

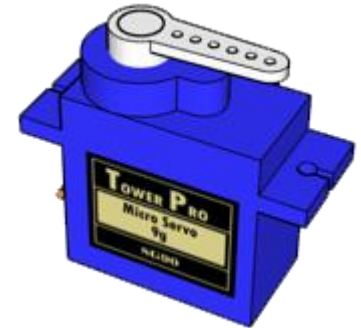
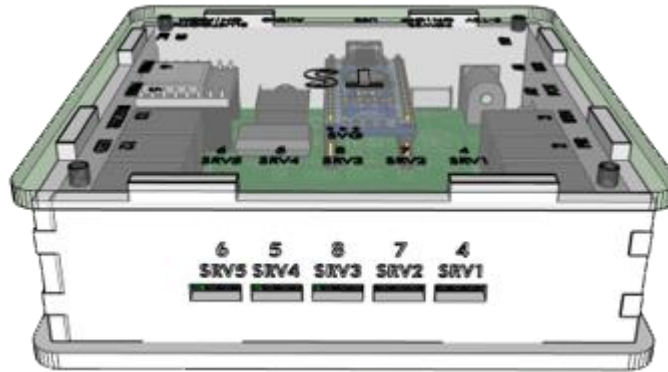
TScratch Basics

Coding with mBlock (Software)

Learning Objective

In this lesson you will learn:

TScratch (SERVO)



- Include a Servo motor in your project!
- Control the motor movement with a digital input



What is Servo Motor?

- A servo motor is a small motor that can be powered by a control system eg. mBlock
- Usually has a sensor inbuilt to feedback position
- Can be a continuous-servo (spins in a circle) or a sweeping-servo (back and forth)
- For this tutorial, we will be learning how to control a sweeping-servo using a button

TSense(Servo)



First: Connecting the Servo to TScratch

Using the SVG outlet at the back of the TScratch

- SVG stands for → Signal, Voltage(5V), Ground(0V)
 - The Signal Pin, usually connects to alternate-colored wires such as white, green, orange, etc
 - The Voltage Pin, usually connects to red colored wires
 - The Ground Pin, usually connects to black or brown colored wires
- Connect the servo motor with the “exposed” metal contacts facing upwards



Write your servo control program

- In this program, we will have a button digital **input (port 3)** and servo **output (port 5)**.
- Create the respective variables in the Data&Blocks tab, then define them in the scripting area:



Write your servo control program

- Within a forever loop, set your conditions. In this case, we want the servo to sweep 180 degrees when the button is pressed.
- If button input is HIGH → servo angle 180deg
- If button input is LOW → servo angle 0deg
- Button input is HIGH when button is pressed, meaning button = 1
- Button input is LOW when button is NOT pressed, meaning button = 0

Write your servo control program

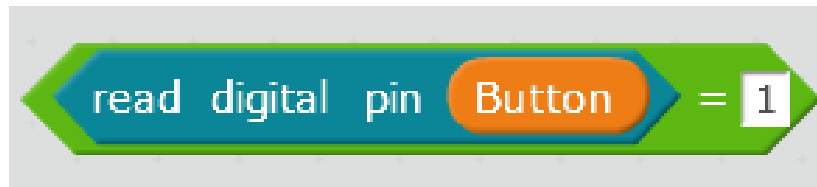
- From the Operators tab, drag the  :



Double-click and type the number 1 in the box

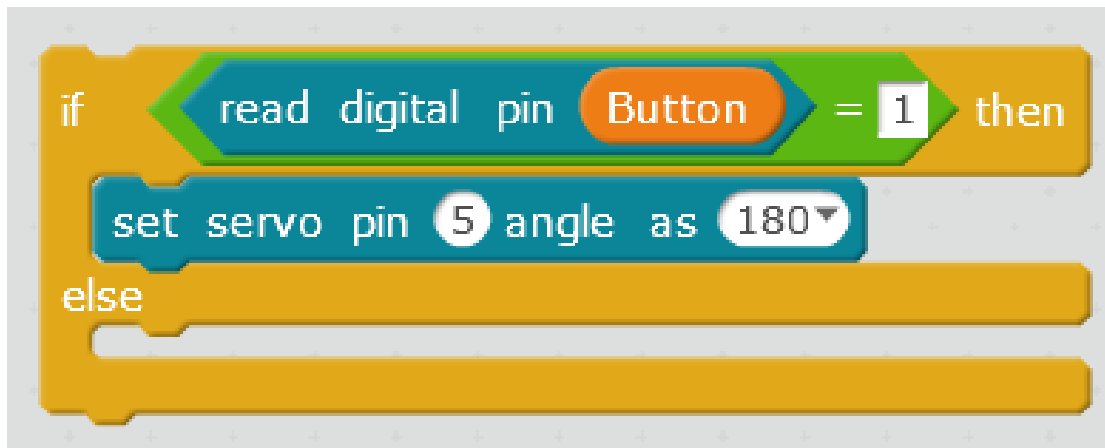
Note: Remember to drag the Button variable inside!

- Click and drag the block over the white square you want it to go until it lights up to insert it.



Write your servo control program

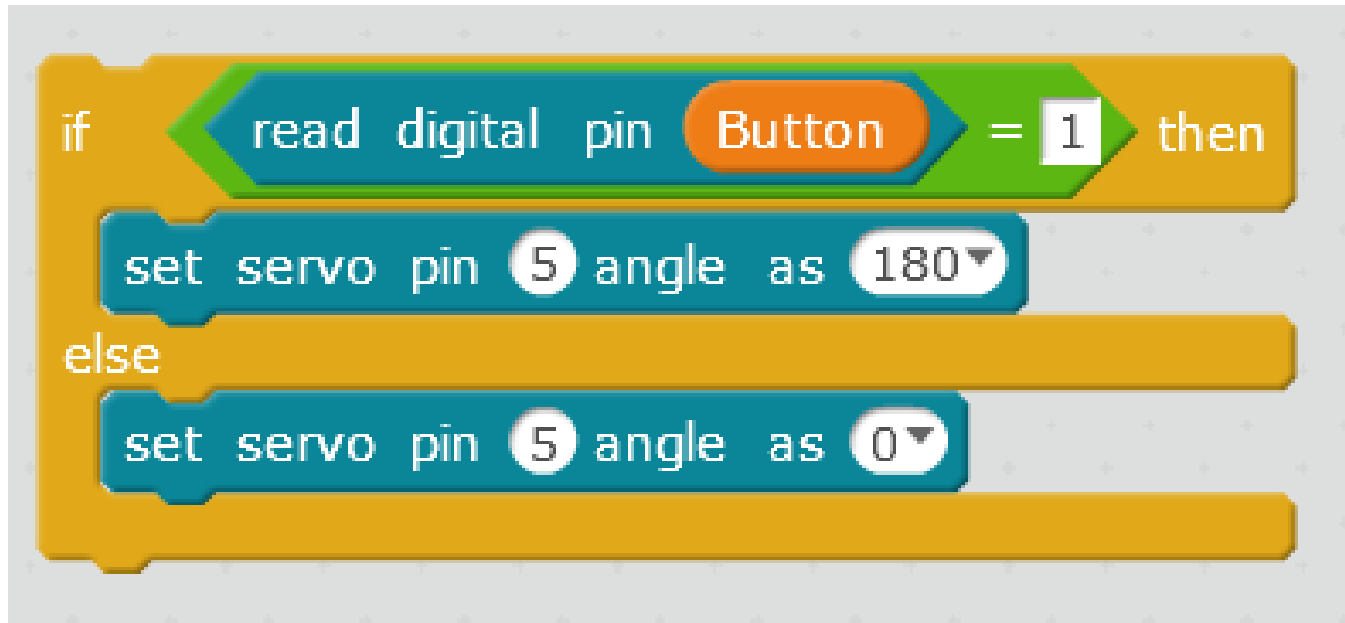
- First condition: if the Button input is HIGH (0), the servo angle is 180 degrees.
- Drag out an **if... else** control block and insert the condition:



Make sure the correct variables are in the correct places, and you are using **digital** pins with the correct designation (input or output)!

Write your servo control program

- Second condition: if the Button input is LOW (0), the servo angle is 0 degrees.
- Insert the condition into the **else** block:

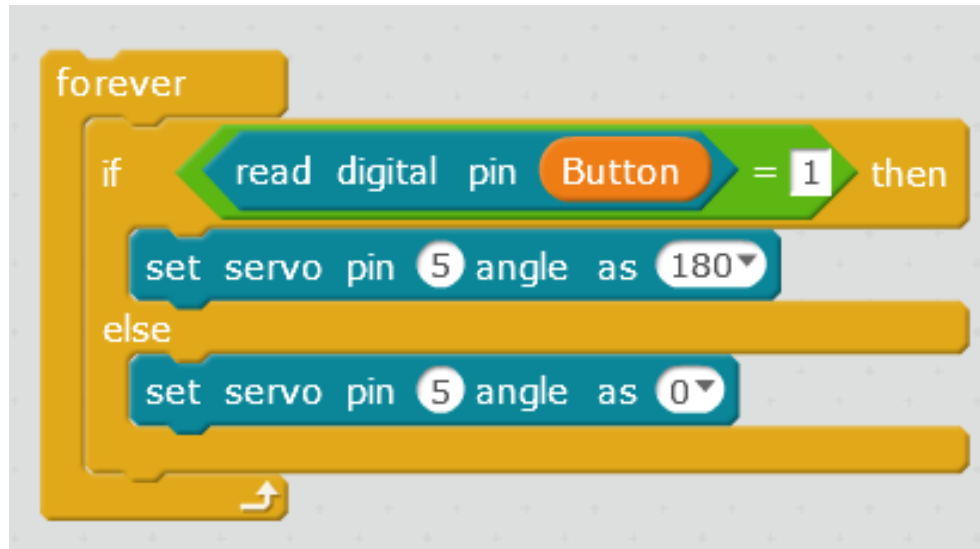


```
if read digital pin Button = 1 then
  set servo pin 5 angle as 180
else
  set servo pin 5 angle as 0
```

The image shows a Scratch-style code block for controlling a servo motor. It is a large yellow block with a 'then' tab on the right. Inside, there is an 'if' block with a green arrow pointing right, containing the text 'read digital pin Button = 1'. Below the 'if' block is a blue block with the text 'set servo pin 5 angle as 180'. Below that is an 'else' block with a blue block containing the text 'set servo pin 5 angle as 0'.

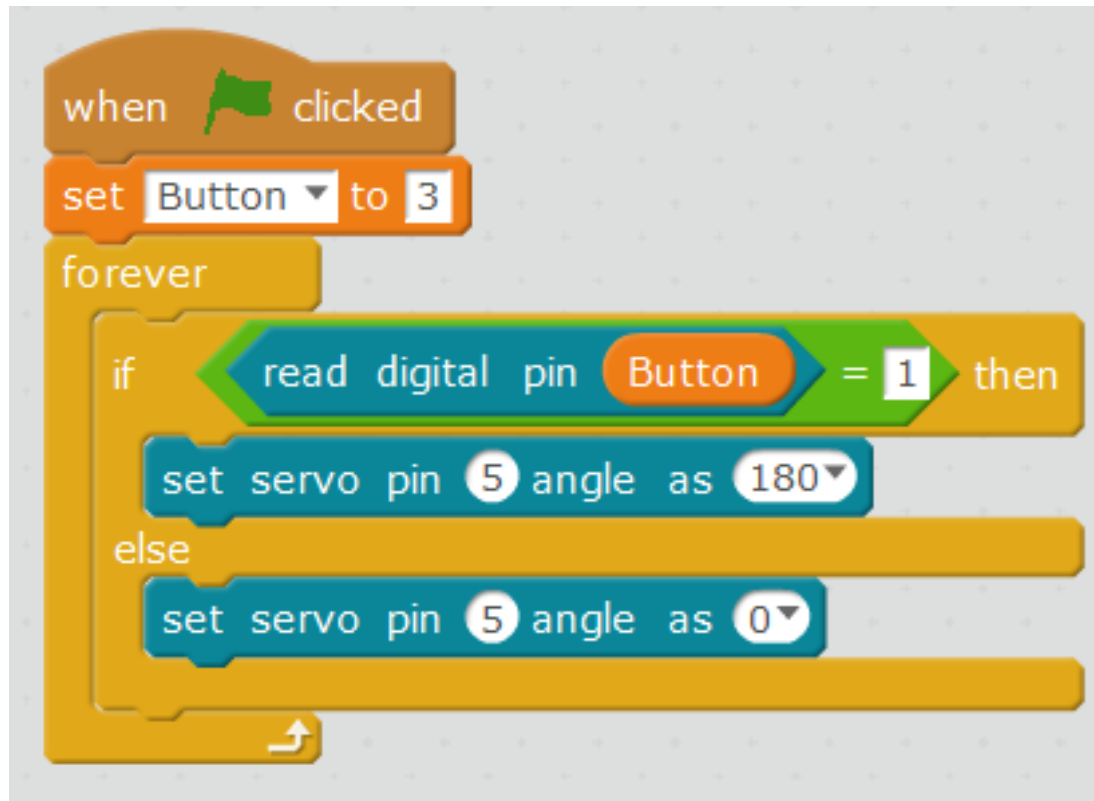
Write your servo control program

- We want the program to continuously check if the conditions are fulfilled, in case there is a change of state.
- Insert your conditions into a forever loop:



Write your servo control program

- Complete program:



```
when green flag clicked
  set Button to 3
  forever
    if read digital pin Button = 1 then
      set servo pin 5 angle as 180
    else
      set servo pin 5 angle as 0
```

The image shows a Scratch script for controlling a servo motor. It starts with a 'when green flag clicked' event block. This is followed by a 'set Button to 3' block. A 'forever' loop contains an 'if' block that checks 'read digital pin Button = 1'. If true, it sets 'servo pin 5 angle as 180'. If false, it sets 'servo pin 5 angle as 0'.