

**UNCA CSCI 235**  
**Final Exam Fall 2018**  
15 October 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.

<b>0123</b>	
<b>0xab</b>	
<b>9 &gt;&gt; 3</b>	
<b>9 &lt;&lt; 3</b>	
<b>20 / 5 * 11</b>	
<b>20 * 5 / 11</b>	
<b>25 &amp; 19</b>	
<b>25 &amp;&amp; 19</b>	
<b>25   19</b>	
<b>25    19</b>	
<b>25 ^ 19</b>	
<b>25 != 19</b>	
<b>~25</b>	
<b>! -3</b>	
<b>235 * (201 != 202)</b>	

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

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

<b>-32</b>	<b>-19</b>
<b>32</b>	<b>63</b>

**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.

<b>00110010</b>
<b>01001001</b>
<b>10010010</b>
<b>11111111</b>

**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.

-2.35

0.4

7.5

**Problem 5 (4 points) Tools of the trade**

*Answer two of the following three questions.*

What text editor have we used to write C code in this class?

What program have we used to compile C code in this class? (There are *two* possible answers.)

What is argc?

