

pix

Learning scenario: Building a smart lamp with
Arduino

school subject: technology

related digital skill: programming



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How does a smart lamp work ?

Smart lamps help protecting the environment by saving energy.

Arduino is an open-source electronics platform based on easy-to-use hardware and software. It's intended for anyone making interactive projects.

Arduino is an ***open-source project, with a worldwide community***

Using Arduino helps to avoid the “blackbox effect”

How does a smart lamp work ?

Learning objectives

- ✓ **Understand the basics** of programming with Pix
- ✓ **Understand how to light a lamp** with Arduino
- ✓ **Use a program** to build a smart lamp

Understand the basics of programming

Programming is just a game !

Ready to play ?


Step 1 :

[Pix question on programming](#)

When the program is run, the pen draws two stair steps.

Complete the program to trace all the steps.

Run the program.



The screenshot shows a programming environment with a code editor on the left and a drawing canvas on the right. The code editor contains the following code:

```
1 pen.moveUpward()  
2 pen.moveForward()  
3 pen.moveUpward()  
4 pen.moveForward()  
5
```

The drawing canvas shows a pen icon at the bottom left, and a dashed line forming two stair steps. Below the code editor is a green button labeled "EXECUTE >>" and below the drawing canvas is a button labeled "RESET".

Understand the basics of programming

Programming is just a game !

Ready to play ?


Step 2 :

[Pix question on programming](#)

The pen must draw a rectangle 100 pixels long and 50 pixels wide.

Complete the program and then run it.

The commands available are: moveUpward, moveDownward, moveForward, moveBackward.



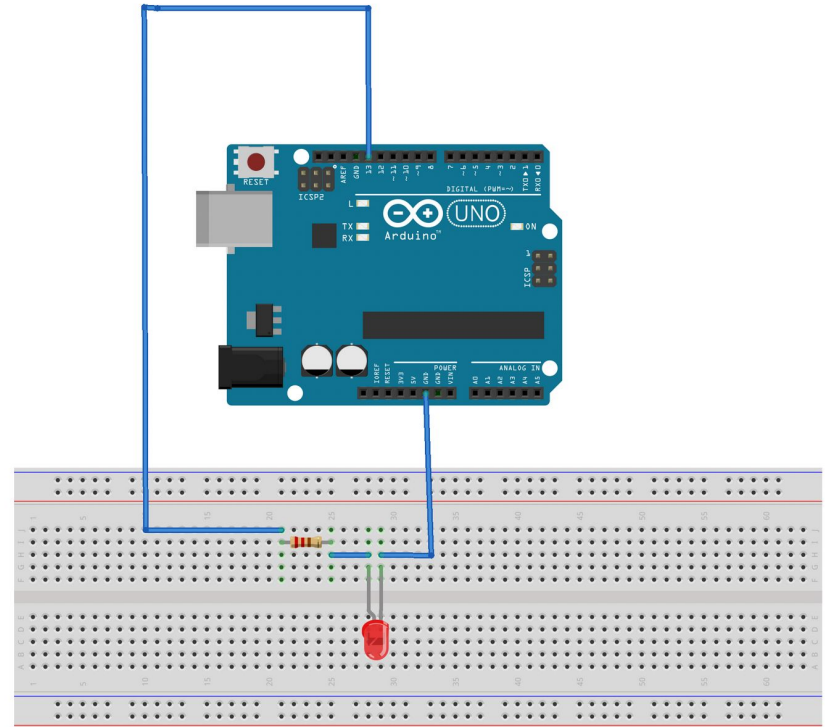
The screenshot shows a programming environment with a code editor on the left and a canvas on the right. The code editor contains two lines of code: `1 pen.moveForward(100)` and `2`. The canvas shows a small orange pen icon at the top left of a dashed rectangular box, indicating the start of a drawing operation. Below the code editor is a green button labeled "RUN >>" and to the right is a grey button labeled "RESET".

Understand the basics of Arduino programming

What is Arduino ?

Arduino senses the environment by receiving inputs from many sensors, and affects its surroundings by controlling lights, motors...

[Make a simple LED program](#)



Understand how to light a lamp with Arduino

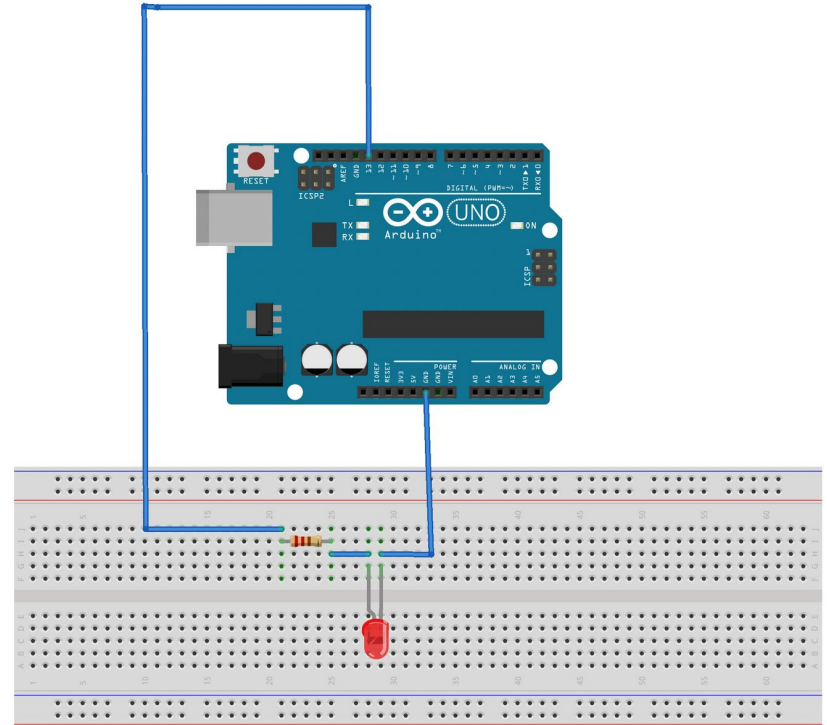
LED Blink Code Arduino



Copy and paste this code into your Arduino IDE or Web Editor

```
1  int led = 13; // the pin the LED is connected to
2  void setup() {
3      pinMode(led, OUTPUT) // Declare the LED as an output
4  }
5
6  void loop() {
7      digitalWrite(led, HIGH) // Turn the LED on
8      delay(1000)// Wait for 1000 milliseconds (1 second)
9      digitalWrite(led, LOW) // Turn the LED off
0  }
```

[Video on Arduino](#)



Using a program, build a smart lamp

```
83
84 void handleGesture() {
85     if ( apds.isGestureAvailable() ) {
86         switch ( apds.readGesture() ) {
87             case DIR_RIGHT:
88                 Serial.println("RIGHT");
89                 if(light_state == true){
90                     hand_swiped = true;
91                     digitalWrite(relay_pin,HIGH);
92                     light_state = false;
93                 Serial.println("light state false");
94             }
95             else if(light_state==false){
96                 hand_swiped=true;
97                 digitalWrite(relay_pin,LOW);
98                 light_state = true;
99                 Serial.println("light state true");
100            }
101            break;
102            case DIR_LEFT:
```



Arduino Smart Lamp © GPL3+

An Arduino-controlled lamp that turns on automatically when it gets dark. Turn it off or back on with the swipe of your hand!

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