Pontificia Universidad Católica de Chile
Escuela de Ingeniería
Departamento de Ingeniería Eléctrica
IEE2463 Sistema electrónicos programables

Laboratory 07

ZYBO-Z7 Microblaze Interruptions

Prof. Dr.-Ing. Félix Rojas - felix.rojas@uc.cl

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1. Laboratory Goals

The goals of this laboratory are:

- To understand basic configuration of Microblaze.
- To incorporate an Interrupt Controller (INTC) IP Core to Microblaze.
- To connect external buttons to the INTC IP Core.
- To configure the INTC Block in Vivado.
- To create a vitis project and initialize the INTC.
- Register the interruptions of both buttons to the microblaze.
- Create three independent Interrupt Service Routines for each interruption associated to each button.
- To validate the proper functionality of the interrupts in the ZYboZ7 by associating each ISR with a different LED sequence within the different ISRs. Run a different process in the main function to prove that it keep ruining after attending each interrupt.

2. Previous Requirements

These requirements are mandatory to perform the laboratory. Not accomplishing them count as missing the laboratory.

- You must have previously installed vitis/vivado version 2020.1.
- You must read the ZYbo Z7 Board Reference.

- You must understand the design flow between vitis and vivado to program a microprocessor.

Note: **Version of the software 2020.1 is mandatory**. This is important to avoid compatibility problems.

3. Laboratory Activities

- Copy the folder of the LAB06, paste it and change the folder name as LAB07. Enter to the folder with extension ".runs.ªnd delete the files within that folder. That will avoid problems of paths when vivado create new synthesis.
- Open the vivado project, same as LAB06.
- Incorporate Interrupt controller IP Core. Configure the INTC IP Core.
- Connect the three buttons of the ZyboZ7 to the INTC and its output to the interrupt input of the Microblaze.
- Create a Vitis project associated to this new hardware. Initialize the INTC, and create three ISRs, one for each interrupt button.

It is very important that you complement the information given by this lab with the documents .ªXI Interrupt Controller (INTC) v4.1", provided in the folder of this lab.

4. Complementary Homework

To fulfill this homework is mandatory, but not evaluated.

- Use four different timers (remember that you have two in each TIMER IP Core) and blink with different frequency the four LEDs of the ZYbo Z7. Each LED control is going to be associated to : i) the main function, ii) ISR1 associated to button 1, , iii) ISR2 associated to button 2, , ii) ISR3 associated to button 3.
- Connect and initialize the interrupt of one TIMER Ip-Core. Use this interrupt to avoid reading the timer counter register of the TIMER IP-Core.