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# The Ultimate Educational Guide to MIPS Assembly Programming

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ISBN-13: 978-1727880878

ISBN-10: 1727880870

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# PREFACE

The MIPS microprocessor is the most known representer of the RISC design philosophy and constitutes an ideal tool for introducing Assembly programming. Moreover, the MIPS 32bit Assembly is the most popular tool among Universities due to simplicity for learning and understanding.

This book has been written from a pure educational point of view and constitutes an ideal learning tool for students.

Additionally, this book has some unique features such as:

- understandable text
- flow charts analysis
- step by step code development
- well documented code
- analytic figures
- laboratory exercises

It is important to note that the whole book material has been tested under real conditions in higher education. By buying this book you have access to download material such as lab solution manual and power point presentations.

This book constitutes the ultimate educational guide which offers important knowledge and demystifies the Assembly programming. Moreover, this book has been written by taking in account the real needs of students, teachers and others who want to develop MIPS Assembly based applications.

The above lines, state the deep belief of the author that this book will constitute a great teaching and educational tool for helping anyone understand the MIPS 32bit Assembly language. On the other hand, the book can be easily used by the teacher for organizing lectures and presentations as well as the laboratory exercises.

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## The book structure

The book consists of 5 chapters.

The first steps in Assembly programming are presented in the **first chapter** as well as the basic features and instructions of the MIPS 32bit microprocessor.

In **second chapter** the first applications using instructions, functions and programming structures will be developed. A main goal is to show that every program is based mainly on the available system functions.

The filling, reading and processing of array data are basic procedures that are presented in **third chapter**. The goal is to present the array management methods in the physical memory and to understand the corresponding addressing modes.

In **fourth chapter**, lab exercises organized in steps are presented. This exercises are well structured for helping the students to work autonomously and to learn how to think.

In **fifth chapter**, the basic MIPS Assembly instructions are presented as well as an instruction list with the corresponding description.

Finally, a short guide for using the MIPS (SPIM/QtSPIM) simulator is presented.





#Code section

li \$v0,4 syscall

documented source code #Display the #Load the function la \$a0,msg\_read\_int #Load the message starting **#Function call** 

Well

li \$v0,5 syscall move \$t1,\$v0 #Read number (keyboard) #Load the function number #Function call #Store the number in \$t1

## Step 3

Now, the simulator has to be activated (PC\$PIM/QtSPIM for Windows or xSPIM/QtSPIM for Linux). Fro vin menu. 13 Laboratory load the program (Load selection). The As are shown now within the text window. exercises

### Step 4

organized in steps Execute the program by selecting Simula main menu. Observe the result on the consorconsole window can be activated from the menu window

# Step 5

After the program execution, write the content of the register \$v0.

 $v_{0}=$ 

# Unique features of this book!





# **Happy Reading!**

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