# A POSTERIORI
Play · Experience · Learn

# Lesson 5 (PC – Arduino Integration)

**Slides – https://a9i.sg/huayi**
**mBlock – https://ide.mblock.cc (start mLink too!)**


*Rehabilitation training for stroke patients*

## Introduction

The PC and the Arduino are good for different things. By using the strength of each, we can create a better product than what each of them can achieve on its own.
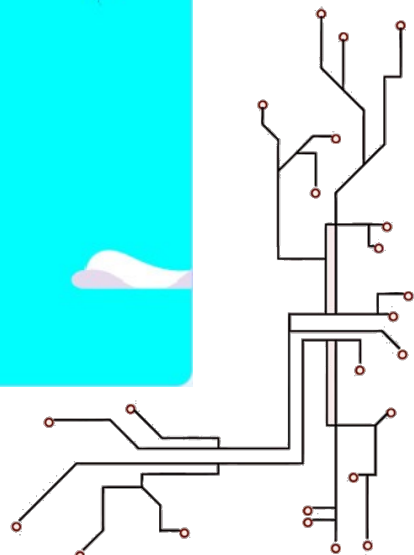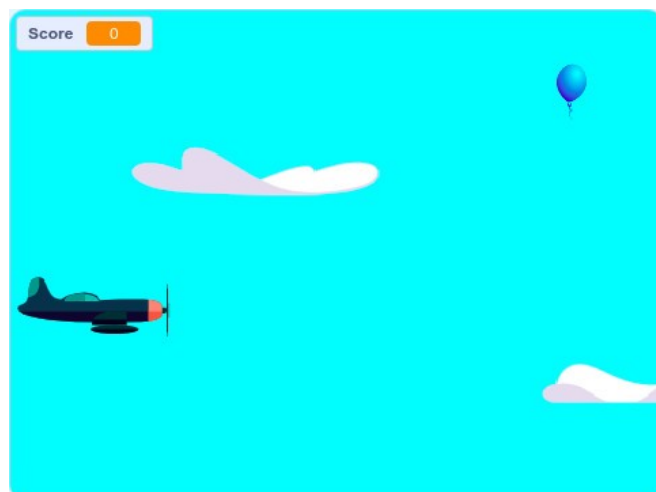
In this lesson, we will build a simple game that integrates with the Arduino.

## Advantages

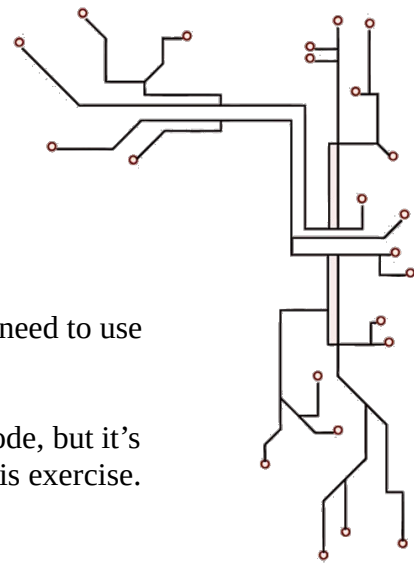| PC | Arduino |
|---|---|
| • Large display<br>• Keyboard and mouse<br>• Sound, graphics, video<br>• Great for games and animation | • Read wide variety of sensors<br>• Control electronics (eg. lights, sound, motors)<br>• Great for real-world interaction |

## Game Idea

- Side Scroller
- Control using potentiometer
- Flash Red LED if balloon is missed
- Flash Green LED when balloon is caught
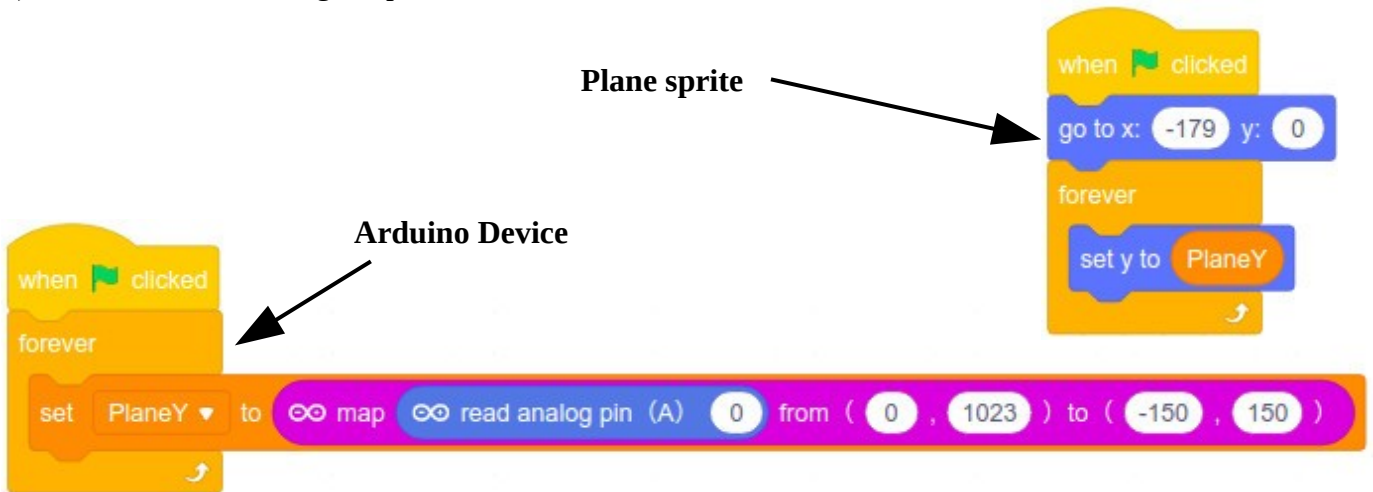
# A POSTERIORI

Play · Experience · Learn

## Important Tips

- In mBlock, the sprites cannot directly read or control an Arduino; you need to use Broadcast
- Use variables to share the result of an analog read with other sprites
- It's possible for an Arduino to communicate with a PC in "Upload" mode, but it's much easier in "Live" mode (...we will only be using Live mode for this exercise.
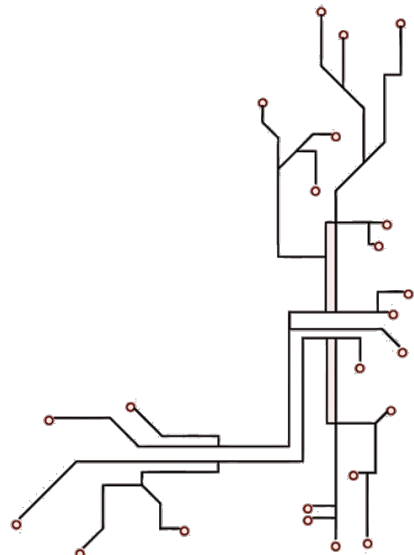
## Basic Controls

1)      Connect a potentiometer to one of the analog inputs. You can refer to lesson 3 for the connection diagram.

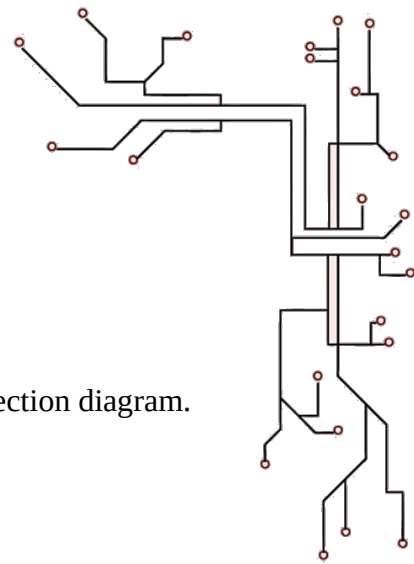2)      Add in a sprite for the plane.

3)      Add the following scripts:

**Plane sprite**

```
when 🏴 clicked
go to x: -179 y: 0
forever
    set y to PlaneY
```

**Arduino Device**

```
when 🏴 clicked
forever
    set PlaneY ▾ to ∞ map ∞ read analog pin (A) 0 from ( 0 , 1023 ) to ( -150 , 150 )
```

### Challenge!

1) In the example program, the potentiometer controls the position of the plane. That makes the game too easy. Can you make it control the Y-velocity instead?

### Adding Balloons

1) Add a balloon sprite

2) Connect a red LED to your Arduino. You can refer to lesson 1 for the connection diagram.
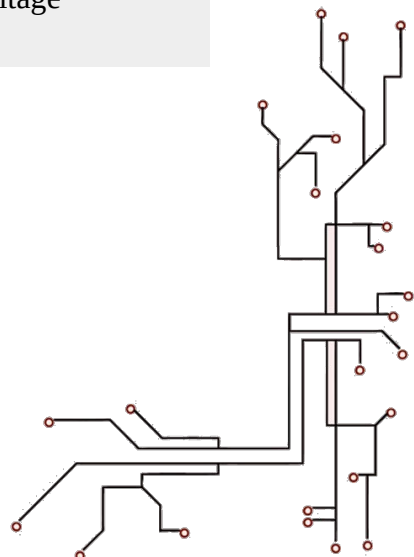
3) Add the following scripts:

**Balloon sprite**

**Arduino Device**



---

## Challenge!

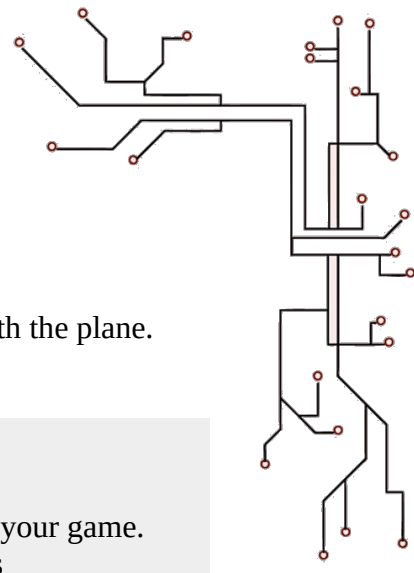2) Add in a Red LED and make it flash if the plane misses the balloon.

Tips
- Use a second resistor for the Red LED.
- Two LEDs cannot share a resistor, unless the LEDs are exactly the same voltage

# A POSTERIORI
Play · Experience · Learn

**Adding Clouds**

The cloud script is the same as the balloon, but without detecting contact with the plane.

---

**Challenge!**

3) A parallax effect can simulate depth and improve the animation quality of your game. Read up on "parallax effect in games" and try to implement it on your clouds

---

**Discuss!**

How can you use games and the Arduino to encourage people to exercise more?

_____

_____

_____

_____

_____

_____