

# Bitwise Operations

## ELE 271: Laboratory 2

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### Introduction

The goal of this short Laboratory exercise is to learn and practice with bitwise operations using the C language. Bitwise operations are particularly useful in manipulating single bits or combinations of bits in a byte or word.

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### Part 1

Follow the instructions in the program shown below to complete the exercise. Use the debugger to show your results and screen capture to document your work.

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```
#include "stm32l476xx.h"

unsigned int a, b, c;
float x = 3.0;

int main () {
    // declare pointer to the floating point number x
    char *ptr = (char *)&x;

    // set bits 15 and 14 of variable a to 01 leaving all other bits unchanged
    a = 0xffffffff;

    // reset bits 16 and 15 of b to 0
    b = 0x00018000;

    // replace byte 1 of variable b with the value 0x80 leaving the other bytes unchanged

    // shift right variable b by 4 bits, what is the resulting value?

    // shift left variable b by 3 bits, what is the resulting value?

    // obtain the 1s complement of c
    c = 0x155;
```

```
// obtain the 2s complement of c
c = 0x8555;

// toggle the 16th bit of b ON and OFF
while (1) {

}

// Determine the address pointed to by ptr[3]

// Explain the following operation
ptr[3] |= 0x80;

// Explain the following operation
*(ptr+2) |= 0x80;

return 0;
}
```

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