Develop leJOS Programs Step by Step

Version 0.6

Juan Antonio Breña Moral

12-Apr-09

Index

Revision History

Name	Date	Reason For Changes	Version
Juan Antonio Breña Moral	12/01/2008	Initial release	0.1
Juan Antonio Breña Moral	18/02/2008	Add FAQ section	0.2
Juan Antonio Breña Moral	09/03/2008	Add Tortoise SVN Section	0.3
Juan Antonio Breña Moral	23/06/2008	Add leJOS RC Car Project	0.4
Juan Antonio Breña Moral	20/03/2009	Book reorganization	0.5
Juan Antonio Breña Moral	10/04/2009	Add RS485 Chapter	0.6

I.- Preface

I.1.- Introduction

In next 10 years, Robotics will become in one of the most helpfully technology for the society. Currently, robotics field is not in a mature phase and it needs new ideas to evolve but this goal is not easy because robotics is a complex science and it has several research lineas as as Localization, Computer vision & Neural Networks for example.

In the market exists many products to learn basic concepts and techniques about robotics and Artificial Intelligence but in my personal opinion, Lego Mindstorms NXT is the best platform to be used in robotics courses at secondary school, university bachelors, and postgraduate programs / Phd.

Lego Midstorms NXT has many ways to develop software for robots but this ebook only offer support for leJOS project which offers the possibility to develop with Java.

This ebook is a project to spread the knowledge about leJOS project and Java techniques to develop software for robots. This ebook is live and every 3-6 months, I will try to update with new ideas and techniques from the projects and the readers.

Enjoy, Learn, ***Contact with me*** to improve the eBook and share ideas.

Juan Antonio Breña Moral.
www.juanantonio.info

I.2.- Audience

The ebook has been written to be read by the following kind of users:

- Lego Mindstorms users
- LeJOS Developers
- Java Developers
- Teachers who teach robotics courses
- Students in Secondary School
- Students in University
- Students in Postgraduate programs / Phd
- Scientifics
- Engineers

I.3.- Organization

The ebook has been organized in the following chapters:

Chapter 1: Introduction

This chapter explains what Lego Mindstors NXT is and the context in the market. The chapter explains the origins, history and milestones with the product Lego Mindstorms NXT.

Chapter 2: LeJOS project
This chapter explains the LeJOS Project, API, Tools, Project structure, etc.

Chapter 3: Getting started with leJOS project
This chapter explains how to install LeJOS Project to execute the , API, Tools, Project structure, etc.

Chapter 4: Basic concepts about Java
This chapter explains basic concepts about Java.

Chapter 5: Sensors
This chapter explains how to use sensors from NXT Kit or sensors from NXT providers as Mindsensors, Hitechnic, CANCAN and others.

Chapter 6: Actuators
This chapter explains how to use actuators. This chapter includes NXT Motors, PF Motors, Servos, DC Motors and RCX Legacy Motors.

Chapter 6: GUI
This chapter explains how to use LCD in NXT brick

Chapter 7-11: Communications
These sets of chapters explain how to use Bluetooth, USB, RS485 & I2C Protocols.

Chapter 12: Sumsubption architecture
This chapter explains how to use sumsubption architecture

Chapter 13: Multithreading
This chapter explains how to manage a java feature which allow your robot manage in parallel multiple tasks.

Chapter 14: LeJOS and mobile phones
This chapter explains how to use some leJOS with mobile phones.

Chapter 15: LeJOS Tools
This chapter explains how to use some tools which are included in every leJOS release and others from leJOS community.

I.4.- Comments & Questions

Please, I would like to receive your feedback about the book to improve it.

I.5.- Acknowledgments

This Project has been posible with the help of my family and friends as Juan Diego Avendaño, Antonio Tejero, Bruno Piñeiro, Isaac Olmos & Marina Perez. I have to congratulate to Brian Bagnall because in the past, he gave the opportunity to join to the leJOS developer team. Besides I give my sincere thanks to my collegues in the project as Lawrie Griffiths, Andy Shaw, Roger Glassey & Matthias Paul Scholz,

they have nice ideas about the future of the project and they have strong experience with Java. Everyday, I learn new things with them.

Finally I have to give many thanks for my readers in special, Yu Yang, Deepak Patik, Dhinakar Radhakrishnan, Takashi Chikamasa, Koldo, Craig Reynols, Matt Denton and Jose Maria Plaza.

Sorry If I forgot some name.

I.6.- Ebook requirements

This ebook needs the following requirements to use correctly

1. Lego Mindstorms NXT Kit
2. Computer with your favorite OS (Windows, Linux or Mac OS)

Note:
For the moment, this ebook only offer support for Windows OS but I hope to expand the support for Linux too in 2009

I.7.- About the author

Juan Antonio Breña Moral collaborates in leJOS Research team since 2006. He works in Europe leading Marketing, Engineering and IT projects for middle and large customers in several markets. Currently, he teachs NXT courses and study Phd about Robotics and Artificial Intelligence in URJC.

Further information:
www.juanantonio.info
www.lejostraining.com

I.8.- About the collaborators

Frank Zimmermann is a Doctor in Mathematics and Professor for CIS at the University of Applied Sciences Nordakademie since 1996. Frank teaches Java, Software Engineering and Information Systems at the university. He discovered leJOS and NXT Technology in 2007.

Further information:
http://fermat.nordakademie.de/
http://www.nordakademie.de/

Patrick Lismore a Napier University Edinburgh student finishing his Bsc (Hons) Software Technology. An aspiring entrepreneur and IT professional who have experience teaching programming and robotics at Carnegie Mellon University. Patrick first got involved with leJOS and NXT's while studying in his last year of University. Patrick research at University involved designing and developing concurrent robotics software using leJOS, JCSP re and Bluetooth.

Further information:
http://www.patricklismore.com