

Automatic Lighting

Picobricks

Beginner

10 Mins

1 Overview

In this project we'll build our very own automatic light, just like the ones that switch themselves on when it gets dark. We'll use the Light Sensor to measure how bright it is around us. When it gets too dark, the RGB LED will switch on all by itself, and when it's bright again, it turns back off.



What you'll learn

- How a light sensor measures the light around it
- How to use an if/else block to make a decision
- How to switch an RGB LED on and off automatically

2 What you'll need



What you'll need

- PicoBricks Kit
- PicoBricks Brick IDE
- MicroUSB to USB cable
- Laptop or tablet for coding

3 Key words

Key words

Light Sensor

A light sensor is a little part that measures how bright or dark it is around it, then turns that into a number your code can read. As the light changes, so does the number.

Like the automatic headlights on a car that switch on when it gets dark, a light sensor notices the light dropping and lets your code react.

RGB LED

An RGB LED is a tiny light that can glow in any colour you like. It mixes red, green and blue light in different amounts, a bit like mixing paints, to make all sorts of colours.

Like the colour-changing lights some people put behind their TV, an RGB LED can shift from red to green to blue and everything in between.

Forever loop

A forever loop repeats its instructions again and again without ever stopping (until you switch off or reset). It's perfect for anything you want to keep happening over and over.

Like a clock's second hand that keeps ticking round and round, a forever loop keeps running the same steps over and over.

If statement

An if statement checks whether something is true, and only runs its instructions when it is. It's how code makes decisions.

"If it's cold, put on a coat." If it's warm, you skip the coat, the action only happens when the check is true.

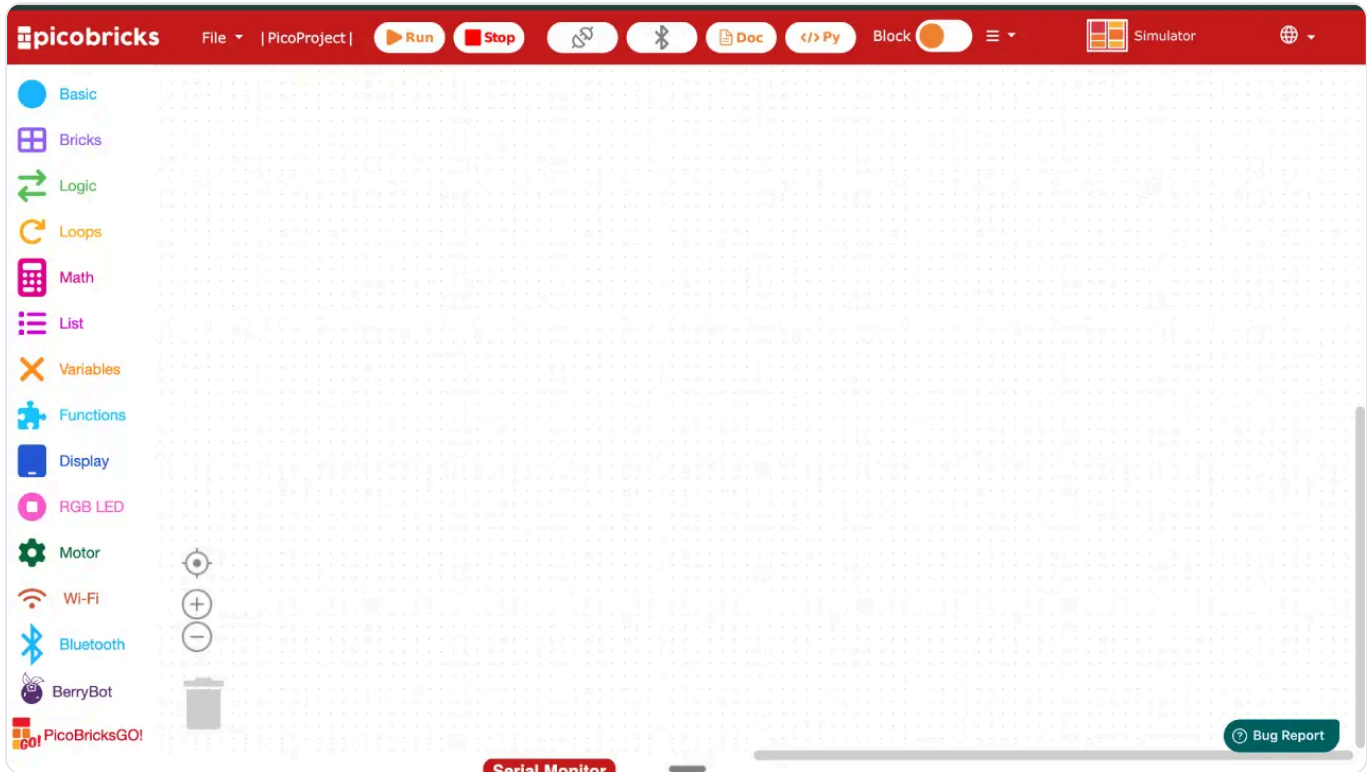
Threshold

A threshold is a cut-off number you pick to help your code make a decision. The code checks whether a value is above or below it, then acts. It's like drawing a line and asking "are we over it or under it?"

Like setting a bedtime of 8 o'clock: before 8 you're still up, after 8 it's lights out. The time is your threshold.

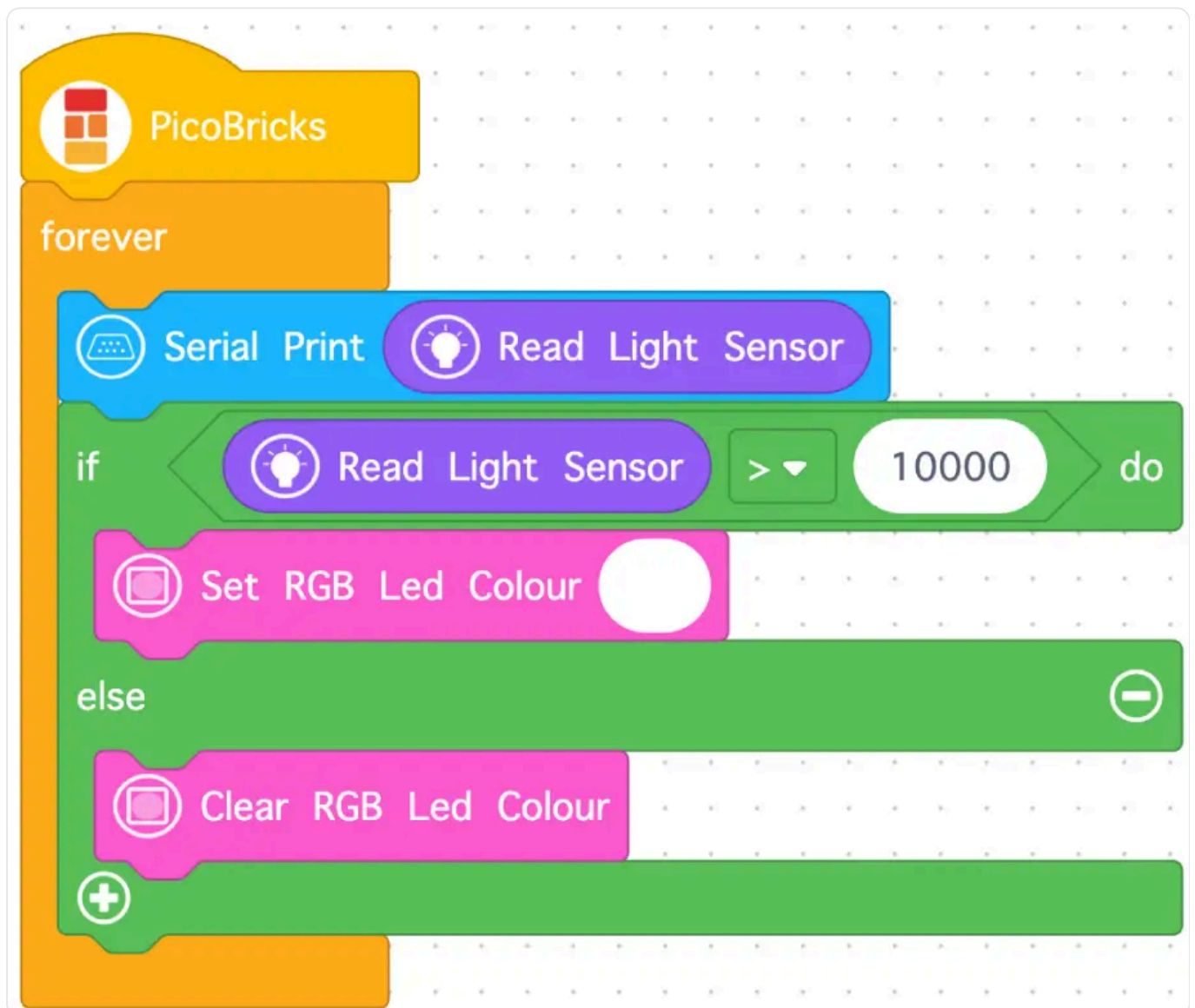
4 Set up your PicoBricks

1. Open your favourite web browser. We recommend either Google Chrome or Microsoft Edge. Type ide.picobricks.com into the address bar.
2. Connect the PicoBricks board to your computer using the USB cable.
3. Connect the PicoBricks board to the Brick IDE by selecting the **Connection** button at the top of the code area.



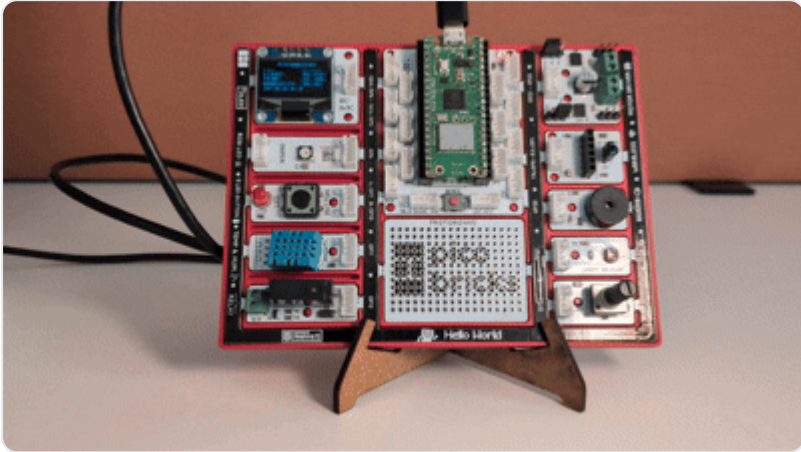
5 Build the code

1. Select **Basic**. Drop a **PicoBricks** block into the code area.
2. Select **Loops**. Snap a **forever** block to the **PicoBricks** block.
3. Select **Basic**. Snap a **Serial Print** block inside the **forever** block.
4. Select **Bricks**. Snap a **Read Light Sensor** block onto the **Serial Print** block where it says **PicoBricks**.
5. Select **Logic**. Snap an **if else** block to the **Serial Print Read Light Sensor** block.
6. Select **Logic**. Snap an **=** block onto the **if** block, then change the **=** to a **>**.
7. Select **Bricks**. Add a **Read Light Sensor** block into the first blank space of the **if** block, before the **>**.
8. Select **Math**. Snap a **0** block into the space after the **>**, then change **0** to **10,000**.
9. Select **RGB LED**. Snap a **Set RGB Led Colour** block inside the **if** block.
10. Select **RGB LED**. Snap a **Clear RGB Led Colour** block inside the **else** block.



6 Run it and Watch

Now the code is finished, let's run it and check it works. Select the run button at the top of the code area. If it's daylight the RGB LED should be off. If it's night time, or if you cover the light sensor with your hand, the RGB LED will turn on.



7 Try it yourself

Try it yourself

Challenge: Can you make your night light more colourful? Try changing the **Set RGB Led Colour** block to a different colour, so your light glows blue, green or purple when it gets dark. Feeling brave? Add a **Buzzer** block so it gives a gentle beep the moment the light comes on.

8 Stuck? Quick fixes

Problem	Try this
The RGB LED won't turn on at all	Cover the light sensor fully with your hand to make it really dark. If it still won't light up, your room might not get dark enough to push the reading past the cut-off, so try lowering the 10,000 value in your <code>if</code> block.
The RGB LED is always on	Your everyday room light is already reading above the cut-off. Try raising the 10,000 value so the light only comes on when it's properly dark.
Nothing happens when I press Run	Check the PicoBricks board is connected (the connection button at the top should show it's linked). Unplugging and replugging the USB cable often does the trick.
I can't see the light readings	Make sure the <code>Serial Print</code> block is inside the <code>forever</code> loop, with the <code>Read Light Sensor</code> block snapped into it.