

Computer Organization

Module 2 Assignment – Number Systems for Computation

Question #1: Binary Numbers

Please convert the following number to/from binary to decimal and complete the missing values in the chart below. Be sure to show your work (you may take pictures/scan your written work or provide typed responses).

Binary	Signedness	Decimal
1101	Unsigned	13
100110	One's Complement	-25
1011010110	Two's Complement	-298
0111011001110	One's Complement	3790
110000110010	Two's Complement	-974

Question #2: Hexadecimal Numbers

Please convert the following number to/from hexadecimal to decimal/binary and complete the missing values in the chart below. Be sure to show your work (you may take pictures/scan your written work or provide typed responses).

Hex	Signedness	Decimal	Binary
B2C	Unsigned	2860	1011 0010 1100
E6	One's Complement	-25	1110 0110
AC	Two's Complement	-84	1010 1100
3AFD	One's Complement	15301	0011101011111101
BEE	Two's Complement	-1042	1011 1110 1110

Question #3: Octal Numbers

Please convert the following number to/from octal to decimal/binary/hex and complete the missing values in the chart below. Be sure to show your work (you may take pictures/scan your written work or provide typed responses).

Octal	Signedness	Decimal	Binary	Hex
1051	Unsigned	553	0010 0010 1001	229
-167	One's Complement	-199	110001000	-77
246	Two's Complement	166	10100110	0x00A6
176544	One's Complement	64868	1111110101100100	FD64
-143	Two's Complement	-99	0011101	-63

Question #4: Arithmetic and Overflow

Complete the following arithmetic operations and tell whether or not there is overflow and provide a brief justification. Please be sure to show your work (you may take pictures/scan your written work or provide typed responses).

Unsigned, 5-bit binary addition			5-bit Binary Sum	5-bit Decimal Sum	Overflow?
01010	+	01011	10101	21	Not overflow

Justification:

Unsigned, 8-bit binary addition			8-bit Binary Sum	8-bit Decimal Sum	Overflow?
11011001	+	10100110	1 0111 1111	383	Overflow

Justification:

Two's Complement, 16-bit hex addition			16-bit Binary Sum	16-bit Decimal Sum	Overflow?
FACE	+	6EEF	0110 1001 1011 1101	27069	Overflow

Justification:

Two's Complement, 8-bit hex subtraction			8-bit Binary Sum	8-bit Decimal Sum	Overflow?
0x88	-	0x0A	0111 1110	126	Not overflow

Justification:

Question #5: IEEE 754 Floating-point Number

Please convert the following number to its binary and hexadecimal IEEE 754-formatted equivalent:

-8765.125

Question #6: Converting Bytes to Binary and ASCII Text

Please convert the following string of bytes to:

1. Binary
2. ASCII text

0x43 0x6F 0x6D 0x70 0x75 0x74 0x65 0x72 0x20 0x4F 0x72 0x67 0x21