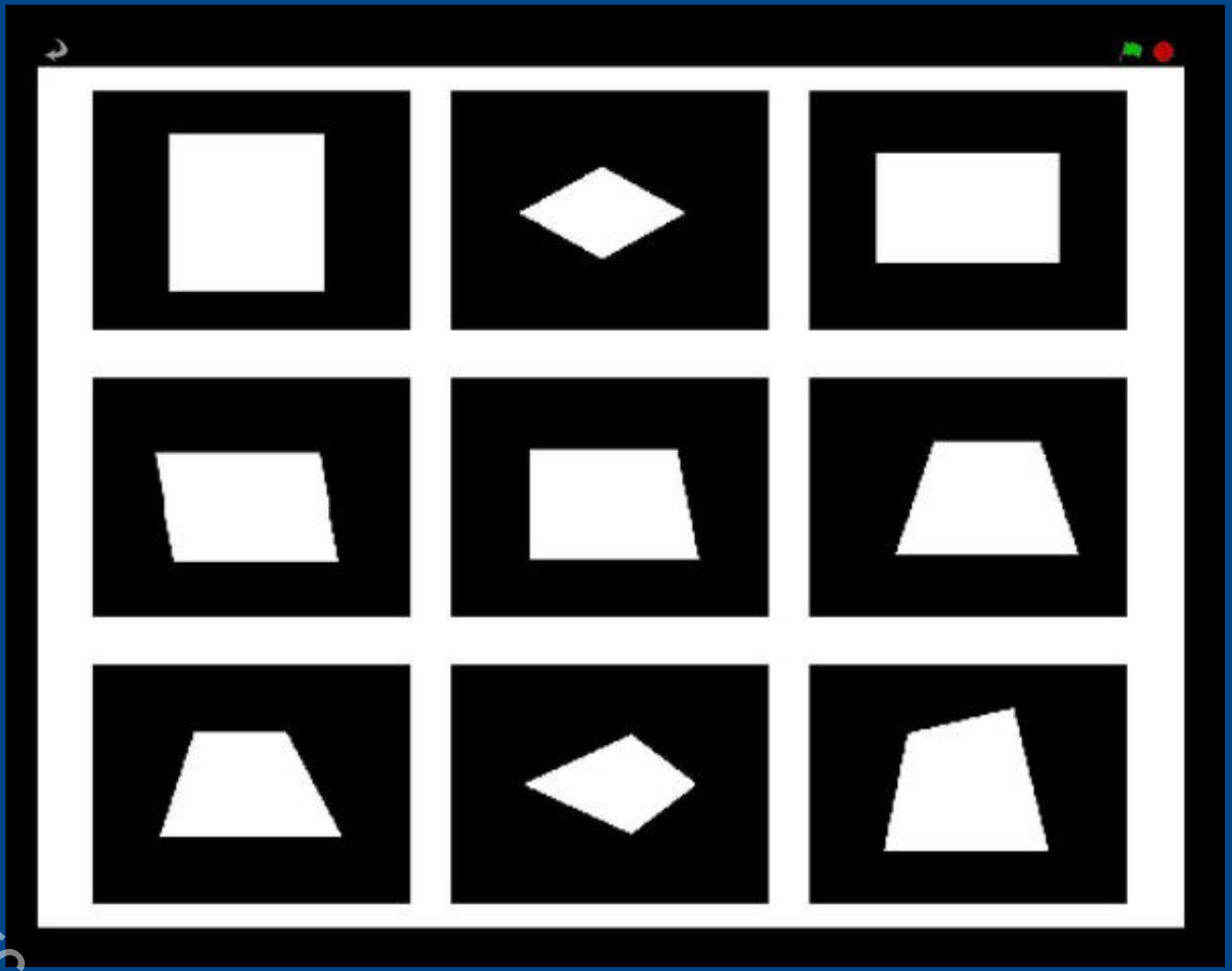
SCRATCH DEMOSTRATION 6

ACTIVITIES: REGULARS POLYGONS



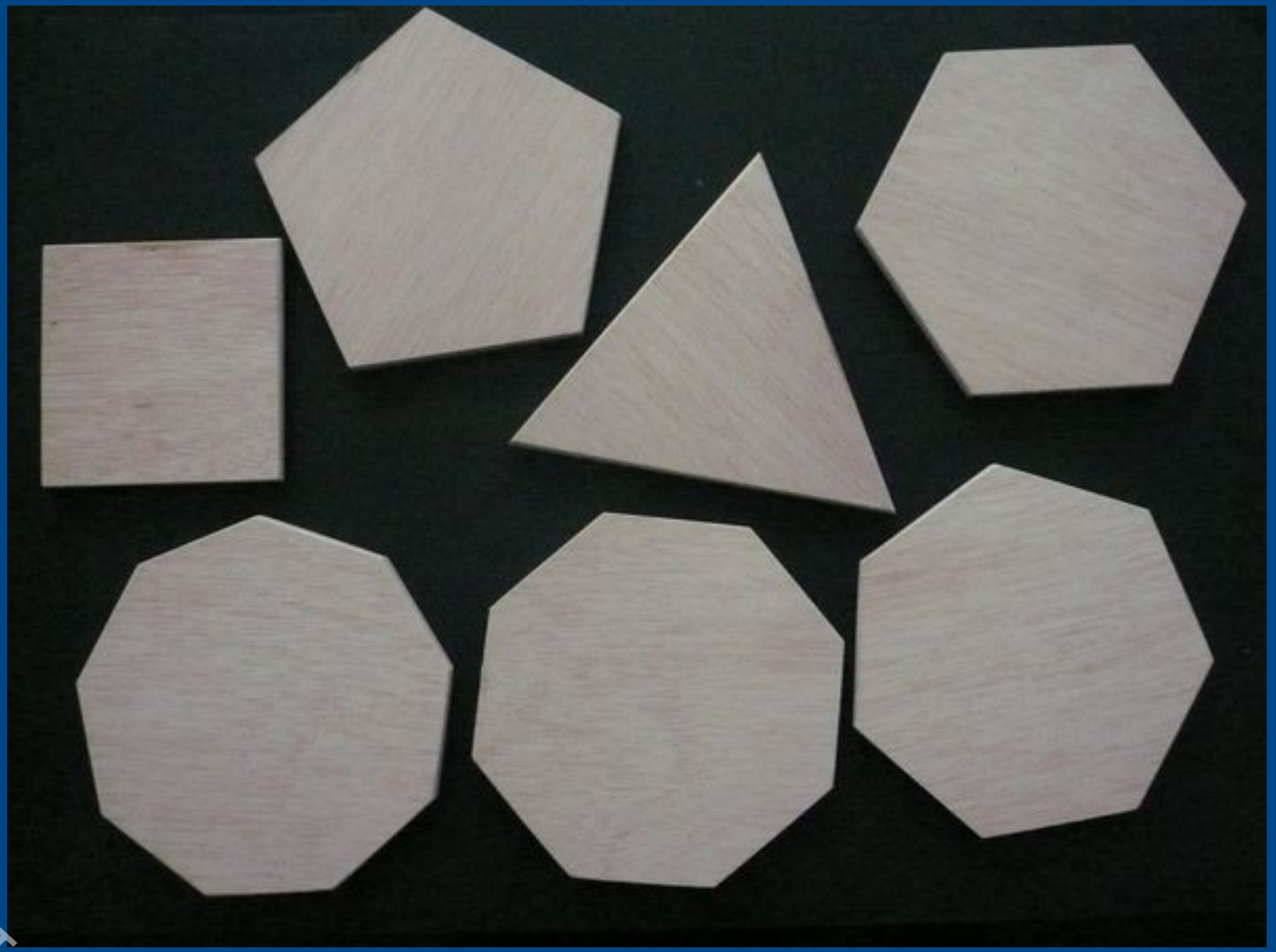
SCRATCH DEMOSTRATION 6

ACTIVITIES: DIFFICULTY LEVELS
ISOSCELES TRAPEZOID?



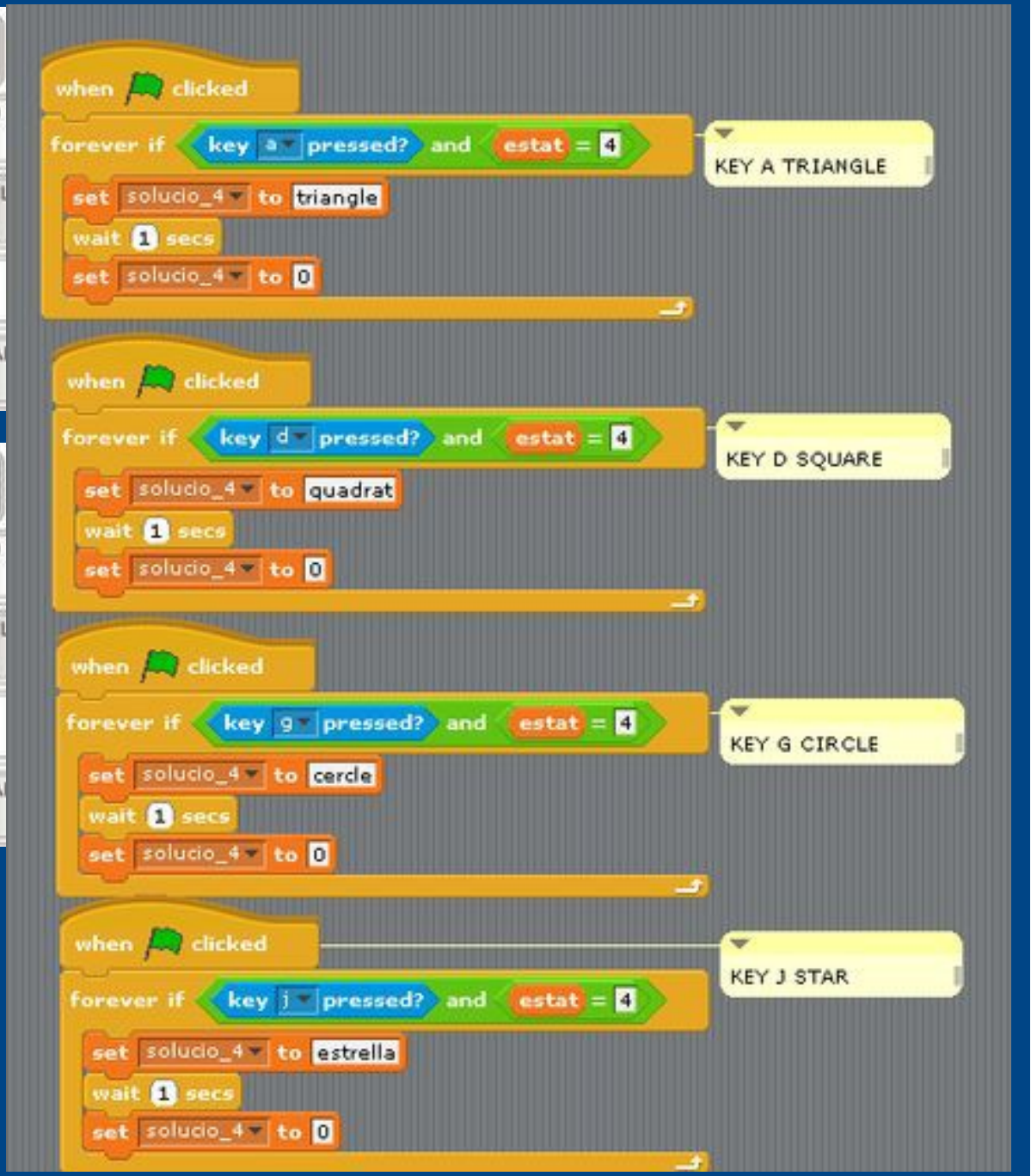
SCRATCH DEMOSTRATION 6

ACTIVITIES: DIFFICULTY LEVELS
HEPTAGON?



SCRATCH DEMOSTRATION 6

OTHERS KINDS OF INTERACTION STICKERS ON KEYBOARD



SCRATCH DEMOSTRATION 6

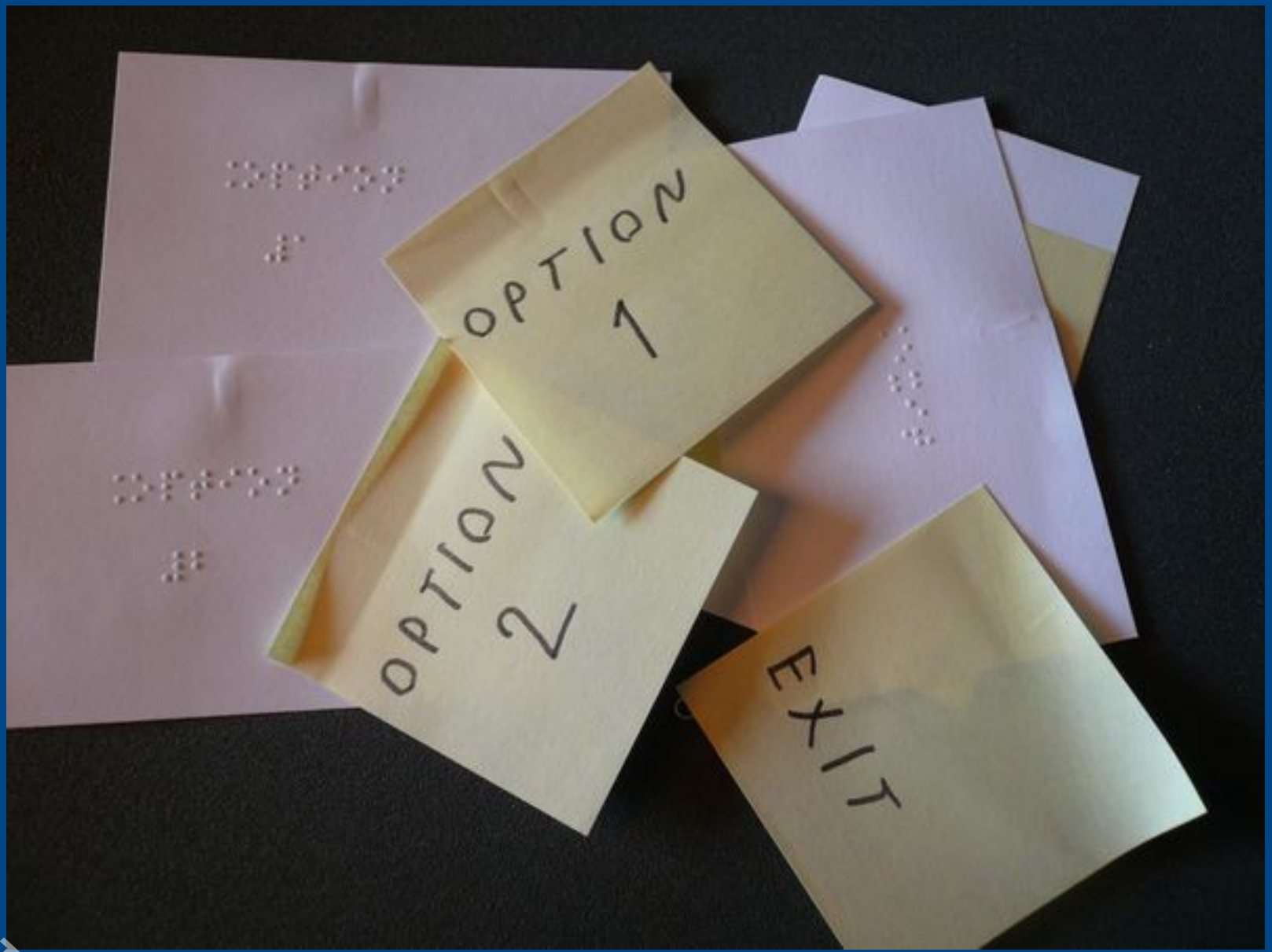
TAGS WITH BRAILLE CODE

SCRATCH DEMOSTRATION 6

TAGS CARD

SCRATCH DEMOSTRATION 6

BRAILLE CODE



SCRATCH DEMOSTRATION 6

TAGS + BRAILLE CODE

SCRATCH DEMOSTRATION 6

INFORMATION ALWAYS IN AUDIO

SCRATCH DEMOSTRATION 6

COLORS

3 COLORS
GREEN RIGHT
RED ERROR
ORANGE INFORMATION

OK

ERROR

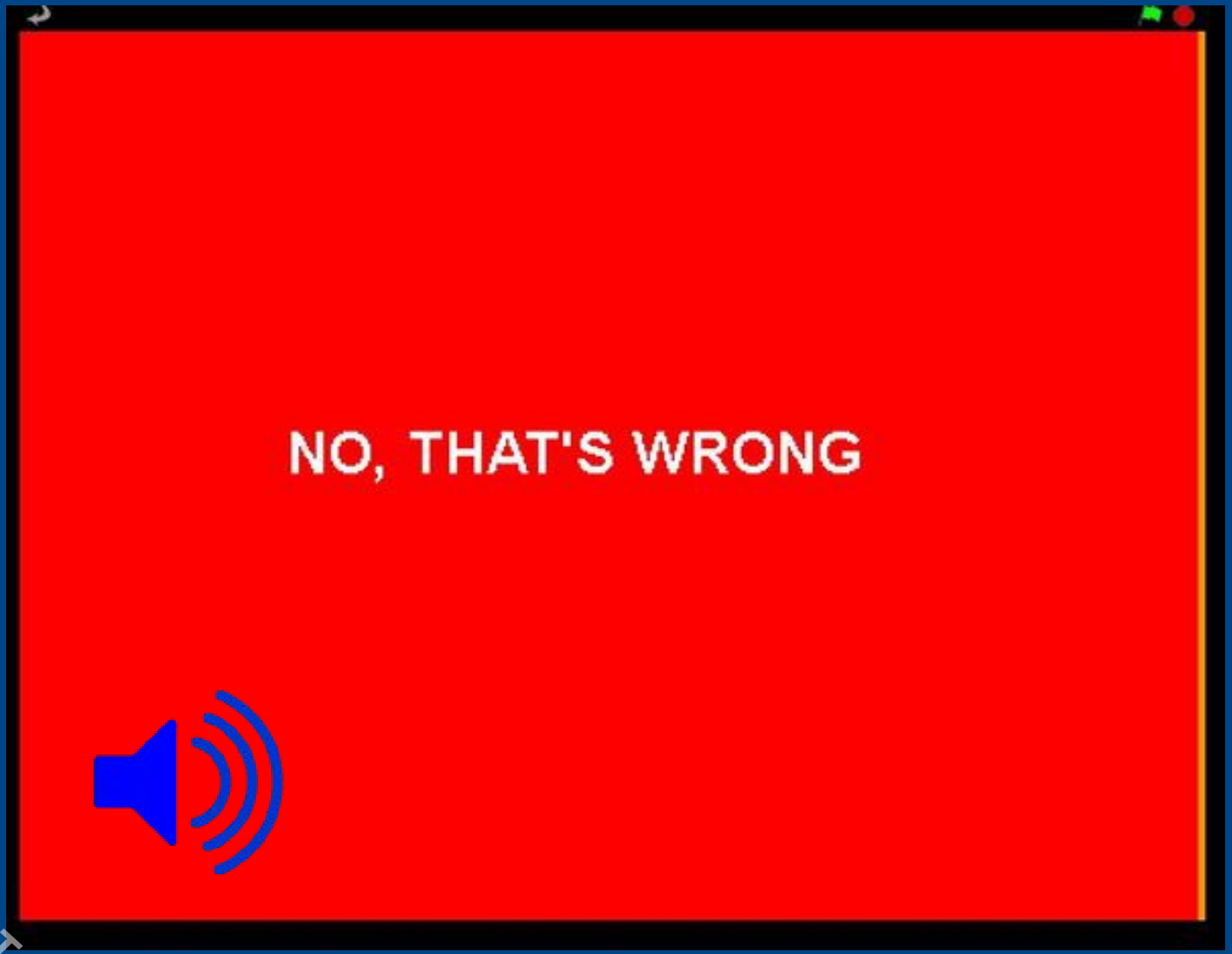
INFO

SCRATCH DEMOSTRATION 6

OK

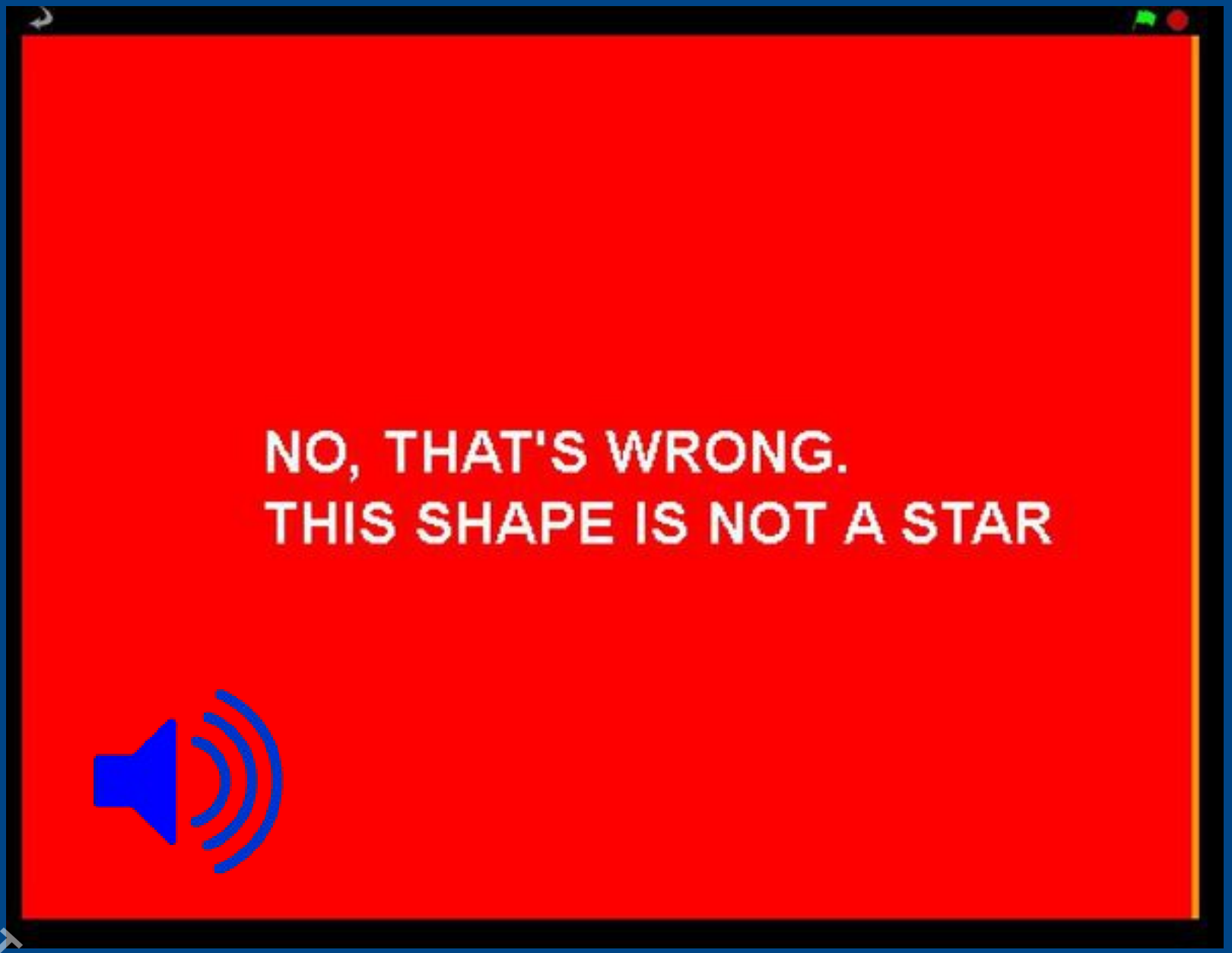
SCRATCH DEMOSTRATION 6

ERROR MESAGE



SCRATCH DEMOSTRATION 6

ERROR MESAGE



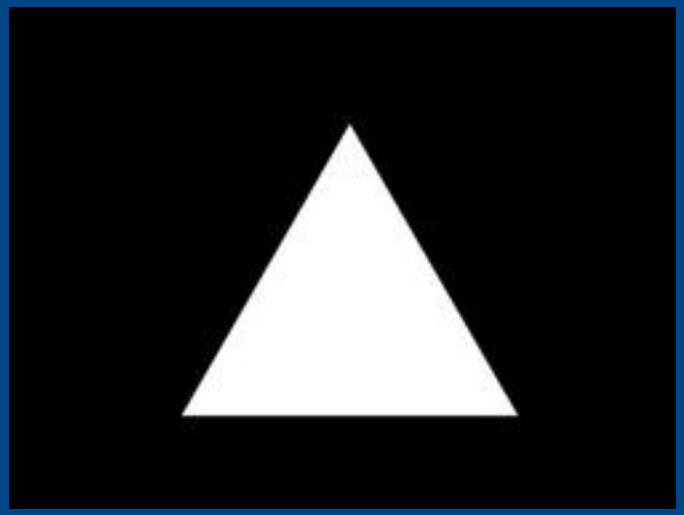
SCRATCH DEMOSTRATION 6

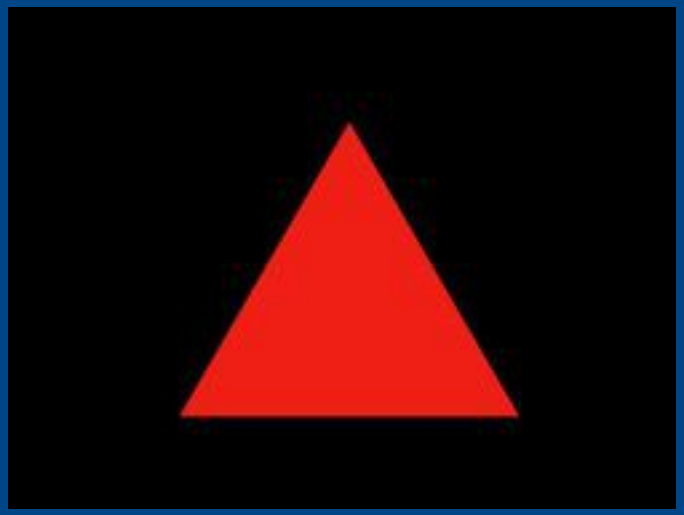
INFORMATION

DO YOU KNOW
THE BASIC SHAPES?

SCRATCH DEMOSTRATION 6

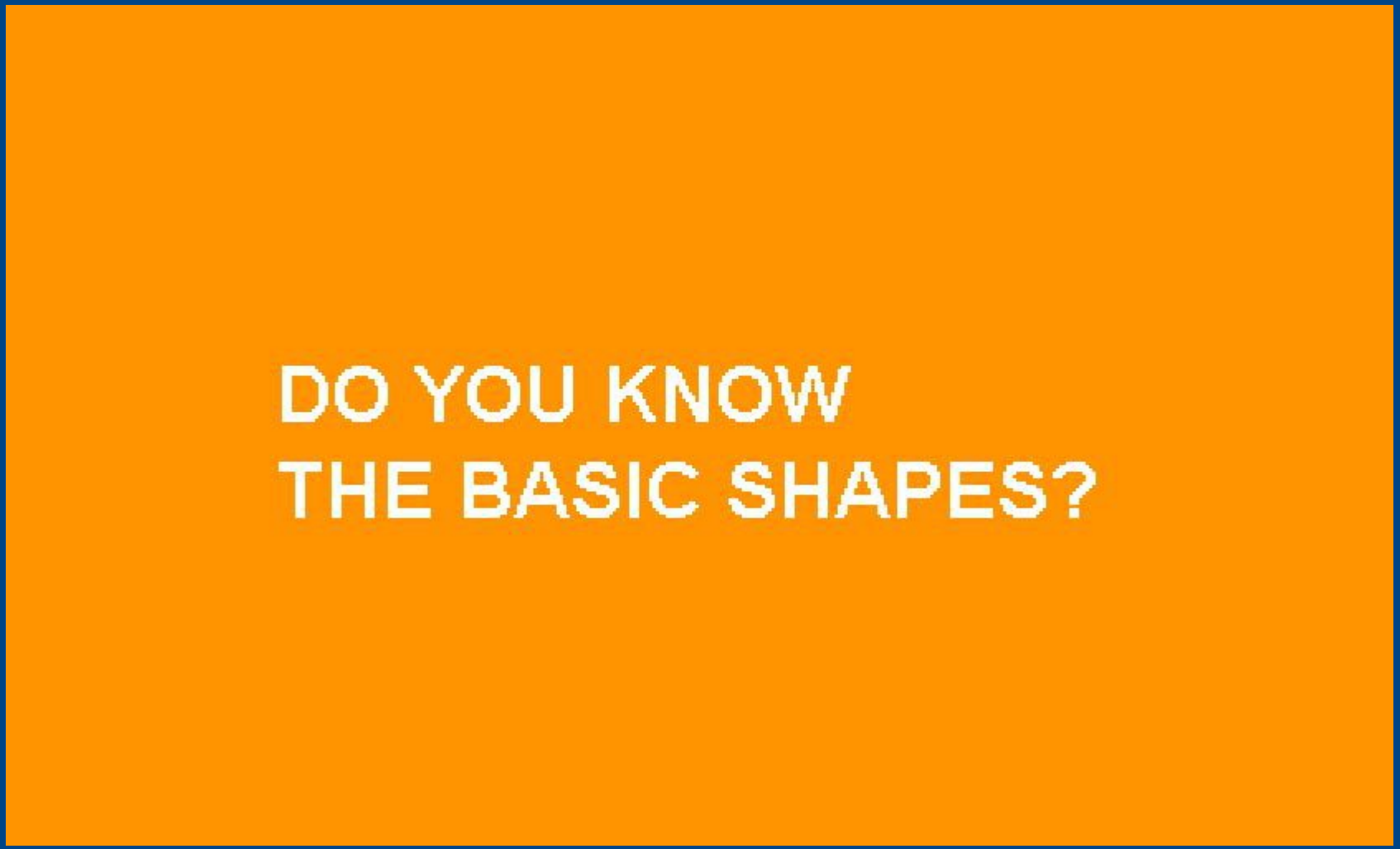
FORMAS GRANDES, COLORES CONTRASTADOS
LARGE SHAPES, CONTRASTING COLORS





SCRATCH DEMOSTRATION 6

WORDS / TEXTOS
TYPOGRAPHY ARIAL, SIZE LARGE, CAPITALS
TIPOGRAFIA ARIAL, MEDIDA GRANDE, MAYÚSCULAS



SCRATCH DEMOSTRATION 6

MENÚ / MENU
OPTIONS: PRESENTATION, IDENTIFY AND POINT
OPCIONES: IDENTIFICAR, SEÑALAR Y RECONOCER

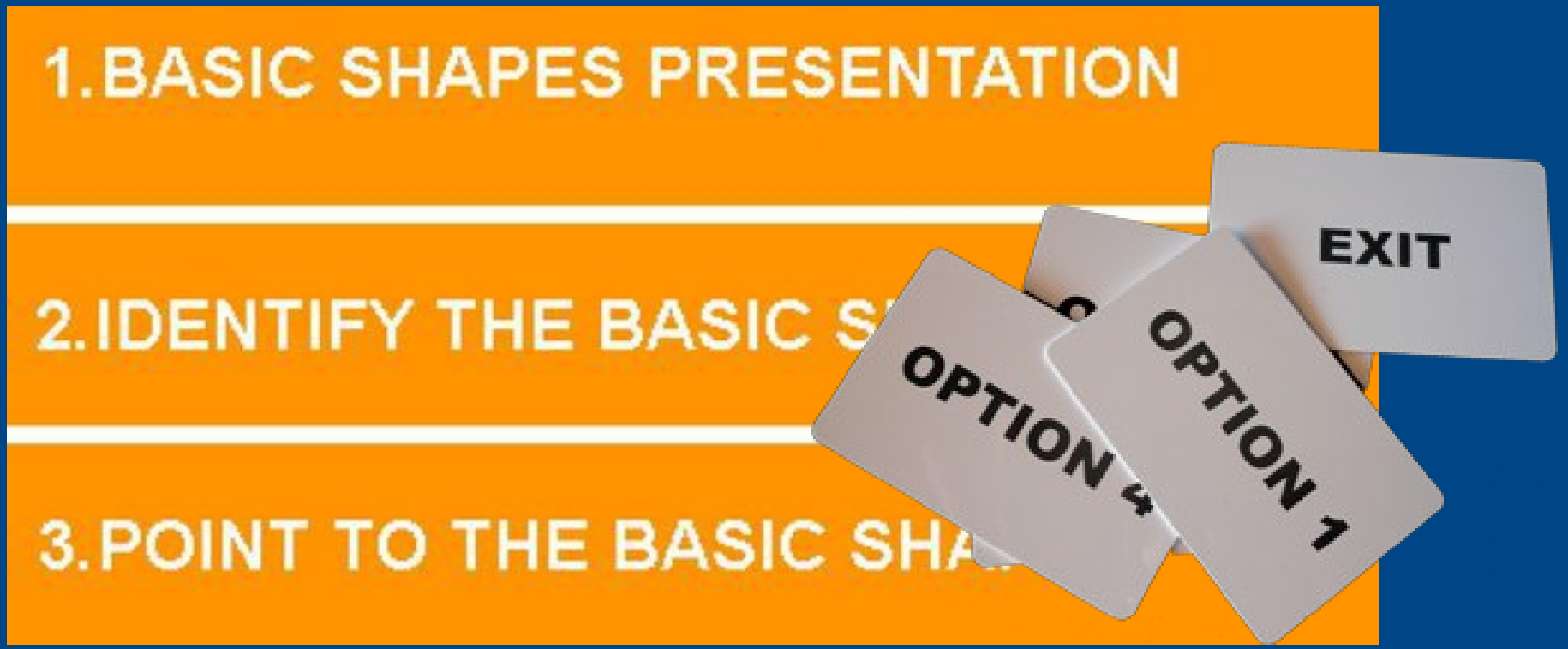
1. BASIC SHAPES PRESENTATION

2. IDENTIFY THE BASIC SHAPES

3. POINT TO THE BASIC SHAPES

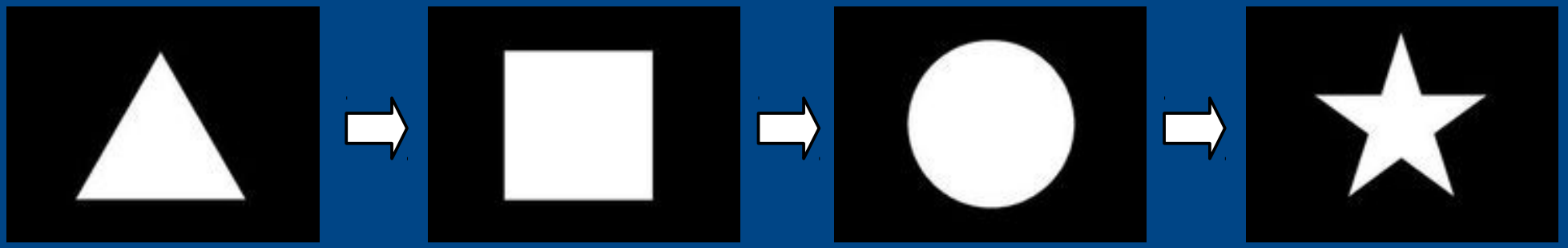
SCRATCH DEMOSTRATION 6

MENÚ / MENU
OPTIONS: PRESENTATION, IDENTIFY AND POINT
OPCIONES: IDENTIFICAR, SEÑALAR Y RECONOCER



SCRATCH DEMOSTRATION 6

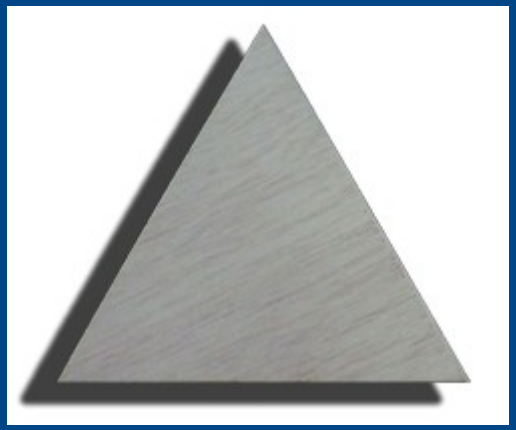
1.BASIC SHAPES PRESENTATION



TRIANGLE ➡ SQUARE ➡ CIRCLE ➡ STAR

SCRATCH DEMOSTRATION 6

2.IDENTIFY THE BASIC SHAPES



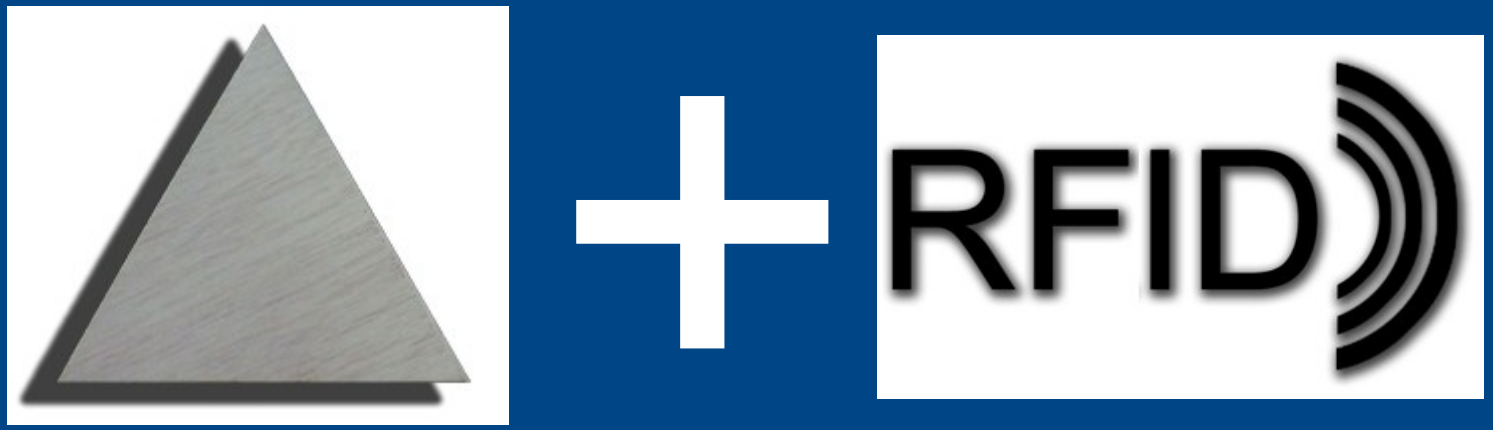
+

= TRIANGLE

SCRATCH DEMOSTRATION 6

3.POINT TO THE BASIC SHAPES

TRIANGLE ?



= OK

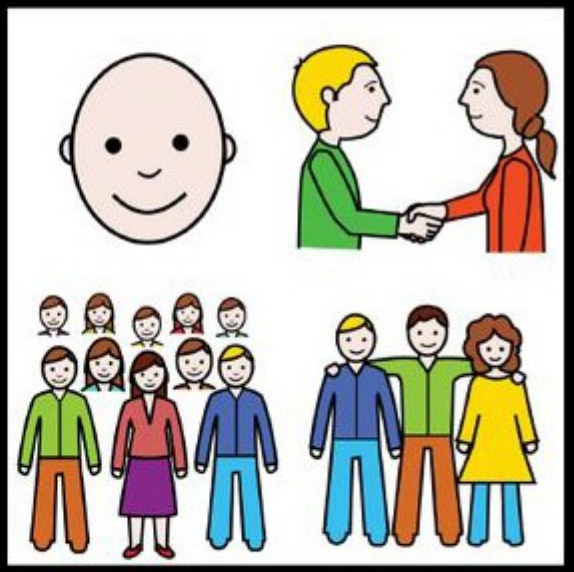
SCRATCH DEMOSTRATION 6

WEB
WWW.SACOSTA.ORG/RFID

www.sacosta.org/rfid (català)
www.rfid.org/rfid_castellano
Imatges i fotos: Jesús Arbués, Bea Cascante,
Banco Imágenes y Sonidos del ITE

GRACIAS

THANK YOU



DEMO