Getting started with arduino massimo banzi pdf free download

Massimo Banzi is the co-founder of the Arduino project. He is an Interaction Designer, Educator and Open Source Hardware advocate. He has worked as a consultant for clients such as: Prada, Artemide, Persol, Whirlpool, V&A Museum and Adidas.Massimo started the first FabLab in Italy which led to the creation of Officine Arduino, a FabLab/Makerspace based in Torino.He spent 4 years at the Interaction Design Institue Ivrea as Associate Professor. Massimo has taught workshops and has been a guest speaker at institutions allover the world.Before joining IDII he was CTO for the Seat Ventures incubator. He spent many years working as a software architect,both in Milan and London, on projects for clients like Italia Online, Sapient, Labour Party, BT, MCI WorldCom, SmithKlineBeecham, Storagetek, BSkyB and boo.com.Massimo is also the author of â€œGetting Started with Arduinoâ€ published by Oâ€™Reilly. He is a regular contributor to the italian edition of Wired Magazine and Che Futuro, an online magazine about innovation.He currently teaches Interaction Design at SUPSI Lugano in the south of Switzerland and is a visiting professor at CIID in Copenhagen. Massimo Banzi Massimo Banzi is the co-founder of the Arduino project and has worked for clients such as: Prada, Artemide, Persol, Whirlpool, V&A Museum and Adidas. He spent 4 years at the Interaction Design Institute Ivrea as Associate Professor. Massimo has taught workshops and has been a guest speaker at institutions like: Architectural Association - London, Hochschule f r Gestaltung und Kunst Basel, Hochschule f r Gestaltung Schw bisch Gm nd, FH Potsdam, Domus Academy, Medialab Madrid, Escola Superior de Disseny Barcelona, ARS Electronica Linz, Mediamatic Amsterdam, Doors of Perception Amsterdam. Before joining IDII he was CTO for the Seat Ventures incubator. He spent many years working as a software architect,both in Milan and London, on projects for clients like Italia Online, Sapient, Labour Party, BT, MCI WorldCom, SmithKlineBeecham, Storagetek, BSkyB and boo.com. View Massimo Banzi's full profile page.Michael Shiloh Michael Shiloh is Associate Professor at the California College of the Arts where he teaches electronics, programming, robotics, and electromechanics. Trained formally as an electrical engineer, Michael worked for various consumer and embedded engineering firms before discovering a passion for teaching. Michael frequently lectures and speaks at conferences and universities worldwide. In 2013, Michael started working for Arduino, speaking about the open-source electronics prototyping platform to new audiences and leading hands-on workshops. View Michael Shiloh's full profile page. Massimo Banzi is the co-founder of the Arduino project. He is an Interaction Designer, Educator and Open Source Hardware advocate. He has worked as a consultant for clients such as: Prada, Artemide, Persol, Whirlpool, V&A Museum and Adidas.Massimo started the first FabLab in Italy which led to the creation of Officine Arduino, a FabLab/Makerspace based in Torino.He spent 4 years at the Interaction Design Institue Ivrea as Associate Professor. Massimo has taught workshops and has been a guest speaker at institutions allover the world.Before joining IDII he was CTO for the Seat Ventures incubator. He spent many years working as a software architect,both in Milan and London, on projects for clients like Italia Online, Sapient, Labour Party, BT, MCI WorldCom, SmithKlineBeecham, Storagetek, BSkyB and boo.com.Massimo is also the author of â€œGetting Started with Arduinoâ€ published by Oâ€™Reilly. He is a regular contributor to the italian edition of Wired Magazine and Che Futuro, an online magazine about innovation.He currently teaches Interaction Design at SUPSI Lugano in the south of Switzerland and is a visiting professor at CIID in Copenhagen. Learn about the Arduino hardware and software development! Note: A fourth version of the book is planned for 2022!This version is a retired product and can no longer be bought from us.This edition thorough introduction gives you lots of ideas for projects and helps you work with them right away!Getting started with Arduino is a snap!To use the introductory examples in this guide, all you need an Arduino Uno or earlier model, along with USB A-B cable and an LED.The easy-to-use Arduino development environment is free to download. Join hundreds of thousands of hobbyists who have discovered this incredible (and educational) platform. Written by the co-founder of the Arduino project, Getting Started with Arduino gets you in on all the fun! Inside, you will learn about:The Arduino hardware and software developmentBasics of electricity and electronicsPrototyping on a solderless breadboardDrawing a schematic diagramOnly available in EnglishBy Massimo Banzi, Michael Shiloh. Publisher: Maker Media, Inc. Final Release Date: December 2014. Pages: 262 by Massimo BanziCopyright © 2009 Massimo Banzi. All rights reserved. Printed in U.S.Published by Make:Books, an imprint of Maker Media, a division of O’Reilly Media, Inc. 1005 Gravenstein Highway North, Sebastopol, CA 95472O’Reilly books may be purchased for educational, business, or sales promotional use. 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Electricity and other resources used for these projects are dangerous unless used properly and with adequate precautions, including safety gear. Some illustrative photos do not depict safety precautions or equipment, in order to show the project steps more clearly. These projects are not intended for use by children.Use of the instructions and suggestions in Getting Started with Arduino is at your own risk. O’Reilly Media, Inc. and the author disclaim all responsibility for any resulting damage, injury, or expense. It is your responsibility to make sure that your activities comply with applicable laws, including copyright.ISBN: 978-0-596-15551- [LSI] [2010-12-10]Contents 1 / Introduction. Preface v Intended Audience What Is Physical Computing? 2 / The Arduino Way Prototyping Tinkering Patching Circuit Bending Keyboard Hacks We Love Junk! Hacking Toys Collaboration. 3 / The Arduino Platform The Arduino Hardware The Software (IDE) Installing Arduino on Your Computer Installing Drivers: Macintosh Installing Drivers: Windows Port Identification: Macintosh Port Identification: Windows 4 / Really Getting Started with Arduino Sensors and Actuators Blinking an LED Pass Me the Parmesan Arduino Is Not for Quitters Real Tinkerers Write Comments The Code, Step by Step What We Will Be Building What Is Electricity? Using a Pushbutton to Control the LED How Does This Work? One Circuit, A Thousand Behaviours 5 / Advanced Input and Output Trying Out Other On/Off Sensors Controlling Light with PWM Use a Light Sensor Instead of a Pushbutton PrefaceA few years ago I was given a very interestingchallenge: teach designers the bare minimumin electronics so that they could build inter-active prototypes of the objects they weredesigning.I started following a subconscious instinct to teach electronics the same way I was taught in school. Later on I realised that it simply wasn’t working as well as I would like, and started to remember sitting in a class, bored like hell, listening to all that theory being thrown at me without any practical application for it.In reality, when I was in school I already knew electronics in a very empirical way: very little theory, but a lot of hands-on experience.I started thinking about the process by which I really learned electronics:» I took apart any electronic device I could put my hands on.» I slowly learned what all those components were.» I began to tinker with them, changing some of the connections insideof them and seeing what happened to the device: usually something between an explosion and a puff of smoke.» I started building some kits sold by electronics magazines.» I combined devices I had hacked, and repurposed kits and other circuitsthat I found in magazines to make them do new things.As a little kid, I was always fascinated by discovering how things work; therefore, I used to take them apart. This passion grew as I targeted any unused object in the house and then took it apart into small bits. Even- tually, people brought all sorts of devices for me to dissect. My biggestPreface vvi Getting Started with Arduinoprojects at the time were a dishwasher and an early computer that came from an insurance office, which had a huge printer, electronics cards, magnetic card readers, and many other parts that proved very interesting and challenging to completely take apart.After quite a lot of this dissecting, I knew what electronic components were and roughly what they did. On top of that, my house was full of old electronics magazines that my father must have bought at the beginning of the 1970s. I spent hours reading the articles and looking at the circuit diagrams without understanding very much.This process of reading the articles over and over, with the benefit of knowledge acquired while taking apart circuits, created a slow virtuous circle.A great breakthrough came one Christmas, when my dad gave me a kit that allowed teenagers to learn about electronics. Every component was housed in a plastic cube that would magnetically snap together with other cubes, establishing a connection; the electronic symbol was written on top. Little did I know that the toy was also a landmark of German design, because Dieter Rams designed it back in the 1960s.With this new tool, I could quickly put together circuits and try them out to see what happened. The prototyping cycle was getting shorter and shorter.After that, I built radios, amplifiers, circuits that would produce horrible noises and nice sounds, rain sensors, and tiny robots.I’ve spent a long time looking for an English word that would sum up that way of working without a specific plan, starting with one idea and ending up with a completely unexpected result. Finally, “tinkering” came along. I recognised how this word has been used in many other fields to describe a way of operating and to portray people who set out on a path of explora- tion. For example, the generation of French directors who gave birth to the “Nouvelle Vague” were called the “tinkerers”. The best definition of tinkering that I’ve ever found comes from an exhibition held at the Exploratorium in San Francisco:Tinkering is what happens when you try something you don’t quite know how to do, guided by whim, imagination, and curiosity. When you tinker, there are no instructions—but there are also no failures, no right or wrong ways of doing things. It’s about figuring out how things work and reworking them.viii Getting Started with ArduinoAcknowledgmentsThis book is dedicated to Luisa and Alexandra.First of all I want to thank my partners in the Arduino Team: David Cuartielles, David Mellis, Gianluca Martino, and Tom Igoe. It is an amazing experience working with you guys.Barbara Ghella, she doesn’t know but, without her precious advice, Arduino and this book might have never happened.Bill Verplank for having taught me more than Physical Computing.Gillian Crampton-Smith for giving me a chance and for all I have learned from her.Hernando Barragan for the work he has done on Wiring.Brian Jepson for being a great editor and enthusiastic supporter all along.Nancy Kotary, Brian Scott, Terry Bronson, and Patti Schiendelman for turning what I wrote into a finished book.I want to thank a lot more people but Brian tells me I’m running out of space so I’ll just list a small number of people I have to thank for many reasons:Adam Somlai-Fisher, Ailadi Cortelletti, Alberto Pezzotti, Alessandro Germinasi, Alessandro Masserdotti, Andrea Piccolo, Anna Capellini, Casey Reas, Chris Anderson, Claudio Moderini, Clementina Coppini, Concetta Capecchi, Csaba Waldhauser, Dario Buzzini, Dario Molinari, Dario Parravicini, Donata Piccolo, Edoardo Brambilla, Elisa Canducci, Fabio Violante, Fabio Zanola, Fabrizio Pignoloni, Flavio Mauri, Francesca Mocellin, Francesco Monico, Giorgio Olivero, Giovanna Gardi, Giovanni Battistini, Heather Martin, Jennifer Bove, Laura Dellamotta, Lorenzo Parravicini, Luca Rocco, Marco Baioni, Marco Eynard, Maria Teresa Longoni, Massimiliano Bolondi, Matteo Rivolta, Matthias Richter, Maurizio Pirola, Michael Thorpe, Natalia Jordan, Ombretta Banzi, Oreste Banzi, Oscar Zoggia, Pietro Dore, Prof Salvioni, Raffaella Ferrara, Renzo Giusti, Sandi Athanas, Sara Carpentieri, Sigrid Wiederhecker, Stefano Mirti, Ubi De Feo, Veronika Bucko.How to Contact UsWe have verified the information in this book to the best of our ability, but you may find things that have changed (or even that we made mistakes!). 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Arduino can be usedto develop standalone interactive objectsor can be connected to software on yourcomputer (such as Flash, Processing, VVVV,or Max/MSP). The boards can be assembledby hand or purchased preassembled; theopen source IDE (Integrated DevelopmentEnvironment) can be downloaded for freefrom arduino.Arduino is different from other platforms on the market because of these features:» It is a multiplatform environment; it can run on Windows, Macintosh,and Linux.» It is based on the Processing programming IDE, an easy-to-usedevelopment environment used by artists and designers.» You program it via a USB cable, not a serial port. This feature is useful,because many modern computers don’t have serial ports.» It is open source hardware and software—if you wish, you candownload the circuit diagram, buy all the components, and make your own, without paying anything to the makers of Arduino.Introduction 12 Getting Started with Arduino» The hardware is cheap. The USB board costs about €20 (currently,about US$35) and replacing a burnt-out chip on the board is easy and costs no more than €5 or US$4. So you can afford to make mistakes.» There is an active community of users, so there are plenty of peoplewho can help you.» The Arduino Project was developed in an educational environment andis therefore great for newcomers to get things working quickly.This book is designed to help beginners understand what benefits they can get from learning how to use the Arduino platform and adopting its philosophy.Intended AudienceThis book was written for the “original” Arduino users: designers and artists. Therefore, it tries to explain things in a way that might drive some engineers crazy. Actually, one of them called the introductory chapters of my first draft “fluff”. That’s precisely the point. Let’s face it: most engineers aren’t able to explain what they do to another engineer, let alone a regular human being. Let’s now delve deep into the fluff.NOTE: Arduino builds upon the thesis work Hernando Barragan did on the Wiring platform while studying under Casey Reas and me at IDII Ivrea.After Arduino started to become popular, I realised how experimenters, hobbyists, and hackers of all sorts were starting to use it to create beauti- ful and crazy objects. I realised that you’re all artists and designers in your own right, so this book is for you as well.Arduino was born to teach Interaction Design, a design discipline that puts prototyping at the centre of its methodology. There are many defini- tions of Interaction Design, but the one that I prefer is:Interaction Design is the design of any interactive experience.In today’s world, Interaction Design is concerned with the creation of meaningful experiences between us (humans) and objects. It is a good way to explore the creation of beautiful—and maybe even contro- versial—experiences between us and technology. Interaction Design encourages design through an iterative process based on prototypes2 / The Arduino WayThe Arduino philosophy is based on makingdesigns rather than talking about them. It isa constant search for faster and more power-ful ways to build better prototypes. We haveexplored many prototyping techniques anddeveloped ways of thinking with our hands.Classic engineering relies on a strict process for getting from A to B; the Arduino Way delights in the possibility of getting lost on the way and finding C instead.This is the tinkering process that we are so fond of—playing with the medium in an open-ended way and finding the unexpected. In this search for ways to build better prototypes, we also selected a number of soft- ware packages that enable the process of constant manipulation of the software and hardware medium.The next few sections present some philosophies, events, and pioneers that have inspired the Arduino Way.The Arduino Way 5TinkeringWe believe that it is essential to play with technology, exploring different possibilities directly on hardware and software—sometimes without a very defined goal.Reusing existing technology is one of the best ways of tinkering. Getting cheap toys or old discarded equipment and hacking them to make them do something new is one of the best ways to get to great results.The Arduino Way 78 Getting Started with ArduinoPatchingI have always been fascinated by modularity and the ability to build complex systems by connecting together simple devices. This process is very well represented by Robert Moog and his analogue synthesizers. Musicians constructed sounds, trying endless combinations by “patching together” different modules with cables. This approach made the synthesizer look like an old telephone switch, but combined with the numerous knobs, that was the perfect platform for tinkering with sound and innovating music. Moog described it as a process between “witnessing and discovering”. I’m sure most musicians at first didn’t know what all those hundreds of knobs did, but they tried and tried, refining their own style with no inter- ruptions in the flow.Reducing the number of interruptions to the flow is very important for creativity—the more seamless the process, the more tinkering happens.This technique has been translated into the world of software by “visual programming” environments like Max, Pure Data, or VVVV. These tools can be visualised as “boxes” for the different functionalities that they pro- vide, letting the user build “patches” by connecting these boxes together. These environments let the user experiment with programming without the constant interruption typical of the usual cycle: “type program, compile, damn—there is an error, fix error, compile, run”. If you are more visually minded, I recommend that you try them out.

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