The Smart Light project (Level 2)

Worksheet for students

Team:………………………………

Aim: To make a smart light that turns on in the dark 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 turning on only in the dark might be necessary or useful? 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 a PIR sensor and a LED. You will also need to connect a photoresistor and a 10 KΩ resistor. **How will you connect them?**

Try to draw the circuit below or create the simulation on TinkerCAD.
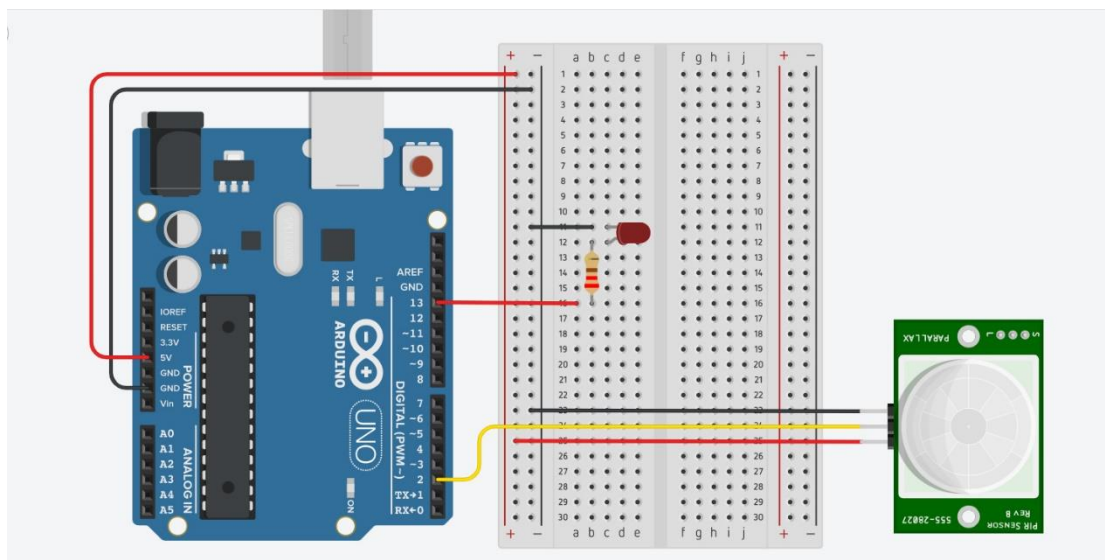
Did you connect the photoresistor to an analog pin? Why? *Please write your answer below:*

Time for hands-on practice!

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

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 darkness and movement/presence are detected. If your PIR sensor has a potentiometer for controlling the Delay Time you can skip the use of the wait block. **Tip:** Start by identifying the values that correspond to the darkness level.
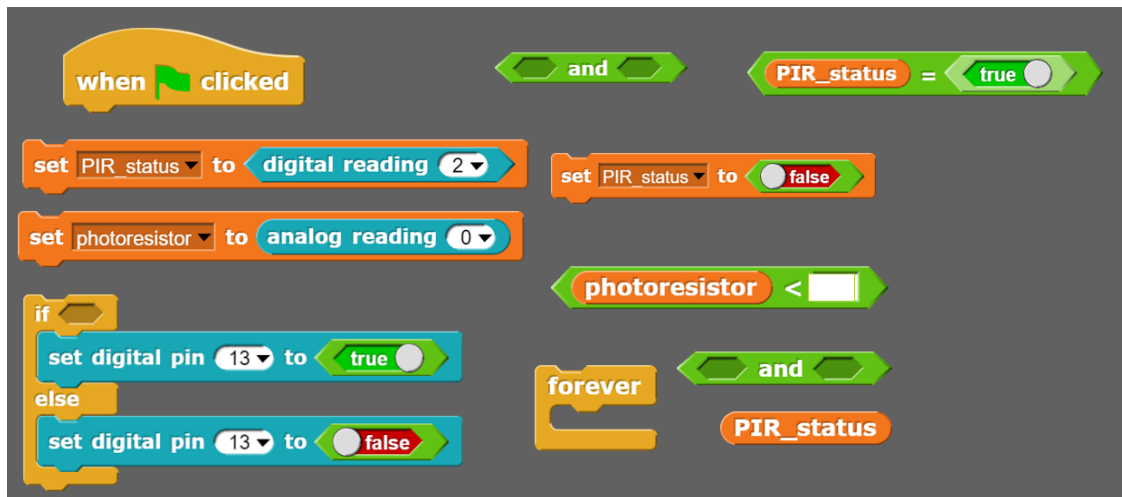
Which blocks are used to check the existence of darkness or lightness?

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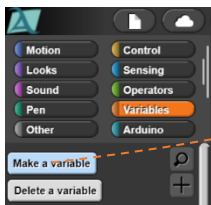
This is a control block that pauses the execution of the script for a predefined number of seconds (keeping the current state on): in this case 1 sec.

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

This block can be used to create a comparison condition/predicate that evaluates to true or false. Don't get confused; a hexagonal block is a predicate/condition, but the value it reports is a Boolean.

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The 'and' Boolean operator, serves to indicate that ALL specified conditions must be met in order for a query to return true.

Condition 1: Presence is detected

Condition 2: there is dark

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
	10 KΩ resistor
	photoresistor

ROBOSCIENTISTS PROJECT

Motivating secondary school students towards STEM careers through robotic artefact making

Erasmus+ KA2 2018-1PL01-KA201-051129

Creators

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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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