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ARDUINO / GENUIN

START AS PROFESSIONAL

SHORT COURSE IN A BOOK

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Contents

How to read this book?

Do you know: Open source, Prototyping, Electronics?

Arduino is a microcontroller. It is an open-source project which created kits for prototyping and building control devices and interactive tools that can sense and control devices.

If you **understand nothing** from the previous lines, **be happy!** This book is written mainly for you.

A lot of beginners approaching electronics for the first time think that they have to learn how to build everything from scratch. Actually this is not true with Arduino/Genuino and this book. This book presents Arduino which is a leading-edge prototyping technology. It is particularly appropriate as introductory course. We used the content of this book to conduct short courses since 2013. Our courses used to target 2nd year students of engineering technology program. We also had few students from different departments. The content is designed for non-professionals to make them start their path in the technology as professionals. The students in this stage are only familiar with electricity basics and have no idea about digital computing. They also have basic programming knowledge in C programming. Therefore, we are sure this book is suitable to any technology lover. To make an innovative project you only need to have a basic knowledge in programming. You need to be aware about electricity and electrical safety issues. Using basic electricity instruments like multimeter, power sources, batteries and different electronic components is demonstrated in this book. Some hints, explanations are added wherever needed.

In this book we focus on software/hardware engineering best practices. At the heart of the book are our two objectives:

1- Learn to make live-codes for real applications.
2- Learn how to be self-independent lifelong learner on technology related topics.

In other words, this book is helping you to be able to access the huge sources on the internet which might seem complicated for you. We guarantee after finishing this book, you will be able to understand the huge sources available on-line. Moreover, you will have very powerful tools to be able to develop your own interactive objects or projects. We try to avoid long theoretical explanation and keep it at minimum. We explain the theories inside the practical experiments explanation only when we feel it is useful to know these theories. Therefore, we consider our book as 100% practical book.

In this book we provide working programs, rather than in code snippets. We provide a detailed explanation of the basics that you need to understand any program and any project. All the source code is available at http://mhdhayyan.alsibai.info/downloads/

Most of schematics and circuit graphs in this book were developed using "Fritzing" software (http://fritzing.org). Actually we recommend readers to use this software. There are many project examples available on Fritzing project page (http://fritzing.org/projects/) which is also a good source for learning.

Finally, it is important to mention that Arduino is designed to be an easy-to-use hardware and software electronic prototyping platform. The main idea of Arduino is enabling users to create interactive electronic objects easily. In this book, we cover most of the important concepts which allow readers to do many professional projects. It is important to know that Arduino is a platform which uses AVR Atmel microcontroller. AVR family supports many advanced technologies and concepts. These concepts includes: Timers, interrupt, internal and external clocks and oscillators, Analog comparator, Digital to analog convertors DAC (Opposite to ADC), Two-Wire Interface (TWI), CAN controller support and the JTAG signals. Most of these technologies are for more advanced or industrial projects. To use these technologies with Arduino, the reader need to understand the structure, the registers and the instructions of the AVR microcontroller which is used with his/her Arduino board. For example Atmel AVR ATmega328 is used in Arduino Uno. These topics are out of scope of this book. However, with the topics covered in this book, a lot of application can be implemented. Anyway, interested readers may refer to our online free course titled "micro-controlling: Start as professional" on the link: https://www.openlearning.com/courses/micro-controlling-start-as-professional. This course covers most of the above mentioned technologies and concepts.

About the Authors

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