Objective

The objective of this assignment is to familiarize ourselves with the binary representation of numeric values and the mathematical operations performed with binary values.

Due

Before Midnight, Tuesday, 14 September

Instructions

Complete the following problems. In order to receive full credit, you must **show your work**. Do not just provide the answer. For example, if asked to convert 23 radix ten to a radix two value, show each step in the conversion (show each round of division and what you do with the values). If you only provide the answer (0001 0111), then you will not receive full credit for your answer. A correct answer would provide each step of the division thus:
23 / 2 = 11, r 1
11 / 2 = 5, r 1
5 / 2 = 2, r 1
2 / 2 = 1, r 0
1 / 2 = 0. r 1
Gather remainders to build binary: 10111

Radix Conversion

Convert the following values to the indicated radix.

1. (1 point) Convert 38 base ten to base two.
2. (1 point) Convert 95 base ten to base two
3. (1 point) Convert 31 base ten to base 16.
4. (1 point) Convert 217 base ten to base 16.
5. (1 point) Convert 0110 0101 base two to base ten.
6. (1 point) Convert 1101 1101 base two to base ten.
7. (1 point) Convert 1010 1010 base two to base 16.
8. (1 point) Convert 0110 1111 base two to base 16.

Arithmetic

Perform the arithmetic as indicated. Remember to show your work! Indicate if you have any carry.

9. (2 points) Calculate the following binary addition: 0010 1101 + 1011 0111

10. (2 points) Your Arithmetic Logic Unit does not have a subtraction circuit but you need to perform subtraction! Use 2's-compliment to calculate the result of the following subtraction (by way of addition): 0110 1100 - 0100 1101

What to submit:

Submit a PDF file (which can be a scan of your hand-written work, or a converted PDF from your typed solutions) to the D2L dropbox by the due date/time. Be sure to include your name at the top of the page.