Embedded Systems

Laboratory 1

Introduction

The aim of the laboratory classes is configuration of the programming environment STM32CubeIDE and getting familiar with basic functionality of ARM STM32L496ZGT6 microcontroller and its input/output ports.

The control of the LED diodes and push buttons will be the final result of the task performed on the KAmeleon-STM32L4 evaluation kit.

Task list

- Analysis of schematic diagrams for the KAmeleon-STM32L4 Evaluation Kit
- Understanding of LED and push buttons connectivity
- Understanding how to configure the General-purpose I/Os (GPIO) port to control LEDs
- Understanding how to configure the General-purpose I/Os (GPIO) port to read push button state
- Understanding how to control LEDs and push buttons
- Writing a simple program that will blink a single LED
- Compilation and debugging of the first program

LED diodes control

There are eight LEDs (D1 – D8) and one RGB LED (D9) available on the evaluation kit. In addition, there are five push buttons in form of joystick available on the board. The schematics are included in the board documentation available on the subject webpage: https://fiona.dmcs.pl/es.

In order to simplify the task, perform the following steps:

Draw the schematic of connection for the D9 RED LED
Search the schematic of the evaluation board.

Draw the schematic of the JOY_RT push button connection
Search the schematic of the evaluation board.

Answer the following questions
Look at the schematic above and analyze if the diodes and buttons are connected to ground or power supply voltage (+3.3 V).

D1 diode is connected to the uC pin	
D9 diodes are connected to uC pins	
In order to turn on the D1 LED the pin state must be	
SW1 JOY_RT push button is connected to the pin	
SW1 JOY_LF push button is connected to the pin	
Releasing the button causes the pin state to be	

Write down the registers necessary to configure GPIO port
The General-purpose I/O controller is described in manual in chapter 8.

All the processor registers required for LED diodes and button operation are described in chapter 8 of the STM32L496ZGT6 processor manual available on the subject webpage.

Operation	**Registers**
Setting IO port in IO mode	
Turning on the clock for IO port	
Setting the direction of IO port	
Forcing the required state on port output	
Reading the port input state	

Program compilation and running

- Develop a program that blinks RED LED with 1 Hz frequency
- Compile the program using the STM32Cube IDE
- Start debugging session