COMP9032 Lab 2

Oct, 2019

1. Objectives

In this lab, you will learn AVR programming on
- function
- parallel I/O

2. Preparation

For Task 2 of this lab, you will use the lab board. It is recommended that you this week (Week 3):
- download and install the Arduino software (avrdude-5.11-Patch7610-win32.zip available on the course website)
  - arduino-1.0.6-windows.exe
- read "Introduction to Lab Board" to know how to use the lab board.

2. Tasks

2.1 Task 1: (10 marks, due Week 4)

GCD can be calculated in many ways. Figure 1 shows a different approach (as compared to the one used in Lab 1) to obtain GCD of two integers (written in C, where, a%b is the remainder of a divided by b).

Write an **assembly recursive function** to implement the C program. Here we assume the integer size is two bytes. For readability, use a macro for n1%n2 in your assembly code.

```
int gcd(int a, int b)
{
   if (b != 0)
       return gcd(b, a%b);
    else
       return a;
}
```

Assemble and run your program in AVR Studio and show your working program to the lab assessor.

2.1 Task 2: (10 marks, due Week 5)

Implement a LED control system to repeatedly display a sequence of three patterns. Assume the three patterns are stored in the registers that can be set before the code execution.

The display will be halted when the user presses a button. To ensure visibility, insert 0.5s delay between two adjacent patterns. The clock frequency used on the lab board is 16MHz.

Assemble your program using AVR Studio, and run it on the AVR Microcontroller Board. Demonstrate your working program to the lab assessor.

Note: All your programs should be well commented and easy to read. Up to 1 mark will be deducted for each program without proper and sufficient comments.