

UNCA CSCI 235
Exam 1 Spring 2018
6 March 2018

This is a closed book and closed notes exam. Communication with anyone other than the instructor is not allowed during the exam. **Furthermore, calculators, cell phones, and any other electronic or communication devices may not be used during this exam.** Anyone needing a break during the exam must leave their exam with the instructor. Cell phones or computers may not be used during breaks.

This exam must be turned in before 6:55 PM.

Name: _____

Problem 1 (30 points) C expressions

In the left column, there are twenty tricky and not-so tricky C expressions. Write their values in the right column. Express your answers in simple base 10 expressions, such as 235 or -235. You may assume that all of these numbers are stored in 16-bit two's complement representation, the usual short.

012	
0x64	
10 >> 2	
10 << 2	
10 / 3 * 5	
10 * 3 / 5	
12 & 7	
12 && 7	
12 7	
12 7	
12 ^ 7	
12 > 7	
~12	
!12	
55*66 && 1003/100	

Problem 2 (16 points) Decimal to two's complement conversion

Convert the following four signed decimal numbers into **five-bit two's complement** representation. Some of these numbers may be outside the range of representation for **five-bit two's complement** numbers. Write "out-of-range" for those cases.

-16	-3
10	16

Problem 3 (16 points) Q4.4 to decimal conversion

Convert the following four Q4.4 *two's complement* numbers (four fixed and four fractional bits) into signed decimal representation.

00000001
10000000
00101010
10101010

Problem 4 (12 points) Decimal to Q4.4 conversion

Convert the following three signed decimal numbers into Q4.4 *two's complement* numbers (four fixed and four fractional bits). If you can't express the number exactly, give the nearest Q4.4 representation.

-1.25

0.2

5.5

Problem 5 (4 points) Floating calculations

One of the following C floating-point multiplications results in 1.0 and one does not:

$$2 * 0.5$$

$$5 * 0.2$$

Which is 1.0? Give an explanation for your choice.

