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CS 5780

Lab 1 Pre-Lab

1. How much memory and FLASH storage does the STM32F072R8 have? (section 1.2)

It contains 16 Kbytes of RAM and 64 Kbytes of FLASH memory storage.

1. What does the acronym "HAL" stand for? (section 1.3)

It stands for hardware abstraction library.

1. What is the STM32CubeMX program used for? (section 1.4)

Since we are using Kiel MDK to develop software for these labs, manually trying to create a project is rather difficult. To combat this we will use the STM32CubeMX program to graphically configure the project parameters and create a ready to use Kiel MDK project. Or in other words it is a graphical IDE to enable creating and configuring our programs much easier.

1. Why can't a "bare-metal" embedded application return from the main function? (section 2.2)

Since embedded applications execute directly on the processor, that means there are no operating systems that exists to help launch or clean up application after they exit, this means that the main function has to run forever in an infinite loop. This is required because the main function of an embedded application can never return. Because there is no operating system to catch the processor’s execution after the main program exits, the behavior of the processor becomes undefined where various unwelcome things will happen such as the device resetting or it begins executing random data. It would effectively then be referred as a system crash.

1. In the system's memory table, are the peripheral registers higher or lower in address than the SRAM? (section 2.3)

The peripheral registers are higher in address than the SRAM. It goes as follows from lowest to highest, Program Code, SRAM, Peripherals, Core Peripherals.

1. What information does each of the four main datasheets/manuals used in the labs provide? (section 2.4)

Each one of the four main datasheets/manuals provides much more detail and information about a specific part or functionality of the Discovery Board. They also provide the documentation for the exercises in the labs. The first datasheet or the STM32F072RBT6 Datasheet contains device specific information about the processor being used. The second datasheet or the Programming & Core Datasheet gives the reader more information about the ARM-core peripherals and the assembly instruction set. The third datasheet or the Peripheral Manual datasheet give the reader more information on all peripherals that could be available within an STM32F0 device. The fourth datasheet or the Discovery Board Manual gives the reader information about the onboard devices and connectors attached to the STM32F0.

1. Why do STM32F0 devices not recognize inputs/outputs on a chip by physical pin numbering? (section 2.4.1)

This is because different chip packages have differing numbers of pins, and the pin ordering between these packages are inconsistent.

1. What is the name of ST's header file that defines names for the peripheral registers? (section 2.4.3)

The name of the header file is stm32f0xx.h also known as the CMSIS Cortex-M0 Device Peripheral Access Layer Header Files.

1. What bitwise operator would you use to set a bit in a register? (section 2.5.1)

You use the bitwise OR operator “|”.

1. What peripheral enables the system clock to other peripherals? (section 2.5.2)

There is a peripheral dedicated to doing just this thing, it is referred as the RCC or Reset and Clock Control, and its job is to enable and disable clock signals around the chip. In order to enable the clock for a peripheral you must first find the proper RCC enable register. If we look in the stm32f072xb.h for RCC\_TypeDef, and then within this there are three registers that control the clock signals to all other peripherals.

1. What peripheral do the HAL library delay functions use? (section 2.5.3)

The HAL library delay functions use the SysTick peripheral.

1. Why should you avoid floating-point values on an STM32F0? (section 2.5.4)

This is because it does not have hardware support for floating-point math and has to emulate it using large and slow code libraries. Which increase the chance for confusion and subtle bugs and also slows down the board.