



# Digital Design

## Sheet 2

1) Add the following pairs of binary numbers, showing all carries:

a) 110101 + 11001	b) 101110 + 100101	c) 11011101 + 1100011	d) 1110010 + 1101101

2) Repeat *Problem (1)* using subtraction instead of addition, and showing borrows instead of carries.

3) Add the following pairs of octal numbers:

a) 1372 + 4631	b) 47135 + 5125	c) 175214 + 152405	d) 110321 + 56573

4) Add the following pairs of hexadecimal numbers:

a) 1372 + 4631	b) 4F1A5 + B8D5	c) F35B + 27E6	d) 1B90F + C44E

5) Write the 8-bit signed-magnitude, two's-complement, and ones'-complement representations for each of these decimal numbers: +18, +115, +79, -49, -3, -100.

6) Indicate whether or not overflow occurs when adding the following 8-bit two's complement numbers:

a) 11010100 + 10101011	b) 10111001 + 11010110	c) 01011101 + 00100001	d) 00100110 + 01011010

7) Show how to subtract BCD numbers, by stating the rules for generating borrows and applying a correction factor. Show how your rules apply to each of the following subtractions: 9-3, 5-7, 4-9, 1-8.