

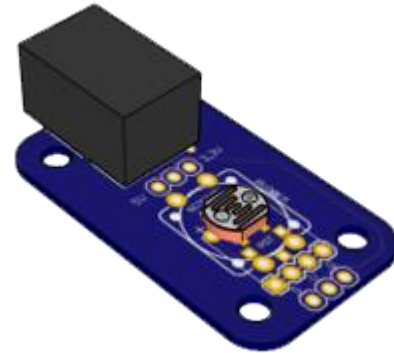
TScratch Basics

Coding with mBlock (Software)

Learning Objective

In this lesson you will learn:

TScratch (TSense LDR)



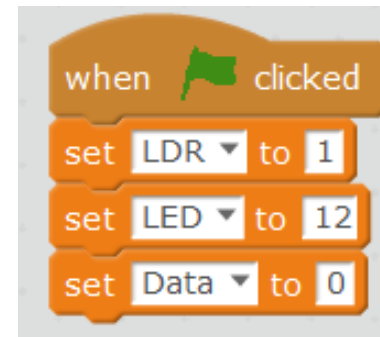
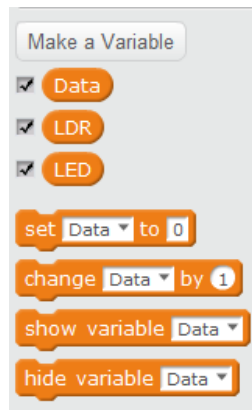
- Include a light-sensitive sensor to your project!
- Coding another Analog input with Arduino

What is a LDR?

- LDR is also known as the Light Dependent Resistors.
- It is a “switch” that works based on the intensity of light.
- Bright → Low Resistance (not working)
- Dark → High Resistance (working)
- They are used commonly in street lamps, dark places, etc.

Write your lighting control program

- In this program, we will have a LDR **analog input (port 1)** and LED **digital output (port 12)**. We will also be creating a variable Data to help us track the LDR value.
- Create the respective variables in the Data&Blocks tab, then define them in the scripting area:



Write your lighting control program

- Within a forever loop, set your conditions. In this case, we want the LED to be switched ON when the LDR value falls below 200.
- If LDR value $< 200 \rightarrow$ LED output is HIGH (switched on)
- If LDR value $> 200 \rightarrow$ LED output is LOW (switched off)

Write your lighting control program

- To track the light intensity value, we will use Data to display the updated value.
- Write a simple program to display the value:

```
when green flag clicked
  set LDR to 1
  set LED to 12
  set Data to 0
  forever loop
    set Data to read analog pin (A) LDR
```

Forever loop to continuously check for changes in state

The value of the LDR will be continuously read and displayed on the stage

Write your lighting control program

- From the Operators tab, drag the  :



Double-click and type the number 200 in the box

Note: Remember to drag the LDR 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 lighting control program

- First condition: if the LDR input is less than 200, the LED output is HIGH (switched on).
- Drag out an **if... else** control block and insert the condition:

```

if read analog pin (A) LDR < 200 then
  set digital pin LED output as HIGH
else
  
```

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

Write your lighting control program

- Second condition: if the LDR value is more than 200, the LED output is LOW (switched off).
- Insert the condition in a **NEW if** block, then into the **else** part:

```

if read analog pin (A) LDR < 200 then
  set digital pin LED output as HIGH
else
  set digital pin LED output as LOW
    
```

Note: There are **TWO** if conditions, but only **ONE** if... else block!
 In the case that the first condition is not fulfilled, **ONLY THEN** will the program check for the second condition!

Write your lighting 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:

```

forever
  if read analog pin (A) LDR < 200 then
    set digital pin LED output as HIGH
  else
    set digital pin LED output as LOW
  
```

Write your lighting control program

- Complete program:

Note: The Data display program is kept so the value of the LDR will constantly be updated. This is useful for troubleshooting your program.

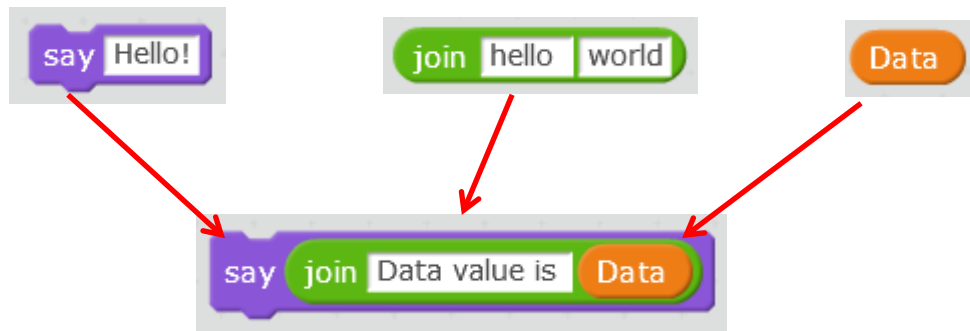
```

when clicked
  set LDR to 1
  set LED to 12
  set Data to 0
  forever
    set Data to read analog pin (A) LDR
    if read analog pin (A) LDR < 200 then
      set digital pin LED output as HIGH
    else
      set digital pin LED output as LOW
  
```

Write your lighting control program

- Additional scripting:
- mBlock comes with a default panda sprite when the software is loaded. To make the program more interesting, we can program the panda to state the LDR value.
- Panda says: “LDR value is [value]”

Double click to add your custom text. Don't forget to add a space at the end for your value to be displayed correctly!



Write your lighting control program

- Drag the text block from the Looks tab and add the desired text:



Data value is 428

```
when clicked
  set LDR to 1
  set LED to 12
  set Data to 0
  forever
    say join Data value is Data
    set Data to read analog pin (A) LDR
    if read analog pin (A) LDR < 200 then
      set digital pin LED output as HIGH
    else
      set digital pin LED output as LOW
```