ENSC 3213 Computer-based Systems

Midterm Exam

Spring, 2019

LAB questions with SOLUTIONS

Note: If the total of points in the Midterm is equal to 100 points, the lab questions should be equal to 16 points in order to count towards around 2% of the final grade.

1. Give a short answer to the following questions related to labs: (16 points)

(1) Write a short **C** code that sets bit 4, 5, and 6 of variable **X** to 1, 0, and 1, respectively. Suppose **X** has 32 bits, from bit 0 to bit 31. (8 points)
Note: all bits in **X** are initialized with unknown values.

```
uint32_t mask = 0x7 << 3;
X &= ~mask;   // clear bit 4, 5, and 6
X |= 5 << 3;  // set bits 4 and 6
```

(2) Suppose we three buttons connected to `GPIO` port `E` pins `7`, `11` and `15`. Write a line of code in **C** to verify when **all three buttons** are pressed **at the same time**. (8 points)
Note: in this case, when a single button is pressed, its input will be equal to `1` bitwise.

```
if ((GPIOE->IDR & 0x8880) != 0x00)
                  OR
if ((GPIOE->IDR & 0x8880) == 0x8880)
```