The Lighthouse project (Level 2)

Worksheet for students

Team:………………………………

Aim: To make a lighthouse that blinks only at dark

In a lighthouse without a keeper how the flashing light is turned on when it is getting dark? How it is turned off in daylight?

Review several structures of lighthouses and start taking decisions for your own design. Sketch your lighthouse and list the crafting material that you may need.

Area for sketches

List of crafting material:

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

The image below depicts a circuit in which a LED is connected. For the needs of this level, you will also need to connect a photoresistor:

- How will you connect it?
- Will you connect it to one of the digital pins?
- Apart from jumpers, will you need any other component?

Try to draw the circuit or try to create the simulation on TinkerCAD.
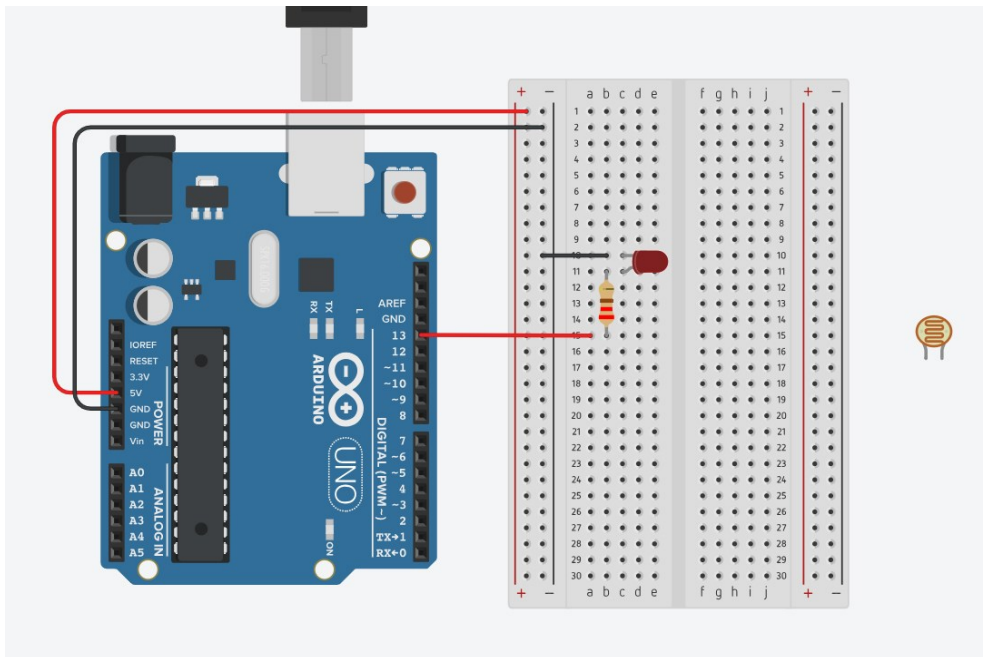
What does the photoresistor do? *Please write your answer below.*

How many resistors will you use and of which value? *Please write your answer below.*

Time for hands-on practice!

Let's add the corresponding components to the circuit from the previous level or create the circuit from scratch.

A script in Snap4Arduino is assembled by dragging blocks from a palette into the scripting area in the middle part of the window in Snap4Arduino.

The following script is semi-structured. Place the blocks in the correct order into the scripting area in the middle part of the window in Snap4Arduino in order to implement the blinking functionality only at dark. *Do not forget to connect your Arduino in Snap4Arduino.*
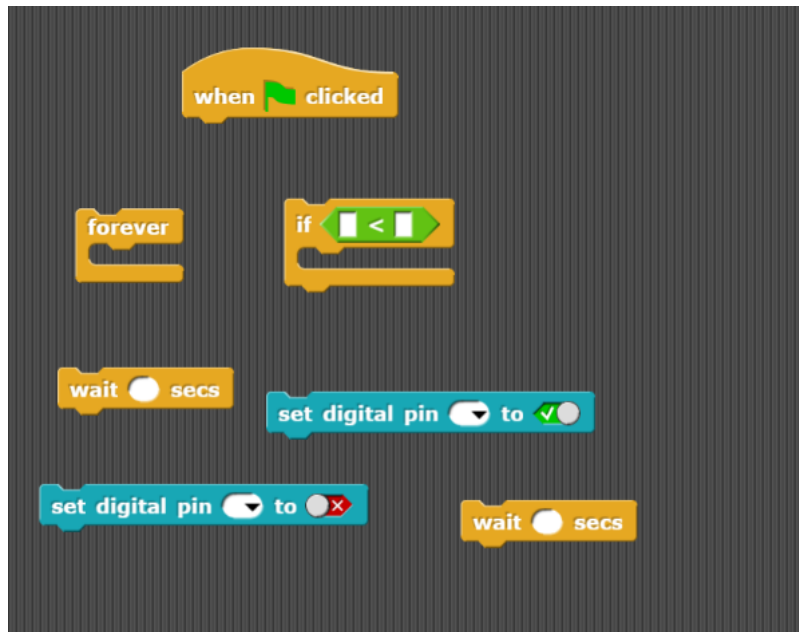
Measure the current ambient light in your class and write the value below. Did everyone in the class get the same value?

Cover with your hands the photoresistor. What is the value now?

Time to revise your model! Start improving the design of the lighthouse model using the available crafting materials. Integrate the electrical circuit and the script that you made to add a level of interactivity.

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. Normally a LED is connected to pin 13.

The C-shaped if block runs its input script if (and only if) the expression in its hexagonal input reports true.

This block can be used to create a 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.

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
		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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