TDT4258
Energy Efficient Computer Design
Exercise 1

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Abstract

JUST PLOTTING DOWN SOME DRAFT-IDEAS FOR
SUBJECTS TO MENTION
Energy-efficient computers, programming and simply awareness, have
over the last few decades become a more and more pressing issue.

In this assignment we go about the specified task first,

Contents

I Introduction

Introduction goes here

This assignments's stated task was to create an assebly program that would turn on the central LED on a given microcontroller, and then allow a user to move the light either left or right. In a sense, this task was solved in three subsequent steps. The first step was to turn the lights on by hardcoding them. The second was to activate the buttons and connect them to the lights through simple(and inefficient) polling. The third step was to arrange for the buttons to work by way of interrupts and altering the code so that it would adhere to the assignment text in terms of keeping the LED-switching in the main-loop.

There was however another more holistic side to this task. Namely energy efficiency. By using techniques such as interrupts instead of polling an implementation can perform the same task while consuming far less energy.

II Description and methodology

Methodololololology
The initial step in solving the task was to read up on the technical details on the AT32AP7000 microcontroller, the STK1000 development-board and the the AVR32 instruction set in order to figure out how to actually go about solving the assignment. Then a plan of five subsequent parts was made.

1. Being able to program the lights in a functional manner by hard-coding a light-arrangement.

2. Connecting the buttons to the LED's, and putting code in a polling loop such that pushing one will turn on the corresponding lights.

3. Making the button code interrupt based and putting all the code that altered the LED's in the main loop.

4. Optimization with respect to energy. That is, putting the micro-controller in sleep mode, reducing the amount of code and avoiding branches where this is possible while maintaining the same functionality.

5. Adding extra functionality to the remaining unused buttons.

The reason for splitting up the assignment into smaller parts was for the sake of debugging and ensuring some measure of incremental success, instead of attempting to solve the whole asssignment in one go and ending up debugging for several weeks.

III Results and tests

Results, wooohoo!

IV   Evaluation of assignment

Evaluation...

V Conclusion

It all went well.

VI   References

Let us test this[1]

And more[2]

References

[1] Computer Architecture and Design Group, *Lab Assignments in TDT4258 Energy Efficient Computer Systems.* Department of Computer and Information Science, NTNU, 2013, `http://www.idi.ntnu.no/emner/tdt4258/_media/kompendium.pdf`.

[2] Atmel. *AVR32 Architecture Document*, 2011, `http://www.idi.ntnu.no/emner/tdt4258/_media/doc32000.pdf`.

[3] Atmel. *AT32AP7000 Preliminary*, 2009, `http://www.idi.ntnu.no/emner/tdt4258/_media/doc32003.pdf`.