University of Delaware
CISC260 Homework 1 Solution

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1 Question 1.

Convert the following numbers to other data representations. The binary is 8-bit, interpreted as two's complement.
Answer:

Decimal	Hex	Binary
-47	0xFD1	11010001
-91	0xFA5	10100101
89	0x59	01011001
90	0x5A	01011010
-11	0xF5	11110101

2 Question 2.

ASCII code.

2.1 a

Decode the following bit sequence (expressed in hexadecimal): X41524D2069732066756E21
Answer
For ASCII code, each character is represented by 8 bits binary and 2 hex number. Then, we can have the following partition of the hexadecimal:
41 — 52 — 4D — 20 — 69 — 73 — 20 — 66 — 75 — 6E — 21
then convert each partition to decimal:
65 — 82 — 77 — 32 — 105— 115— 32 — 102— 117— 110— 33
then, lookup ASCII code table, we get:

A — R — M — SPACE — i — s — SPACE— f — u — n — !
Then the final answer is **ARM is fun!**

2.2 b

Encode the following word to bit sequence (expressed in hexadecimal): Hello
Answer Following same logic, we use ASCII table to find the decimal representation first:
072 — 101 — 108 — 108 — 111
Then convert the above decimal to hex, we get:
48 — 65 — 6c — 6c — 6f Then the final answer is **48656c6c6f**

3 Question 3.

With $x = 01111001_{two}$ and $y = 11000101_{two}$ representing two's complement signed integers, perform the following operations, showing all work: State if an overflow occurs.

3.1 a.

x + y
Answer
0111 1001 + 1100 0101 = 0011 1110
There is no overflow occurs.

3.2 b.

x - y
Answer
0111 1001 - 1100 0101 = 0111 1001 + 2's complement of (1100 0101)
2's complement of (1100 0101) = 0011 1010 + 1 = 0011 1011
Then, 0111 1001 - 1100 0101 = 0111 1001 + 0011 1011 = 1000 0100
There is overflow occurs since x-y is positive but result is negative.

4 Question 4.

Answer
See the text file named as homework1Problem4