

Getting Started with MBED

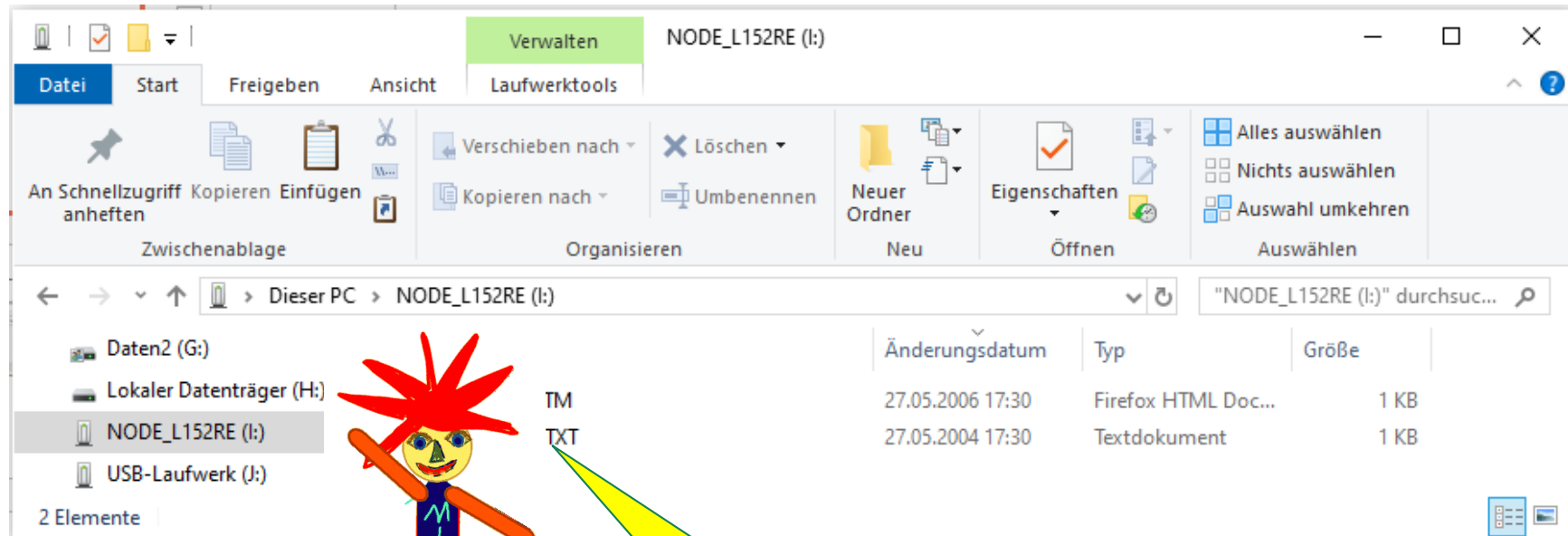
Die Entwicklungsumgebung



Ich bin Mik, Dein Mikrocontroller



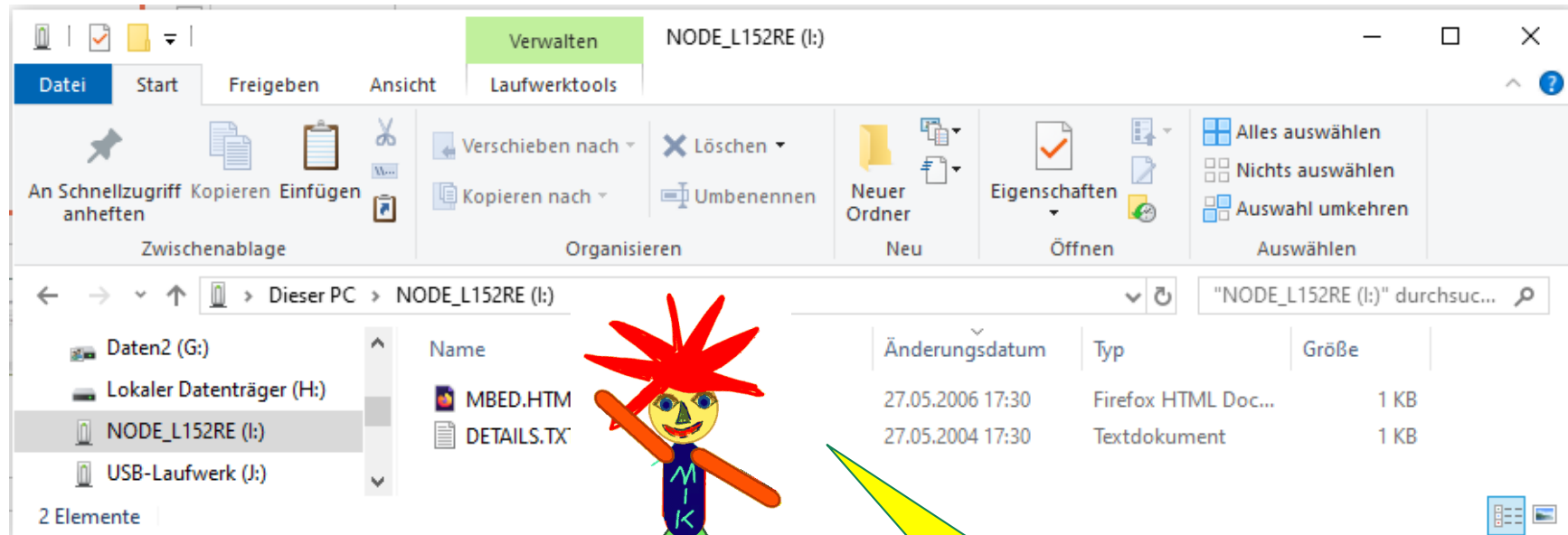
Getting Started with MBED



Der Mikrocontroller
erscheint nach dem
Anschließen als USB-
Laufwerk



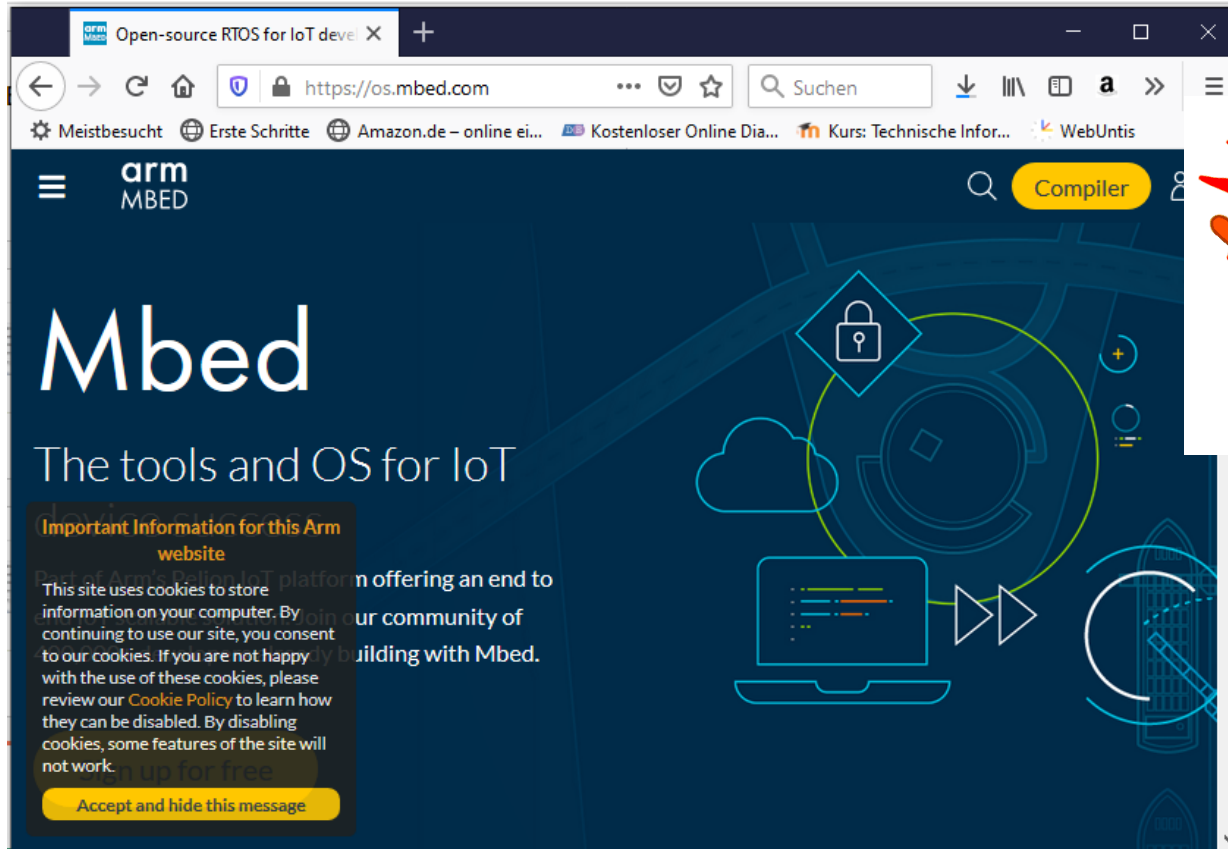
Getting Started with MBED



Den Link anklicken



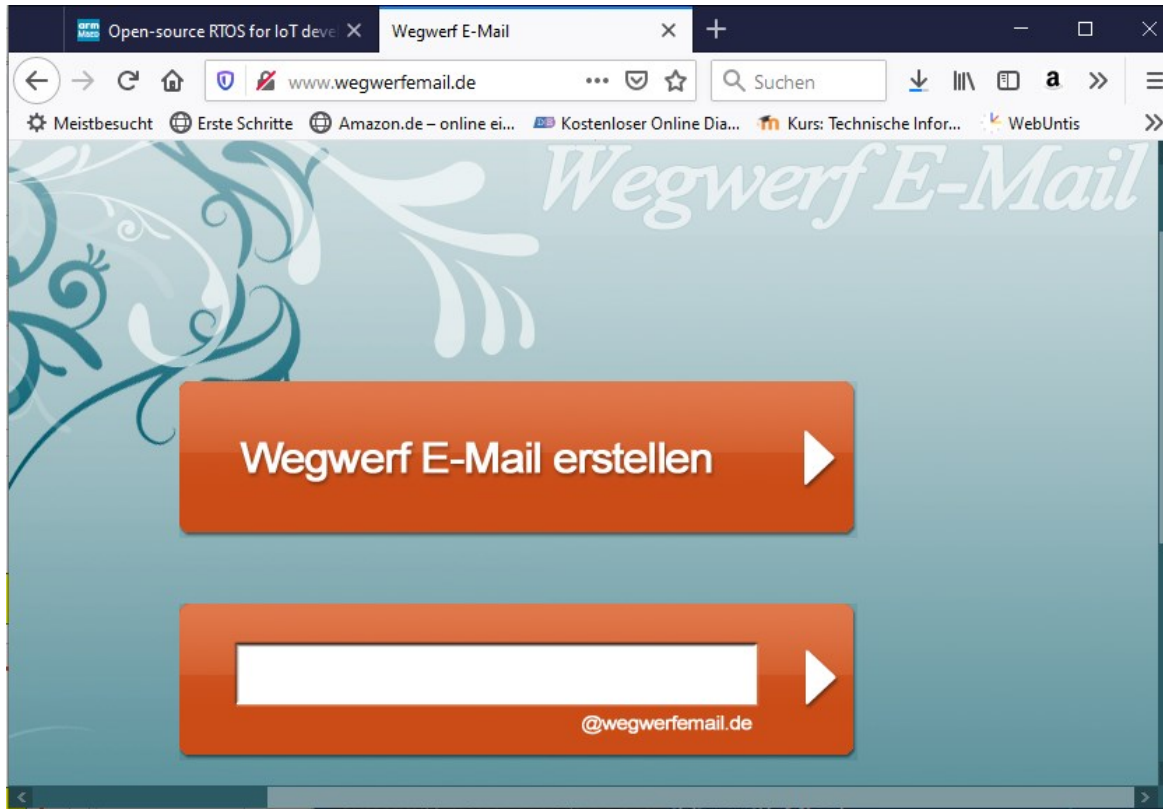
Getting Started with MBED



Einloggen oder
Registrieren.



Getting Started with MBED



Zum Registrieren wird eine EMAIL-Adresse benötigt. Das kann auch eine Wegwerf-Email sein.



Getting Started with MBED

Open-source RTOS for IoT devel X Wegwerf E-Mail

https://os.mbed.com

arm MBED

Mbed

The tools and OS for IoT device success

Part of Arm's Pelion IoT platform offering an end to end IoT scalable solution. Join our community of 400,000+ developers already building with Mbed.

Sign up for free

Compiler

Klick auf Compiler startet die Online-Entwicklungsumgebung

Getting Started with MBED

Open-source RTOS for IoT dev... Mbed Compiler Workspace Ma... Wegwerf E-Mail

https://ide.mbed.com/compiler/#nav;/ 170% Suchen

Meistbesucht Erste Schritte Amazon.de – online ei... Kostenloser Online Dia... Kurs: Technische Infor... WebUntis Verwaltung der Gewer... Meine Ablage – Googl... Kopano WebApp

Mbed

Workspace Management

1.10.25.0

New Import Save Save All Compile Pelion Device Management Commit Revision NUCLEO-L152RE

Program Workspace

My Programs

- LCD_i2c_GSOE
- Nucleo_printf
- Nucleo_read_ios
- STM32_Print_PC

Workspace Management

Manage your Program Workspace

Listing all programs in your Program Workspace

Type to filter the list ... ☐ Match Case ☐ Whole Word Find

Name	Modified	De
LCD_i2c_GSOE	, 1 hour ago	

Workspace Details

jack1930

Total Programs 4

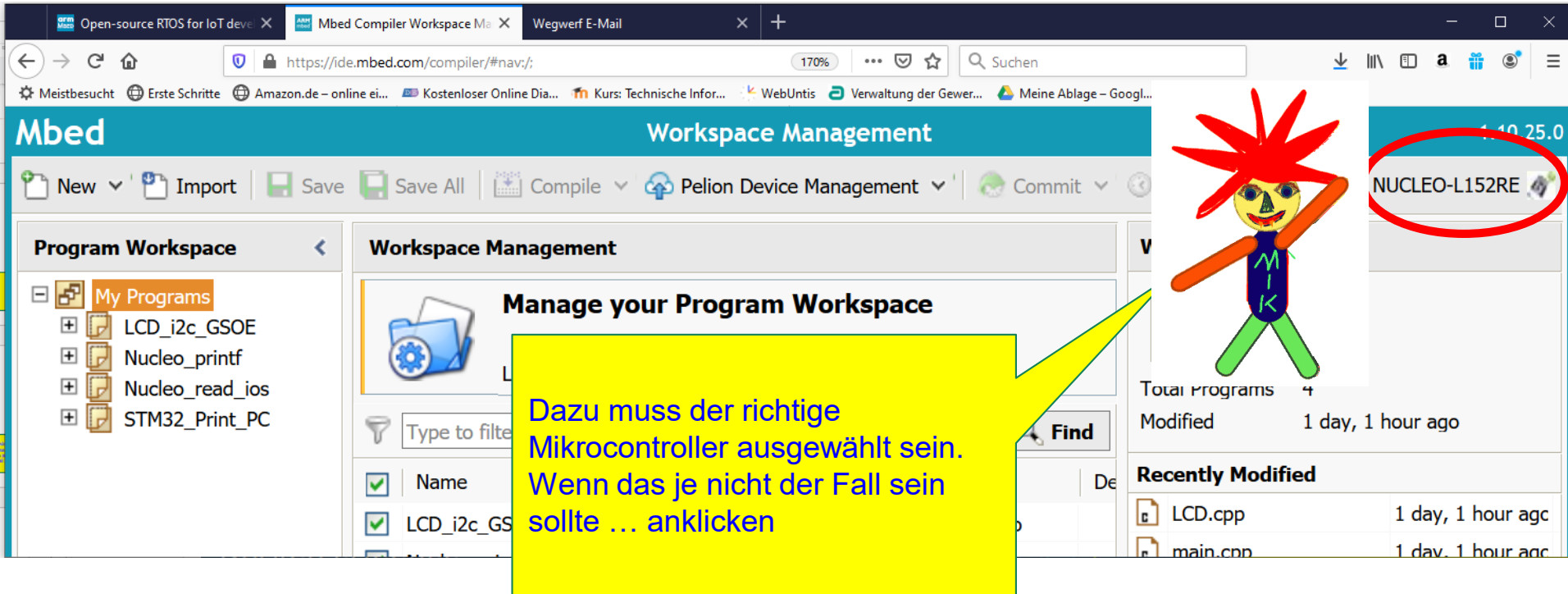
Modified 1 day, 1 hour ago



Jetzt können wir mit dem ersten Projekt beginnen



Getting Started with MBED



The screenshot shows the Mbed IDE interface. The top bar includes tabs for 'Open-source RTOS for IoT dev...', 'Mbed Compiler Workspace Ma...', and 'Wegwerf E-Mail'. The browser address bar shows 'https://ide.mbed.com/compiler/#nav:/;'. The main header is 'Mbed Workspace Management'. Below this is a toolbar with buttons for 'New', 'Import', 'Save', 'Save All', 'Compile', 'Pelion Device Management', and 'Commit'. The left sidebar shows 'Program Workspace' with a tree view under 'My Programs' containing 'LCD_i2c_GSOE', 'Nucleo_printf', 'Nucleo_read_ios', and 'STM32_Print_PC'. The main area is titled 'Manage your Program Workspace' and features a 'Find' button and a table with columns 'Name' and 'Device'. The table lists 'LCD_i2c_GSOE' with a checked checkbox. A yellow callout box points to the 'Device' column with the text: 'Dazu muss der richtige Mikrocontroller ausgewählt sein. Wenn das je nicht der Fall sein sollte ... anklicken'. On the right, a 'Total Programs' section shows '4' programs, 'Modified 1 day, 1 hour ago', and a 'Recently Modified' list with 'LCD.cpp' and 'main.cpp'. A red circle highlights the 'NUCLEO-L152RE' target in the top right corner. A cartoon character with a red starburst head is also visible.

Dazu muss der richtige Mikrocontroller ausgewählt sein. Wenn das je nicht der Fall sein sollte ... anklicken




Getting Started with MBED

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https://ide.mbed.com/compiler/#nav/;



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Select a Platform



NUCLEO-L152RE

You are currently compiling for the "NUCLEO-L152RE" platform.



Overview

Affordable and flexible platform to... using a STM32L152RET6 microcontroller.

flexible way for users to try out new ideas and build... from the various combinations of performance,


orders make it easy to expand the... platform with a wide choice of

debugger/programmer.


{{https://www.youtube.com/watch?v=7YDIG-oArdk&index=9&list=PLgyFKd2HIZlhbKhvngDGmsJxX0uLscnvV}}

More Info


Your registered platforms



NUCLEO-L152RE




Add Board



Add Module



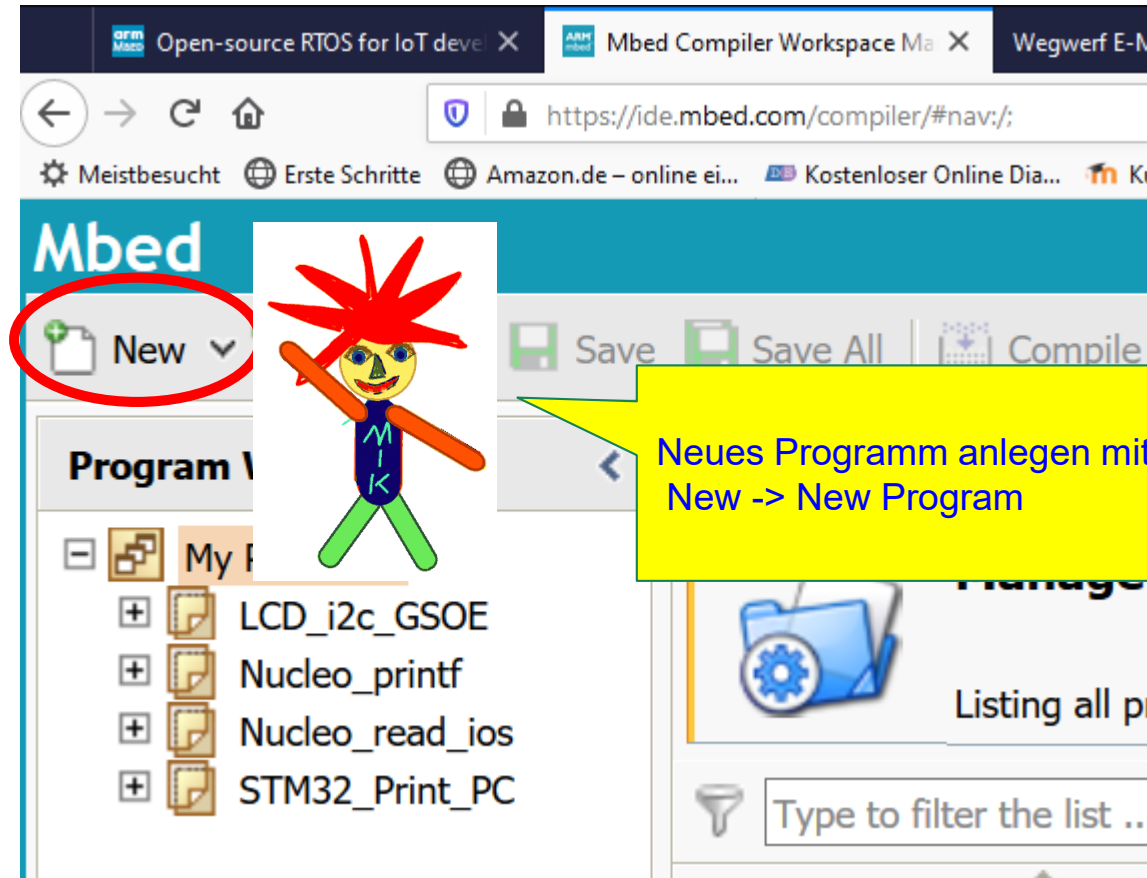
Windows taskbar with icons for a file explorer, a terminal, and a settings menu.



Select Platform



Getting Started with MBED



The screenshot shows the Mbed IDE web interface. The browser tabs at the top include 'Open-source RTOS for IoT devel...', 'Mbed Compiler Workspace Ma...', and 'Wegwerf E-M...'. The address bar shows the URL 'https://ide.mbed.com/compiler/#nav:/;'. The Mbed logo is in the top left. A red circle highlights the 'New' button, which has a green plus icon. A yellow callout box points to the 'New' button with the text 'Neues Programm anlegen mit New -> New Program'. Below the 'New' button is a 'Program' section with a list of files: 'LCD_i2c_GSOE', 'Nucleo_printf', 'Nucleo_read_ios', and 'STM32_Print_PC'. A cartoon character with red spiky hair and a blue body is overlaid on the interface.

Open-source RTOS for IoT devel... Mbed Compiler Workspace Ma... Wegwerf E-M...

https://ide.mbed.com/compiler/#nav:/;

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Mbed

New

Save Save All Compile

Neues Programm anlegen mit New -> New Program

Program

My P

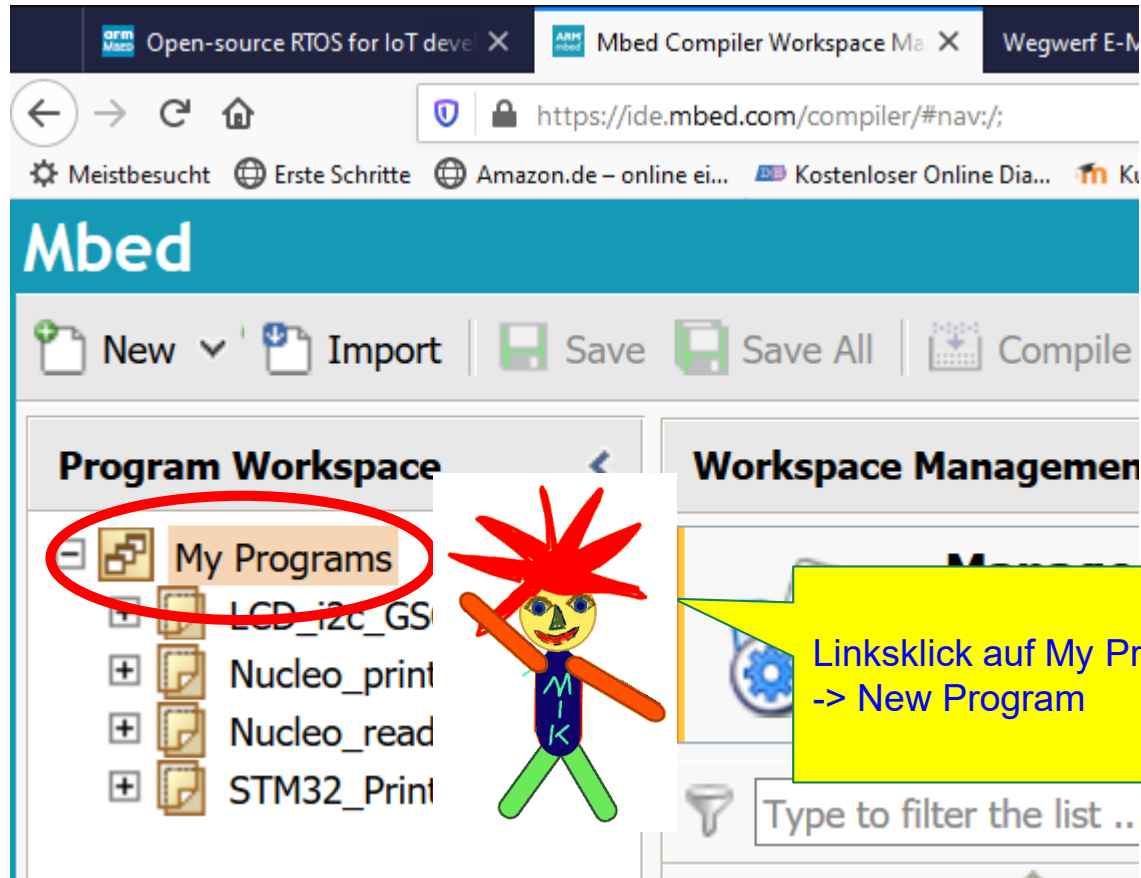
- LCD_i2c_GSOE
- Nucleo_printf
- Nucleo_read_ios
- STM32_Print_PC

Listing all p

Type to filter the list ..



Getting Started with MBED



The screenshot shows the Mbed IDE web interface. At the top, there are browser tabs for 'Open-source RTOS for IoT devel...', 'Mbed Compiler Workspace Ma...', and 'Wegwerf E-M...'. The address bar shows 'https://ide.mbed.com/compiler/#nav:/;'. Below the address bar, there are search results for 'Meistbesucht', 'Erste Schritte', 'Amazon.de - online ei...', 'Kostenloser Online Dia...', and 'Ki...'. The main header is 'Mbed'. Below the header, there are buttons for 'New', 'Import', 'Save', 'Save All', and 'Compile'. The 'Program Workspace' section on the left shows a list of programs: 'My Programs', 'LCD_i2c_GS', 'Nucleo_print', 'Nucleo_read', and 'STM32_Print'. The 'My Programs' link is circled in red. A cartoon character with a red starburst head and a blue body with 'M-K' on it is standing next to the list. A yellow speech bubble points to the 'My Programs' link with the text 'Linksklick auf My Programs -> New Program'. Below the list, there is a search bar with the text 'Type to filter the list ..'.



Getting Started with MBED

Create new program

Create new program for "NUCLEO-L152RE"
This will create a new C++ program for "NUCLEO-L152RE" in your workspace. You can always change the platform of this program once created.

Please specify program name

Platform:

NUCLEO-L152RE

Template:

mbed OS Blinky LED HelloWorld

Program Name:

ErstesMBED_Programm

The name of the program to be created in your workspace

☒ Update this

Als Vorlage wählen wir:
Mbed **OS** Blinky LED HelloWorld





Getting Started with MBED


Create new program

Create new program for "NUCLEO-L152RE"

This will create a new C++ program for "NUCLEO-L152RE" in your workspace. You can always change the platform of this program once created.

 Please specify program name



Platform:  NUCLEO-L152RE

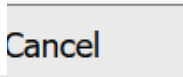
Template:  mbed OS Blinky LED HelloWorld

Program Name: ErstesMBED_Programm

The name of the program to be created in your workspace

☒ Update this program and its dependencies

 Cancel

Der Programmname sollte aussagekräftig sein.



Getting Started with MBED

Open-source RTOS for IoT devel... Mbed Compiler /ErstesMBED_P... Wegwerf E-Mail

https://ide.mbed.com/compiler/#nav 170% Suchen

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Mbed

/ErstesMBED_Programm

New Import Save Save All

Program Workspace

- My Programs
 - ErstesMBED_Programm
 - resources
 - CONTRIBUTING.md
 - main.cpp
 - README.md
 - mbed-os

Program: /ErstesMBED_Programm

Type to filter... Match Case Whole


	Size	Type
CONTRIBUTING.md	0.4 kB	Generic File
main.cpp	0.5 kB	C/C++ Source

Program Details

Summary Build

Name	ErstesMBED_Programm
Created	mon 11.08.2019 14:00
Last Modified	mon 11.08.2019 14:00
Last Built	Neu
URL	/a/...

Das erste Programm ist schon fertig! Nur was macht es? Wie bringen wir es auf den Mikrocontroller?



Getting Started with MBED

Open-source RTOS for IoT development | Mbed Compiler / ErstesMBED_Programm | Wegwerf E-Mail

https://ide.mbed.com/compiler/#nav:/ErstesMBED_Programm/main.c 170% Suchen

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Mbed

/ErstesMBED_Programm/main.cpp 1.10.25.0


New Import Save Save All Compile Pelion Device Management Commit Revision NUCLEO-L152RE

Program Workspace

- My Programs
 - ErstesMBED_Programm
 - resources
 - CONTRIBUTING.md
 - main.cpp
 - README.md
 - mbed-os
 - LCD_i2c_GSOE
 - Nucleo_printf
 - Nucleo_read_ios
 - STM32_Print_PC

```
9
10 // Blinking rate in milliseconds
11 #define BLINKING_RATE_MS 500
12
13
14 int main()
15 {
16     // Initialise the digital pin LED1 as a
17     DigitalOut led(LED1);
18
19     while (true) {
20         led = !led;
21         thread_sleep_for(BLINKING_RATE_MS);
22     }
23 }
```

Ein Symbol **BLINKING_RATE_MS** mit dem Wert 500 wird definiert.



Getting Started with MBED

Open-source RTOS for IoT development | Mbed Compiler /ErstesMBED_Programm | Wegwerf E-Mail

https://ide.mbed.com/compiler/#nav:/ErstesMBED_Programm/main.c 170% Suchen

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Mbed

/ErstesMBED_Programm/main.cpp 1.10.25.0


New Import Save Save All Compile Pelion Device Management Commit Revision NUCLEO-L152RE

Program Workspace

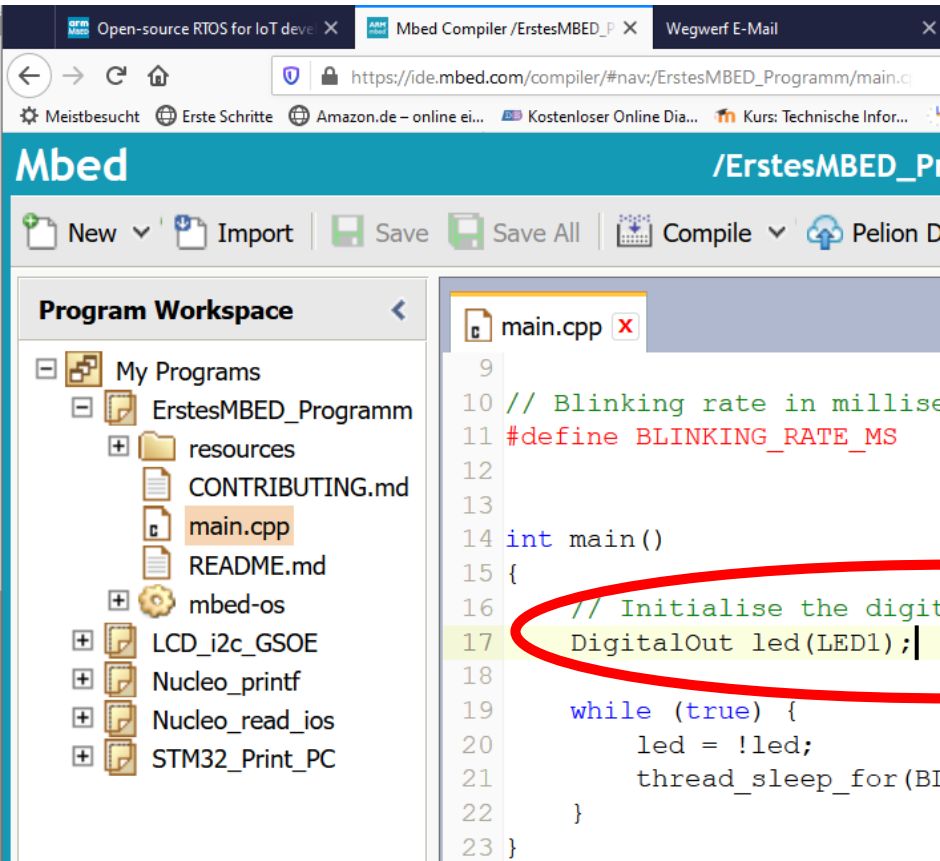
- My Programs
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 - main.cpp
 - README.md
 - mbed-os
 - LCD_i2c_GSOE
 - Nucleo_printf
 - Nucleo_read_ios
 - STM32_Print_PC

```
9
10 // Blinking rate in milliseconds
11 #define BLINKING_RATE_MS 500
12
13
14 int main()
15 {
16     // Initialise LED1 as an output
17     DigitalOut led1(LED1);
18
19     while (true)
20     {
21         led1 = !led1;
22         thread_sleep_for(THREAD_SLEEP_TIME * BLINKING_RATE_MS);
23     }
24 }
```

Das Hauptprogramm beginnt bei int main()



Getting Started with MBED



The screenshot shows the Mbed IDE interface. The top bar includes the Mbed logo and the text "Open-source RTOS for IoT development". The main window is titled "Mbed" and shows the "Program Workspace" on the left and the "main.cpp" file in the center. The "Program Workspace" lists several folders and files, including "ErstesMBED_Programm", "resources", "CONTRIBUTING.md", "main.cpp", "README.md", "mbed-os", "LCD_i2c_GSOE", "Nucleo_printf", "Nucleo_read_ios", and "STM32_Print_PC". The "main.cpp" file is open in the center, showing the following code:

```
9
10 // Blinking rate in milliseconds
11 #define BLINKING_RATE_MS
12
13
14 int main()
15 {
16     // Initialise the digital pin LED1 as an output
17     DigitalOut led(LED1);
18
19     while (true) {
20         led = !led;
21         thread_sleep_for(BLINKING_RATE_MS);
22     }
23 }
```

Ein Portbit des Mikrocontrollers wird als Digitalausgang initialisiert.

Der Port bekommt den Namen **led**

Hinter LED1 verbirgt sich PA_5 (GPIOA Bit5)

Es wäre auch möglich:

DigitalOut PC0(PC_0);

DigitalOut meinPort(PC_1);

Usw.

Also: DigitalOut *Wunschname*(*Portbezeichnung*);



Getting Started with MBED

Open-source RTOS for IoT development | Mbed Compiler / ErstesMBED_Programm | Wegwerf E-Mail

https://ide.mbed.com/compiler/#nav:/ErstesMBED_Programm/main.c 170% Suchen

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Mbed

/ErstesMBED_Programm/main.cpp 1.10.25.0



New Import Save Save All Compile Pelion Device Management Commit Revision NUCLEO-L152RE

Program Workspace

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 - Nucleo_printf
 - Nucleo_read_ios
 - STM32_Print_PC

```
9
10 // Blinking rate in millise
11 #define BLINKING_RATE_MS
12
13
14 int main()
15 {
16     // Initialise the
17     DigitalOut led(LED
18
19     while (true) {
20         led = !led;
21         thread_sleep_f
22     }
23 }
```

Endlosschleife: Wiederhole endlos



Getting Started with MBED

Open-source RTOS for IoT development | Mbed Compiler / ErstesMBED_Programm | Wegwerf E-Mail

https://ide.mbed.com/compiler/#nav:/ErstesMBED_Programm/main.cpp 170% Suchen

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Mbed

/ErstesMBED_Programm/main.cpp 1.10.25.0

New Import Save Save All Compile Pelion Device Management Commit Revision NUCLEO-L152RE


Program Workspace

- My Programs
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 - CONTRIBUTING.md
 - main.cpp
 - README.md
 - mbed-os
 - LCD_i2c_GSOE
 - Nucleo_printf
 - Nucleo_read_ios
 - STM32_Print_PC

```
9
10 // Blinking rate in millise
11 #define BLINKING_RATE_MS
12
13
14 int main()
15 {
16     // Initialise the digital pin LED1 as an c
17     DigitalOut led(LED1);
18
19     while (true) {
20         led = !led;
21         thread_sleep_for(BLINKING_RATE_MS);
22     }
23 }
```

Led invertieren 0 -> 1 -> 0 -> 1 -> ...
500ms warten (schlafen legen)

500



Getting Started with MBED

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https://ide.mbed.com/compiler/#nav:/ErstesMBED_Programm/main.cpp 170% Suchen

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Mbed


/ErstesMBE in.cpp 1.10.25.0

New Import Save Save All Compile

Program Workspace

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 - main.cpp
 - README.md
 - mbed-os
 - LCD_i2c_GSOE
 - Nucleo_printf
 - Nucleo_read_ios
 - STM32_Print_PC

```
9
10 // Blinking rate in mil
11 #define BLINKING_RATE_M
12
13
14 int main()
15 {
16     // Initialise the digital
17     DigitalOut led(LED1);
18
19     while (true) {
20         led = !led;
21         thread_sleep_for(BLI
22     }
23 }
```



Compile erzeugt den Maschinencode für unseren Mikrocontroller

Compiling ErstesMBED_Programm

Target: NUCLEO-L152RE
Program: ErstesMBED_Programm
Status: Compiled mbed-os/platform/source /FileSystemHandle.cpp

Cancel

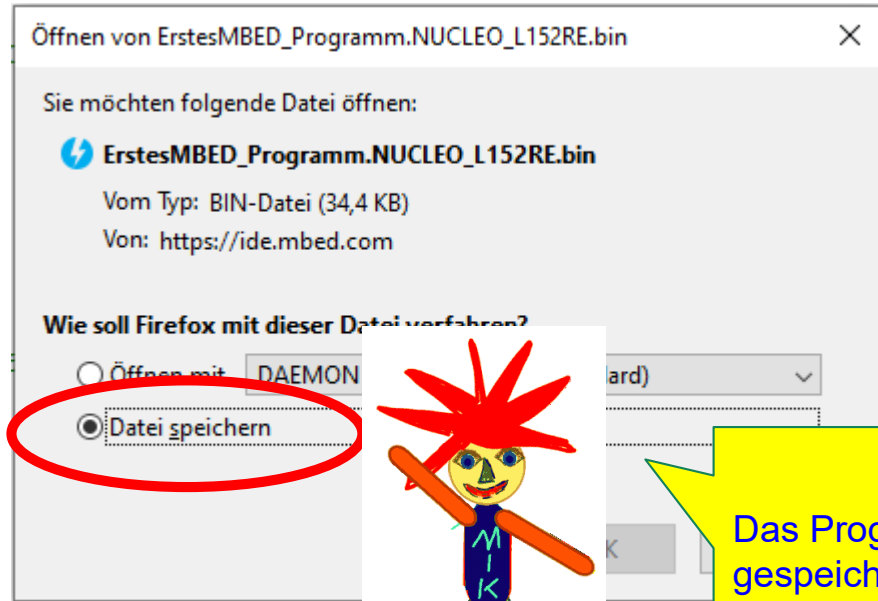
Getting Started with MBED



Das fertig übersetzte Programm steht zum Download bereit.



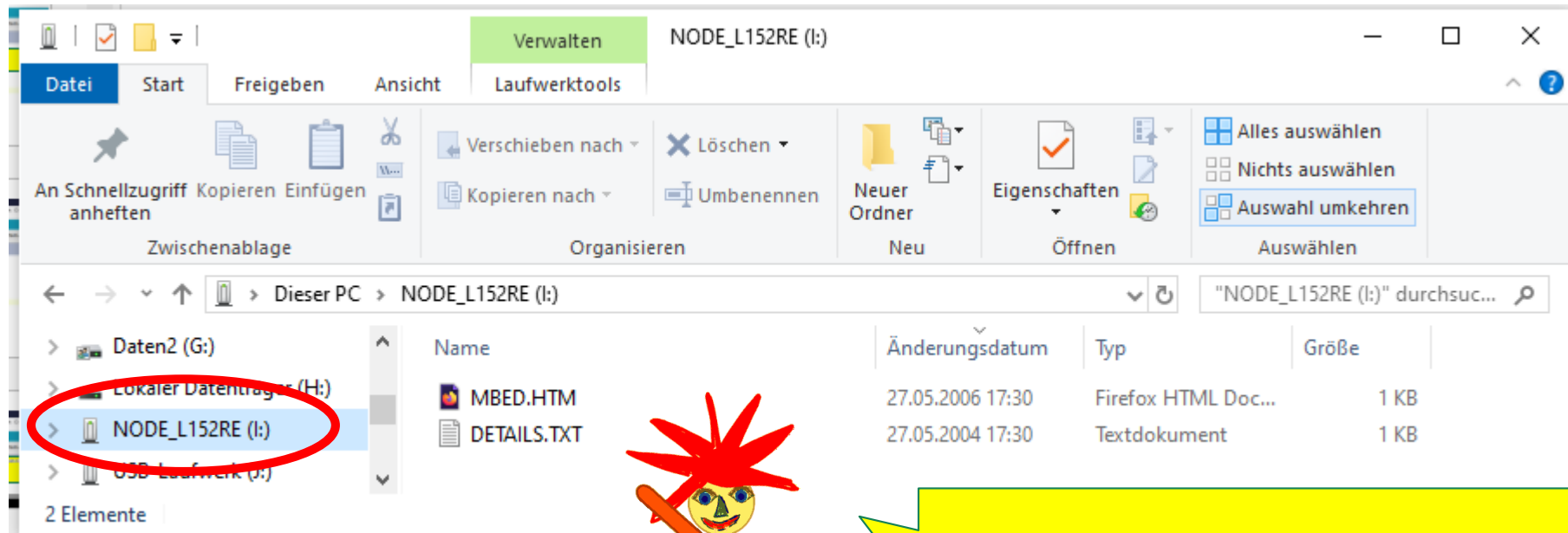
Getting Started with MBED



Das Programm wird im Downloadordner gespeichert. Anschließend im Downloadordner kopieren und in ...



Getting Started with MBED



Getting Started with MBED

Download-Ordner wählen:

← → ↕ ↑ > Dieser ... > NODE_L152RE (I:) ↻ "NODE_L152RE (I:)" du

Organisieren ▾ Neuer Ordner

- > INTENSO (F:)
- > Daten2 (G:)
- > Lokaler Datenträger (H:)
- > **NODE_L152RE (I:)**
- > USB-Laufwerk (J:)


Es wurden keine Suchergebnisse gefunden

Ordner: NODE_L152RE (I:)

Ordner auswählen Abbrechen

is wählen wahlen...

Falls in den Browsereinstellungen das Mikrocontrollerlaufwerk als Downloadordner gewählt, wird erfolgt der Download direkt auf den Mikrocontroller. Das Programm wird dann direkt auf dem Mikrocontroller installiert und gestartet.



Datenschutz & Sicherheit


Sync

Dateien und Anwendungen

Downloads

☒ Alle Dateien in folgendem Ordner abspeichern: **I:** Durchsuchen...

☐ Jedes Mal nachfragen, wo eine Datei gespeichert werden soll

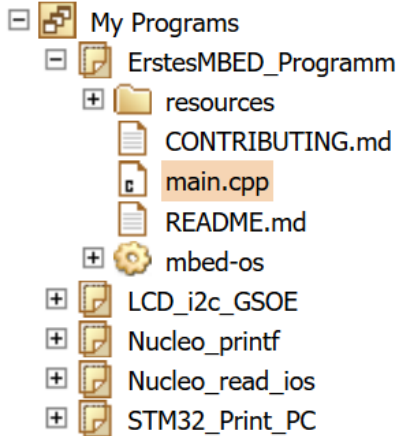


Getting Started with MBED

Jetzt soll Taste PA1 auf die LED ausgegeben werden.

- Digitaleingang für Taste PA1 definieren
- Mode PullDown wählen (Die Taste schaltet nach 1. PullDown legt den Inaktivpegel auf 0)
- In der Endlosschleife led und Taste verknüpfen

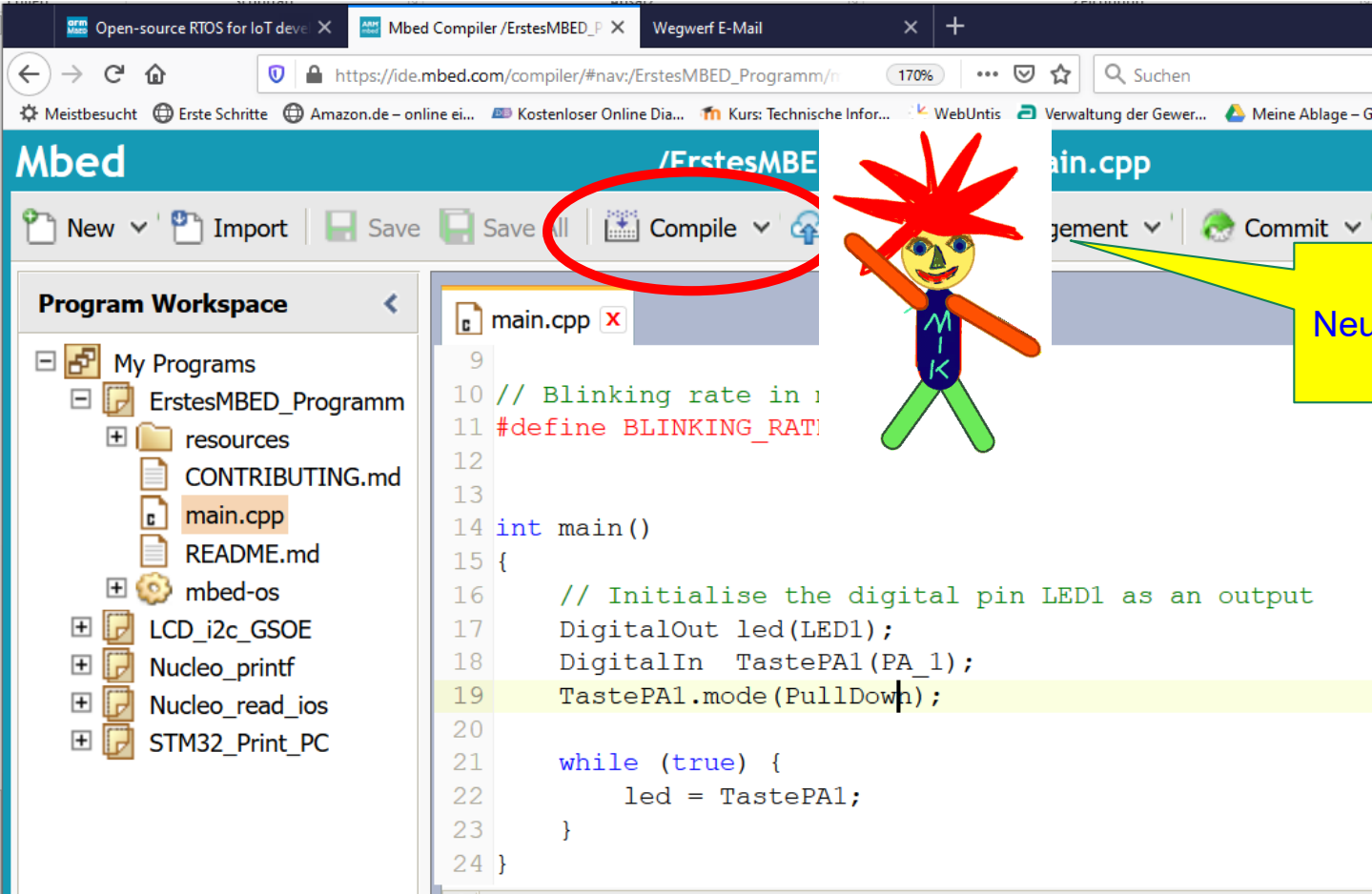
Program Workspace



```
9
10 // Blinking rate in milliseconds
11 #define BLINKING_RATE_MS
12
13
14 int main()
15 {
16     // Initialize the digital pin LED1
17     DigitalOut led(LED1);
18     DigitalIn TastePA1(PA_1);
19     TastePA1.mode(PullDown);
20
21     while (true) {
22         led = TastePA1;
23     }
24 }
```



Getting Started with MBED



The screenshot shows the Mbed IDE interface. The top navigation bar includes tabs for 'Open-source RTOS for IoT dev...', 'Mbed Compiler /ErstesMBED_P', and 'Wegwerf E-Mail'. The browser address bar shows the URL 'https://fide.mbed.com/compiler/#nav:/ErstesMBED_Programm/n'. The main toolbar contains buttons for 'New', 'Import', 'Save', 'Compile', and 'Commit'. The 'Compile' button is circled in red. The left sidebar shows the 'Program Workspace' with a tree view of 'My Programs' containing 'ErstesMBED_Programm' and its sub-items: 'resources', 'CONTRIBUTING.md', 'main.cpp', 'README.md', 'mbed-os', 'LCD_i2c_GSOE', 'Nucleo_printf', 'Nucleo_read_ios', and 'STM32_Print_PC'. The main editor displays the 'main.cpp' file with the following code:

```
9
10 // Blinking rate in
11 #define BLINKING_RAT
12
13
14 int main()
15 {
16     // Initialise the digital pin LED1 as an output
17     DigitalOut led(LED1);
18     DigitalIn TastePA1(PA_1);
19     TastePA1.mode(PullDown);
20
21     while (true) {
22         led = TastePA1;
23     }
24 }
```



Neu Kompilieren und fertig

