**Quiz 1** **EC262** **Name:__Solution_____**

**Section:_____**

**Date:_____**

**Show all work and box your answers.**

1. (2 points) Suppose $82_{16}$ is stored at a memory location (8 bits).

(a) What is the decimal equivalent if the number is stored as a 2's complement number?

$82_{16} = 10000010_2 = -126$

(b) What is the smallest negative number (in decimal) that can be stored at this memory location?

Range of 8-bit two's complement number N:
$(2^{8-1}-1) \geq N \geq -(2^{8-1})$ or $127 \geq N \geq -128$

The smallest number that can be stored at this memory location: -128

2. (4 points) Suppose we use 6 bits to store integers. Add the two **unsigned** numbers; show both numbers and the result in decimal as well as binary. Indicate if there is overflow.

$000101_2 + 010110_2$

| | Binary | Unsigned Decimal |
|---|---|---|
| *Carry bits* | *1*<br>000101<br>+ 010110<br>011011 | 5<br>+22<br>27<br>No overflow |

3. (4 points) Suppose we use 6 bits to store **signed** numbers (2's complement). Perform the following subtraction. Show both numbers and the result in decimal as well as binary. Indicate if there is overflow.

$100100_2 - 011101_2 = -28_{10} - (29_{10}) = -57$

Note: a – b = a + (-b)

| | Binary | Signed decimal |
|---|---|---|
| *Carry bits*<br>a<br>2s complement of b<br>sum | *10*<br>100100<br>100011<br>000111 | -28<br>-29<br>+ 7<br>overflow |