Introduction to RISC-V (LFD110x)

Discover various aspects of RISC-V, including technical aspects, specifications and the community ecosystem.

Course Overview

This course has five chapters that will guide you through the various aspects of understanding the RISC-V community ecosystem, the RISC-V specifications, and some technical aspects of working with RISC-V.

While this course will not teach you everything you need to know about how to design your own RISC-V processor, it will help experienced developers understand what is different about RISC-V from other architectures, and give you a clear path to getting started with RISC-V in any area of the computer industry. More than that, we will show you how to work within the RISC-V community so you can understand what exists, what is coming soon, and how to help us make the magic happen. The course showcases a series of assembly language code examples for you to get familiar with the technical aspects of the ISA and assembly language.

This course contains a high-level overview of RISC-V International as well as how to get started working with the RISC-V Instruction Set Architecture (ISA). The course gives you the foundation of knowledge you need to effectively engage in the RISC-V community, contribute to the ISA specifications, or to develop a wide range of RISC-V software and hardware projects. After completing this course you will have a better understanding of the terminology, resources, and workflow you will need to complete your RISC-V journey.

Course Instructor

Eduardo Corpeño

Eduardo Corpeño is an electrical engineer, computer programmer, teacher, and the creator of the world-renowned Brainfuino platform.

Eduardo is a proud graduate of the Online Master of Science in Computer Science program from Georgia Tech. He has published over 30 online courses on topics like microcontrollers, embedded systems, and solving engineering problems. At Galileo University in Guatemala City, Eduardo teaches a variety of subjects including electrical circuit theory and embedded systems based on microcontrollers and FPGAs. Along with a colleague, Eduardo translated to Spanish "The RISC-V Reader: An Open Architecture Atlas" by Turing Award laureate David Patterson and Andrew Waterman.

In his free time, Eduardo enjoys the company of his beloved wife, his two talented sons, and his spoiled dog, speaking of which, Eduardo is a friend of every Chihuahua out there.

Audience

RISC-V enthusiasts, hardware and software developers, technology hobbyists, and anyone else interested in the details of how an open source ISA is breaking down barriers and opening up new opportunities in the microprocessor world.

Prerequisites

No specific prerequisites, although some basic knowledge of computer architecture and programming will certainly help.

Course Length

15 - 20 hours

Course Learning Objectives

By the end of this course, you should be able to:

- Describe the nature, history, and ongoing practices of RISC-V as a technology, an international organization, and a community of developers and implementers.
- Describe the technical aspects of the RISC-V ISA.
- Put the RISC-V ISA into action with a simulator running simple assembly language applications.
- Choose the right development tool for your next RISC-V related project.

Course Outline

Course Introduction/Welcome!

Chapter 1: Getting to Know RISC-V

Chapter 2: Exploring the RISC-V Instruction Set Architecture

Chapter 3: Hands-On RISC-V Assembly Language

Chapter 4: RISC-V Development Tools

Chapter 5: Meeting the Demands of Today's Computing

Final Exam (verified track only)

edX Platform

If you are using edX for the first time, we strongly encourage you to start by taking a free 'how to use edX' course that the team at edX has made available. In this course, you will learn how to navigate the edX platform, how to connect with other edX learners, how to answer problems on the edX platform, how grades work in edX courses, and how to complete your first course.

Click here to register for "*DemoX*" and you will be on your way. You will find the edX platform simple and intuitive.

Getting Help

For any **technical issues** with the edX platform (including login problems and issues with the Verified Certificate), please use the **Help** icon located on the upper right side of your screen.

One great way to interact with peers taking this course and resolving any **content-related issues** is via the **Discussion Forums**. These forums can be used in the following ways:

- To discuss concepts, tools, and technologies presented in this course, or related to the topics discussed in the course material.
- To ask questions about course content.
- To share resources and ideas related to the RISC-V ISA specifications, the RISC-V community, RISC-V projects and more.

We strongly encourage you not only to ask questions, but to share with your peers opinions about the course content, as well as valuable related resources. The Discussion Forums will be reviewed periodically by The Linux Foundation staff, but it is primarily a community resource, not an 'ask the instructor' service.

To learn more tips on how to use them, read the following article: "*Getting the Most Out of the edX Discussion Forums*".

Course Timing

This course is entirely self-paced; there is no fixed schedule for going through the material. You can go through the course at your own pace, and you will always be returned to exactly where you left off when you come back to start a new session. However, we still suggest you avoid long breaks in between periods of work, as learning will be faster and content retention improved.

The chapters in the course have been designed to build on one another. It is probably best to work through them in sequence; if you skip or only skim some chapters quickly, you may find there are topics being discussed you have not been exposed to yet. But this is all self-paced and you can always go back, so you can thread your own path through the material.

Learning Aids

Besides simple exposition through text and figures, this course uses several additional methods to present and solidify the learning material, including examples, external resources, and knowledge check questions (Verified Certificate track only).

Audit and Verified Tracks

You can enroll into an audit or a verified track. In an audit track, you will have access to all ungraded course content: course readings, videos, and learning aids, but no certificates are awarded when auditing. You will not be able to access any graded content (knowledge check questions at the end of each chapter, and the final exam).

In order to receive a certificate, you will need to obtain a passing grade (please refer to the "Grading" section below), verify your identity with edX, and pay a fee. Once all edX requirements have been met, you can download your certificate from the Progress tab.

To learn more about audit and verified tracks, visit edX Help Center > Certificates.

Grading (Verified Certificate track only)

At the end of each chapter, you will have a set of graded **knowledge check questions**, that are meant to further check your understanding of the material presented. The grades obtained by answering these knowledge check questions will represent **20%** of your final grade.

The remaining **80%** of your final grade is represented by the score obtained in the **final exam**. The final exam is located at the end of the course and it consists of 20 questions.

You will have a maximum of two attempts to answer each knowledge check and final exam question (other than True/False questions, in which case, you have only one attempt). You are free to reference your notes, screens from the course, etc., and there is no time limit on how long you can spend on a question. You can always skip a question and come back to it later.

In order to complete this course with a passing grade, you must obtain a passing score (knowledge check and final exam) of minimum 70%.

Course Progress and Completion (Verified Certificate track only)

Once you complete the course (including knowledge check questions and final exam), you will want to know if you have passed. You will be able to see your completion status using the **Progress** tab at the top of your screen, which will clearly indicate whether or not you have achieved a passing score.

About The Linux Foundation

The Linux Foundation is the world's leading home for collaboration on open source software, hardware, standards, and data. Linux Foundation projects are critical to the world's infrastructure, including Linux, Kubernetes, Node.js, ONAP, PyTorch, RISC-V, SPDX, OpenChain, and more. The Linux Foundation focuses on leveraging best practices and addressing the needs of contributors, users, and solution providers to create sustainable models for open collaboration. For more information, please visit us at linuxfoundation.org. The Linux Foundation has registered trademarks and uses trademarks. For a list of trademarks of The Linux Foundation, please see its trademark usage page: www.linuxfoundation.org/trademark-usage. Linux is a registered trademark of Linus Torvalds.

The Linux Foundation Events

The Linux Foundation hosts an increasing number of events each year, including:

- Open Source Summit North America, Europe, Japan and China
- Embedded Linux Conference + OpenIoT Summit North America and Europe
- Open Source Leadership Summit
- Open Networking Summit North America and Europe
- KubeCon + CloudNativeCon North America, Europe and China
- Automotive Linux Summit
- KVM Forum
- Linux Storage Filesystem and Memory Management Summit
- Linux Security Summit North America and Europe
- Cloud Foundry Summit
- Hyperledger Global Forum
- And many more.

To learn more about The Linux Foundation events and to register, click here.

The Linux Foundation Training

The Linux Foundation offers several types of training:

- Classroom
- Online
- On-site
- Events-based.

To get more information about specific courses offered by The Linux Foundation, click [here](#).

The Linux Foundation Certifications

The Linux Foundation certifications give you a way to differentiate yourself in a job market that's hungry for your skills. We've taken a new, innovative approach to open source certification that allows you to showcase your skills in a way that other peers will respect and employers will trust:

- You can take your certification from any computer, anywhere, at any time
- The certification exams are either performance-based or multiple choice
- The exams are distribution-flexible
- The exams are up-to-date, testing knowledge and skills that actually matter in today's IT environment.

For a list of currently offered certifications, click [here](#).

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