

FAQ

Currently, it is only possible to write programs for LEGO MINDSTORMS EV3, NXT and Bot'n Roll robots.

Yes, you need an USB Wifi Dongle (we recommend the Edimax USB Wifi dongle) and a micro SD card which comes with a SDHC adapter for your PC.

In general it does not matter if you got the retail set (from the toy department) or the education set (from LEGO Education).

Currently, it is possible to only run programs on the brick which are created by Open Roberta Lab.

NEPO is a stand-alone Scratch-inspired programming language. Scratch is event-based, NEPO is a procedural programming language. NEPO has its own semantics and syntax. NEPO was specifically designed to program hardware systems. The special feature of NEPO is the code generation on Fraunhofer servers. This takes place depending on the target system (robot / microboard, etc.) in other programming languages, e.g. C, Java, Python. NEPO is embedded in the cloud-based development / programming environment Open Roberta Lab. Both were developed open source at the Fraunhofer IAIS and made available on Github.

In general YES. We are happy about everyone who is willing to make Open Roberta even more appealing to children/teenagers and teachers. Take a look at <http://dev.open-roberta.org> for additional information.

No, the robot detects the micro SD card. While starting it will run the system SD card firmware if the SD card is bootable. The official EV3 firmware and all the programs on it remain untouched. If you like to run the LEGO EV3 firmware again, you have to remove the micro SD card while the EV3 is powered off and start your robot again.

Currently, every time you connect your robot to Open Robert Lab, a new password/token is generated on the EV3. If you have restarted the brick, you have to type in a new password/token in Open Roberta Lab.

If you forgot your username and you remember the e-mail address you used when registering - then follow these steps to detect your username:

- 1. Click the user icon to login.*
- 2. In the login dialog window click the link "reset password ...".*
- 3. Enter your e-mail address and click "Send now".*

After a short time you receive an e-mail. In the salutation line you see your username.

Please reformat your micro SD card and try to install the firmware again. If the error persists, this is most likely because of the micro SD card. We have discovered, that the EV3 runs into trouble with some cards sized of 32 GB or larger (like TS32GUSDHC10E, Lexar, Samsung EVO 32 GB). We suggest to try another micro SD card for the Open Roberta firmware, which size is between 2 and 16 GB.

It's possible that you were not patient enough and have interrupted the initial installation process of the Open Roberta operating system by mistake. (On delivery of an Open Roberta Starter Kit the microSD card already contains pre-configured files, which are automatically set up when you first start the card inside an EV3 to a functioning system.) This process takes approximately between 10 and 15 minutes. Although seemingly nothing happens on the EV3 brick, there are running internal processes. Only after the EV3 display shows "Open Roberta Lab" the system is ready for use.

During initialization, the microSD card is partitioned. If you want to copy the system on it again later again, you first must remove the partitions of the microSD card. A single-steps instruction, see here: [Formatting the microSD card](#).

When the microSD card has only one partition (free memory = SD card size) and has been formatted, the initialization files must be re-written on the card. You find a single-step instructions for this: [Set up](#). Begin there in step 1

In step 3, you should wait patiently until the Open Roberta main menu appears on the EV3.

On average, we have 8 minutes as the empirical value for the operation. In individual cases, it sometimes takes a little longer. Here, then, you should be patient.

The reason for this problem is most likely the micro SD card. We have discovered, that the EV3 runs into trouble with some cards sized of 32 GB or larger (like TS32GUSDHC10E, Lexar, Samsung EVO 32 GB). We suggest to try another micro SD card for the Open Roberta firmware, which size is between 2 and 16 GB.

At first, please check if the problem persists after restarting the brick (remove the battery for a short time, put it back and start the EV3 again). If so, it may have two different causes:

- 1. You are using an unofficial LEGO Firmware installed on your EV3 (for example the one which adds support for additional USB Wifi dongles and is compatible to the MINDSTORMS EV3 software)
Solution: Check the version of the LEGO EV3 firmware. We have observed, that the unofficial LEGO EV3 software is not able to boot the micro SD card any more. Try to install the latest official LEGO MINDSTORMS EV3 firmware (flashing) on your EV3 by using the MINDSTORMS software. The newest version currently is 1.06H. Restart your EV3 afterwards and try again booting from the micro SD card.*
- 2. You are using a micro SD card with a size of 32 GB or more (for example Samsung EVO 32 GB).
Solution: The EV3 system runs into trouble when using micro SD cards with a size of 32 GB or more. This can lead to several different errors when trying to start the EV3. We suggest you to try another micro SD card for the Open Roberta firmware, which size is between 2 and 16 GB, or reduce the primary partition to a size of maximum 16 GB (see the [Reformatting the micro SD card](#) page to learn how to do this).*

The current version of Open Roberta makes it possible to run programs also on the LEGO MINDSTORMS NXT.

The standard configuration uses a predefined wheel diameter of 5.6 cm (wheels of the education set) and a track width of 17 cm. The diameter of the wheels in the retail set is 4.2 cm.

To create variables just click the + sign in the program-start block.

This way you create a variable which may be configured, for example by giving a name and to declare the variable type. After this declaration the variable block is available in the variables toolbox.

A detailed description for the use of variables is available in the programming Wiki.

We have found some problems with the "turn right/left" block. We are using the basic LEGO EV3 robot.

When using the "turn degree" block with speed 20, the robot turns accurately to any degree, but if we change the speed parameter to 50 the turn of the robot is not very accurate (the degrees of the turn change considerably).

The EV3 robot is turning a different number of degrees with speed = 20 and with speed = 50. Is there any reason that explains that behavior?

The problem mentioned is indeed a problem, because the result is not as expected. To be honest, we cannot avoid this unless we make changes in the low level classes of lejos, the system that is used on the robot.

If the turn block with degree/rotation is used, internally there is a loop that is asking the motor encoders how far they already have rotated. When the given limit is exceeded the motor action stops and the loop is returning. When the motors are rotating slowly, everything is fine, but if they rotate fast, the degrees between two checks are increased. So maybe one check internally returns 359. This is below 360 so the next check is already 370! Then the motors stop, but if the speed is low maybe the next check is returning 360 instead of 370.

So currently we recommend to use slow speed parameters to receive more precise turnings.

In general real robots do behave "as they want to" because of the environment. Friction can cause also a lot of problems and the faster the robot is the more friction we have. With the encoders we cannot discover those influences.

Using the USB connection, the EV3 has the IP address 10.0.1.1. The computer gets an IP address from the EV3 (dhcp) in the range of 10.0.1.10 to 10.0.1.19 automatically. The USB Software is using the standard-http-port 80 for the communication between both devices.

The lab.open-roberta.org server is also accessible on port 80. If you setup a local installation of the Open Roberta server, you can freely choose the port on which the server should run. The default port is 1999.

This functionality is not supported by the menu of the EV3 Open Roberta firmware. But there is a trick how to do connect your robot to such kind of a network "by hand". A SSH connection (via USB cable) or a Linux installation on your PC is required to access the filesystem of the micro SD card.

In the following section we explain, how to make the necessary setting in order to connect to the EV3 via a SSH using the USB cable (this part is only for advanced users who have knowledge about linux systems):

- First of all, you have to install the driver for the USB network emulation: [EV3 \(leJOS\) driver installation under Windows 7](#) or use our new installer of the [USB connection program](#).
- Connect to your EV3 via SSH: [SSH connection to an EV3](#).
- In the file system, navigate to /home/root/lejos/bin/utills by using the command "cd /home/root/lejos/bin/utills" (without quotes " ").
- Open the file wpa_supplicant.conf in the VI Editor of the terminal "vi wpa_supplicant.conf".
- The editor will launch in the terminal of the SSH connection. This one has to modes: "write mode" and "command mode".
- By using the keys "escape" as well as "insert" you can toggle between both modes.
- Now, delete the old content of the file wpa_supplicant.conf in the directory /home/root/lejos/bin/utills and add the following lines:

```
ap_scan=2

ctrl_interface=/var/run/wpa_supplicant

network={
    mode=0
    ssid="Name of the WLAN"
    proto=RSN
    key_mgmt=NONE
}
```

(Replace "Name of the WLAN" by your SSID but keep the quotes " " this time)

- By switching to the command mode and typing ":wq" you save the file with it's new content and close the editor.
- Close the SSH connection to the robot by using the command "exit".
- At the end, you shut down the brick and start it again. If everything was correct, the ev3 will connect to the WLAN automatically. The third line in the main menu will then show a new IP address.

If you want to use your EV3 in different networks, it is recommendable that you save a copy of multiple wpa_supplicant.conf files under different names. When switching between networks, you just have to rename two files and restart the brick insted of editing one wpa supplicant every time.

Modifying the internal configuration file „wpa_supplicant.conf“ of the image makes it possible to connect EV3 robots with WPA2 enterprise networks.

A forum entry is available here: <https://lejos.sourceforge.io/forum/viewtopic.php?t=7292>

A manual describing the file modifications can be found here: <https://forums.freebsd.org/threads/39557/>

If it is not possible to establish a WiFi connection to the EV3 you may connect the EV3 via USB cable.

It is well known that the current Windows versions (Win8 ... Win10) will signal problems with our open source drivers because they are not certified by Microsoft.

Our new installer is currently in beta state and can be downloaded from [USB connection](#). Before installation you have to uninstall an older version.

When the connection program is started the first time it may take some time (1-2 minutes) until the button "connect" is activated.

The USB connection to the NXT requires the installation of the current Open Roberta USB connection software on the PC.

It is well known that the current Windows versions (Win8 ... Win10) will signal problems with our open source drivers because they are not certified by Microsoft.

Our new installer is currently in beta state and can be downloaded from [USB connection](#). Before installation you have to uninstall an older version.

When the connection program is started the first time it may take some time (1-2 minutes) until the button "connect" is activated.

Hint: In this pre-version of the software the programs will not be stored permanently. To save programs you should use the export function so that you can import programs later on.

In the Open Roberta Lab the normal symbols will not be displayed. Instead of them some strange symbols appear. Sometimes the simulation window comes up empty and is not operating.

In both cases you have to empty your cache memory of the internet browser. Consult the internet about how to empty your browser's cache memory.

After clearing the cache the Open Roberta Lab will work fine again.

An empty simulation windows or code window may also be depending on the zoom level of the browser. At zoom levels above and below 100%, Firefox will occasionally display blank windows. In that case, changing the zoom level helps.

The custom simulation background images have a fixed pixel to cm ratio of 3:1. For example, if you would like to set the width of the corridors of a labyrinth to 20 cm, you would have to set the width of the corridors to 60 pixels in the simulation background image.

If you already have an simulation background image that uses another pixel to cm ratio you can scale it (by using microsoft Paint or other image processing programs) to its whole width or height multiplied by 3.

This error is displayed on the EV3 screen and is caused by:

1. The sensor is connect to a different port than specified in the robot configuration EV3basis.
2. A different sensor port is used in the sensor block than specified in the robot configuration EV3basis.

This error occurs, if you try to install a local copy of Open Roberta with Maven version lower than 3.2. Update your Maven installation to at least version 3.2 and repeat the installation.

You can find the RobertaFunctions library in our GitHub repository for the Nepo4Arduino implementation:

<https://github.com/OpenRoberta/robertalab/tree/master/OpenRobertaParent/RobotArdu/resources/libraries/RobertaFunctions>