Get Started with the Arduino IDE

Time required: 60 minutes

The mBot is based on an open-source microcontroller board called an Arduino. We are going to learn Arduino C to make our mBot move about. Arduino C is based on the C++ programming language.

Video walkthrough: Arduino IDE Installation Walkthrough

Install the Arduino IDE

An IDE is an Integrated Development Environment. mBlock is an IDE. An IDE contains everything necessary to create fully functional programs in whatever language you are writing in. The Arduino IDE is specifically designed for microcontroller boards like the mBot.

1. Go to https://www.arduino.cc/en/Main/Software
2. Download and install the **Arduino IDE**: **Windows Win 10 and newer, 64 bits**
3. Double Click the file downloaded file to start the installation.
4. Accept everything. Run the program.
5. Accept the firewall change.
6. You are ready to install the Makeblock Libraries.

Install the Makeblock Libraries

The Arduino IDE doesn't know anything about the mBot. We will download the code needed to communicate with the mBot. This code is in a library.

1. Go to https://github.com/Makeblock-official/Makeblock-Libraries/archive/master.zip
2. This link will start a download of a file named **Makeblock-Libraries-master.zip**
3. Go to the **Sketch** menu → **Include Libraries** → **Add .ZIP Library**
4. Browse to your Downloads folder → Select **Makeblock-Libraries-master.zip** → Click **Open.**
5. The library should install.
6. You are ready to program your mBot in Arduino C.

First Program: Blink LED's

Please read the directions carefully before beginning the assignment.

- Comment your code as shown in the tutorials and other code examples.
- Follow all directions carefully and accurately.
- Think of the directions as minimum requirements.

Requirements

1. Blink LED's on the robot in a continuous loop.

Tutorial Assignment

- Start the Arduino IDE. Save the sketch as **Blinky**
- Complete and test the program as shown.

```
/**
   @file    LED.ino
   @author  William A Loring
   @version V1.0.0
   @date revised 06/07/2017  created: 12/10/16
   @Description: Sample code for mBot onboard LED's
*/
#include <MeMCore.h>  // Include mBot library
MeRGBLed led(0, 30);  // Create an LED object to control mBot LED's

// Initialization code, only runs once
void setup() {
  led.setpin(13);     // Set the pin to access the onboard LED's
}

void loop() { // Loop forever
  led.setColor(60, 60, 60);    // Set both LED to White
  led.show();                  // Use .show() to make new color take effect.
  delay(500);                  // Delay in milliseconds,
                               // program pauses for LED's to display

  led.setColorAt(0, 60, 0, 0); // Set LED0 (RGBLED1) (RightSide) to Red
  led.setColorAt(1, 0, 0, 60); // Set LED1 (RGBLED2) (LeftSide)  to Blue
  led.show();
  delay(500);

  led.setColorAt(0, 0, 0, 60); // Set LED0 (RGBLED1) (RightSide) to Blue
  led.setColorAt(1, 60, 0, 0); // Set LED1 (RGBLED2) (LeftSide)  to Red
  led.show();
  delay(500);
}
```

Upload a Program to the mBot

This is how to compile and upload your program to the robot. An Arduino device can only run one program at a time.

1. Power on the robot.
2. Connect the robot through the USB cable.
3. Run the **Arduino IDE** software.
4. Under **Tools → Board → Arduino AVR Boards → Arduino Uno**.
5. Select **Tools → Port → COMx**, where x is the highest number shown.
6. Select **Sketch → Upload**. This compiles and uploads the program to your robot.

Assignment

Start with your tutorial project and add the following.

1. Add more LED blinks
2. Add different delay times.

Assignment Submission

- **All students** → Attach finished programs to the assignment in Blackboard.
- **In class assignment submission** → Demonstrate in person.
- **Online submission** → A link to a YouTube video recording showing the assignment placed in the submission area in BlackBoard.