



The Smart Light project (Level 1)

Worksheet for students

Team:.....

Aim: To make a smart light that turns on only when movement is detected

Can you describe what a smart light might do? Search for information online and write your answers below.

Can you think of some scenarios and implementations where a smart light might be necessary? Discuss with your team and document your thoughts below.

Review several scenarios and choose one to demonstrate. Sketch your smart-light and list the crafting material that you may need.

Area for sketches

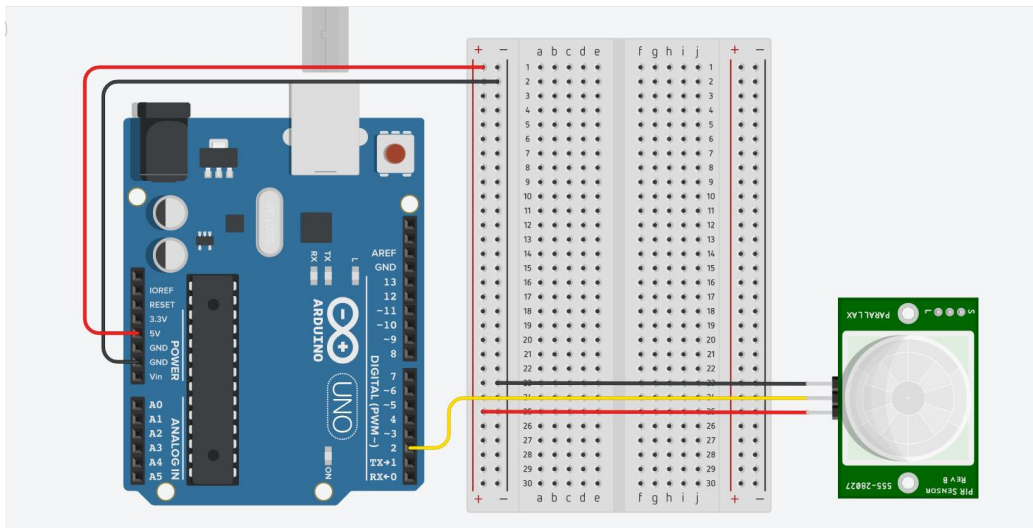
List of material:

Time for crafting! Start working on the design of the smart light using the available crafting materials; bear in mind that your model will be revised several times and adjustments/improvements will be introduced.

Time for circuit making!

The image below depicts an already connected breadboard to the Arduino board with PIR sensor. You will also need to connect a LED and a resistor. **How will you connect them?**

Try to draw the circuit below or create the simulation on TinkerCAD.



Does the PIR Sensor need a resistor? Why or why not? *Please write your answer below:*

Time for hands-on practice!

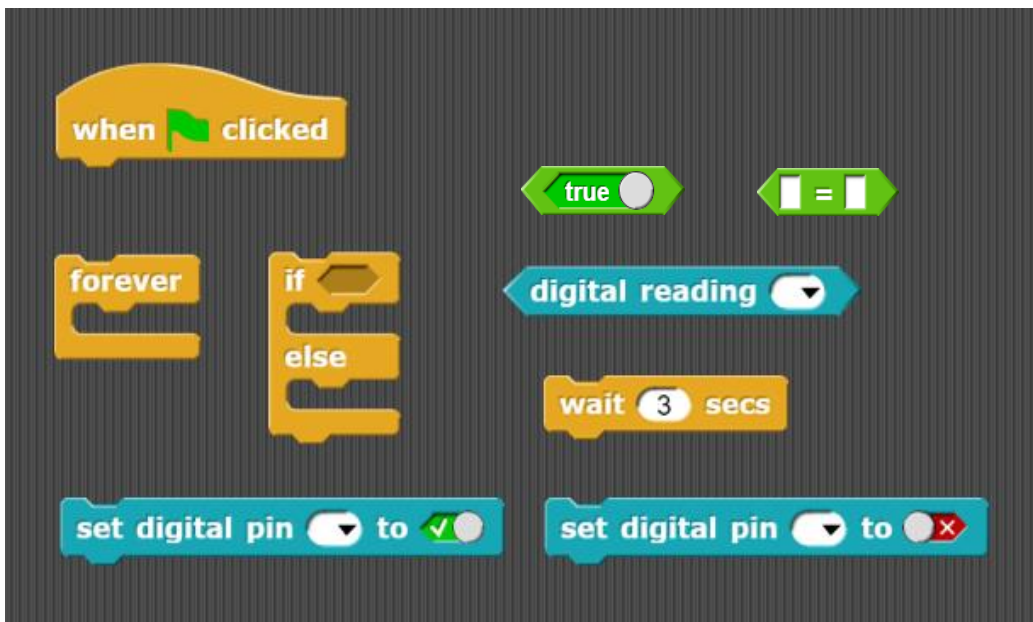
Let's create the circuit using your Arduino board and the corresponding electrical components.

Time for programming!

Open Snap4Arduino and connect your Arduino to Snap4Arduino.

A script in Snap4Arduino (and in most of the block-based programming environments) is assembled by dragging blocks from a palette into the scripting area in the middle part of the window in Snap4Arduino.

The following script (see below) is semi-structured. Find the blocks and place them in the correct order into the scripting area, in the middle part of the window, in Snap4Arduino, in order to make the smart light turn on when movement/presence is detected. **If your PIR sensor has a potentiometer for controlling the Delay Time you can skip the use of the wait block.**



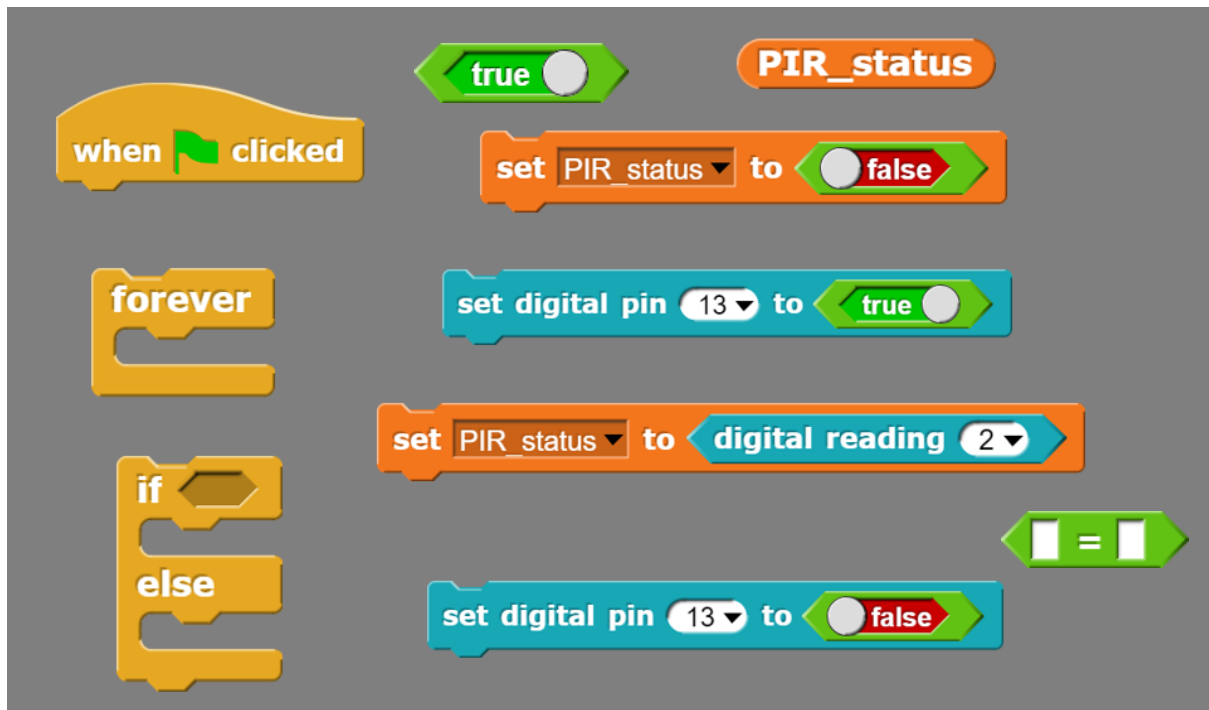
What changes should be introduced in your script in order to turn off the LED when presence is detected?

Time to revise your model! Start improving the design of the smart light model using the available crafting materials. Integrate the electrical circuit and the script to add the needed level of interactivity.

Towards a more optimal solution

Let's move to a more optimal solution by introducing a variable to our code. Here, the digital reading from the PIR sensor will be stored in a variable, which will be called PIR_status.

The following script (see below) is semi-structured. Find the blocks and place them in the correct order into the scripting area, in the middle part of the window, in Snap4Arduino, in order to make the smart light turn on when the value of the PIR_status variable is checked.



Tips zone

Programming blocks



This is a *hat* block that indicates that the script should be carried out when the green flag will be clicked.



This is a C-block. The slot inside the C shape is a special kind of input slot that accepts a *script* as the input. Any script placed *in there* will be carried out forever in a circle.



This is a control block that pauses the execution of the script for a predefined number of seconds (keeping the current state on): in this case 1 sec.



This block sets the selected digital pin (in this case 13) to the logical true value. You can toggle between the true and false values directly in the block.






This block sets the selected digital pin as input.



Click on the Variables Palette and then [here](#) to make a variable

Electrical components

The following table is an index containing all the components that need to be implemented for accomplishing the present activity.

| | |
|---|---|
|  | LED light |
|  | 220 Ω resistor |
|  | PIR sensor |

ROBOSCIENTISTS PROJECT

Motivating secondary school students towards STEM careers through robotic artefact making

Erasmus+ KA2 2018-1PL01-KA201-051129

Creators

Rene Alimisi, Chrysanthi Papasarantou, Konstantinos Salpasaranis (EDUMOTIVA)

Declaration

This report has been prepared in the context of the ROBOSCIENTISTS project. Where other published and unpublished source materials have been used, these have been acknowledged.

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