

Overview of OpenPLC with LDmicro

Spoken Tutorial Project

<https://spoken-tutorial.org>

National Mission on Education through ICT

<http://sakshat.ac.in>

Script: Harsha Priyanka

Video: Nirmala Venkat

IIT Bombay

4 March 2021



Learning Objectives

In this tutorial, we will learn about



Learning Objectives

In this tutorial, we will learn about

- PLC



Learning Objectives

In this tutorial, we will learn about

- PLC
- OpenPLC **and** LDmicro



Learning Objectives

In this tutorial, we will learn about

- PLC
- OpenPLC **and** LDmicro
- **Features of** OpenPLC



Learning Objectives

In this tutorial, we will learn about

- PLC
- OpenPLC **and** LDmicro
- **Features of** OpenPLC
- **What you can expect in this series**



Learning Objectives

- The content available in various tutorials in this series



Learning Objectives

- The content available in various tutorials in this series
- How to use the Code files given in each tutorial



System Requirements



System Requirements

To record this tutorial I'm using



System Requirements

To record this tutorial I'm using

- **Ubuntu Linux 18.04 operating system**



Pre-requisites



Pre-requisites

To follow this tutorial you should have basic knowledge of



Pre-requisites

To follow this tutorial you should have basic knowledge of

- Electronics



Pre-requisites

To follow this tutorial you should have basic knowledge of

- Electronics
- PLC



Introduction to PLC



Introduction to PLC

- PLC **stands for** Programmable Logic Controller



Introduction to PLC

- PLC **stands for** Programmable Logic Controller
- PLC **is an industrial** digital computer



Introduction to PLC

- PLC **stands for** Programmable Logic Controller
- PLC **is an industrial** digital computer
- **It is used for the automation of various** electro-mechanical processes



Introduction to PLC



Introduction to PLC

- **A PLC program is usually written on a computer and then it is downloaded to the controller**



Introduction to PLC

- **A PLC program is usually written on a computer and then it is downloaded to the controller**
- **PLC is programmed using special programming languages like ladder logic, function blocks etc.**



Embedded devices vs PLC



Embedded devices vs PLC

- Now you may ask, "Why not use embedded devices for these processes?"



Embedded devices vs PLC

- Now you may ask, "Why not use embedded devices for these processes?"
- These controllers are designed to be shock-resistant, suitable for harsh environments



About OpenPLC



About OpenPLC

- **OpenPLC** is an **affordable** open source hardware **developed at IIT Bombay by the FOSSEE team**



About OpenPLC

- It is designed to get hands-on PLC programming experience at an affordable cost



About OpenPLC

- It is designed to get hands-on PLC programming experience at an affordable cost
- OpenPLC can be programmed using ladder logic



About LDmicro



About LDmicro

- LDmicro, **is an** open source software



About LDmicro

- LDmicro, **is an** open source software
- **It is used to draw** ladder diagrams **and generate .hex files for OpenPLC**



About LDmicro



About LDmicro

- LDmicro **was available only for Windows initially**



About LDmicro

- LDmicro **was available only for Windows initially**
- **The FOSSEE team from IIT Bombay ported it and made it available for Linux OS also**



Features of OpenPLC



Features of OpenPLC

- **OpenPLC has all the capabilities of an industrial PLC and is simpler to work with**



Features of OpenPLC

- **OpenPLC has all the capabilities of an industrial PLC and is simpler to work with**
- **It is a** modular hardware



Features of OpenPLC

- OpenPLC has all the capabilities of an industrial PLC and is simpler to work with
- It is a modular hardware
- It uses ladder logic programming, which is one of the easiest and efficient



Features of OpenPLC



Features of OpenPLC

- For example, it can be interfaced **with** electronic modules **like** relay modules **etc.**



Features of OpenPLC

- For example, it can be interfaced **with** electronic modules **like** relay modules **etc.**
- These are readily available in the market



What can you expect in this series?



What can you expect in this series?

- Each tutorial is demonstrated with simple experiments using instructions **of** LDmicro



What can you expect in this series?

- Each tutorial is demonstrated with simple experiments using instructions **of** LDmicro
- **LDmicro has a simulation feature**



What can you expect in this series?

- Each tutorial is demonstrated with simple experiments using instructions **of** LDmicro
- LDmicro has a simulation feature
- It allows us to check the code before uploading it on to the OpenPLC Mainboard



What can you expect in this series?



What can you expect in this series?

- This is helpful to avoid any hardware damage



What can you expect in this series?

- This is helpful to avoid any hardware damage
- Once we are sure that the logic is working, we can compile the logic



What can you expect in this series?

- This is helpful to avoid any hardware damage
- Once we are sure that the logic is working, we can compile the logic
- That is to generate the .hex file for the same in LDmicro to upload it to OpenPLC Mainboard



What can you expect in this series?



What can you expect in this series?

- In this series, we have used some custom modules such as



What can you expect in this series?

- In this series, we have used some custom modules such as
 - Traffic Light module



What can you expect in this series?

- In this series, we have used some custom modules such as
 - Traffic Light module
 - Switchboard module



What can you expect in this series?

- **In this series, we have used some custom modules such as**
 - Traffic Light module
 - Switchboard module
 - Heater module



What can you expect in this series?



What can you expect in this series?

- Using these modules we will check the working of the ladder logic that we have created on hardware



Who can use OpenPLC?



Who can use OpenPLC?

- OpenPLC **can be used by anyone who is interested in** PLC programming



Who can use OpenPLC?



Who can use OpenPLC?

For example:

- **Polytechnic, Engineering and other technical students**



Who can use OpenPLC?

For example:

- **Polytechnic, Engineering and other technical students**
- **any hardware professional**



Who can use OpenPLC?

For example:

- **Polytechnic, Engineering and other technical students**
- **any hardware professional**
- **individuals who are interested in hands-on experimentation**



How to use the Code Files?



How to use the Code Files?

- **Code files are available in the Code files link of that particular tutorial**



How to use the Code Files?

- **Code files are available in the Code files link of that particular tutorial**
- **The .ld file can be accessed by opening them in LDmicro using 'Open' option under 'File' menu**



How to use the Code Files?



How to use the Code Files?

- The ladder diagram **can then be compiled to generate a .hex file**



How to use the Code Files?

- **The ladder diagram can then be compiled to generate a .hex file**
- **Or you can download the .hex file from Code files which can be uploaded to the Mainboard directly**



How to use the Code Files?



How to use the Code Files?

- It is not recommended to download the Code files without understanding the working



How to use the Code Files?

- It is not recommended to download the Code files without understanding the working
- Follow all the steps as shown in each tutorial and understand the working of each instruction



How to use the Code Files?

- It is not recommended to download the Code files without understanding the working
- Follow all the steps as shown in each tutorial and understand the working of each instruction
- It is the better way of learning



Summary

In this tutorial, we have learnt about

- **PLC**
- **OpenPLC and LDmicro**
- **Features of OpenPLC**
- **What you can expect in this series**



Summary

- The content available in various tutorials in this series
- How to use the Code files given in each tutorial



About Spoken Tutorial project

- Watch the video available at https://spoken-tutorial.org/What_is_a_Spoken_Tutorial
- It summarises the Spoken Tutorial project
- If you do not have good bandwidth, you can download and watch it



Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- Conducts workshops using spoken tutorials
- Gives certificates to those who pass an online test
- For more details, please write to contact@spoken-tutorial.org



Answers for THIS Spoken Tutorial

- Questions in THIS Spoken Tutorial?
- Visit <https://forums.spoken-tutorial.org>
- Choose the minute and second where you have the question
- Explain your question briefly
- The Spoken Tutorial project will ensure an answer



Forum for Specific Questions

- **The Spoken Tutorial forum is for specific questions on this tutorial**
- **Please do not post unrelated and general questions on them**
- **This will help reduce the clutter**
- **With less clutter, we can use these discussion as instructional material**



Forum for specific questions

- Questions not related to the Spoken Tutorial?
- Do you have general / technical questions on the Software?
- Please visit the FOSSEE Forum
<https://forums.fossee.in/>
- Choose the Software and post your question



Acknowledgements

Spoken Tutorial project is supported by

- **National Mission on Education through ICT (NMEICT)**
- **Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching**

Initiatives of MHRD, Government of India



THANK YOU!

For more Information, visit our website
<https://fossee.in/>

