- CPSC 275: Introduction to Computer Systems

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Fall 2025

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Solution to Homework 8

1.
   1. $1011 = -2^3 + 2^1 + 2^0 = -8 + 2 + 1 = -5$
   2. $11011 = -2^4 + 2^3 + 2^1 + 2^0 = -16 + 8 + 2 + 1 = -5$
   3. $111011 = -2^5 + 2^4 + 2^3 + 2^1 + 2^0 = -32 + 16 + 8 + 2 + 1 = -5$

2.

Hex		Unsigned		Two's complement	
Original	Truncated	Original	Truncated	Original	Truncated
0	0	0	0	0	0
2	2	2	2	2	2
9	1	9	1	−7	1
B	3	11	3	−5	3
F	7	15	7	−1	-1

3.

w	fun1(w)	fun2(w)
0x00000076	0x00000076	0x00000076
0x87654321	0x00000021	0x00000021
0x000000C9	0x000000C9	0xFFFFFFC9
0xEDCBA987	0x00000087	0xFFFFFF87

Function `fun1` extracts a value from the low-order 8 bits of the argument, giving an integer ranging between 0 and 255. Function `fun2` extracts a value from the low-order 8 bits of the argument, but it also performs sign extension. The result will be a number between -128 and 127.

4.
```
unsigned replace_byte (unsigned x, int i, unsigned char b)
{
    int itimes8 = i << 3;
    unsigned mask = 0xFF << itimes8;

    return (x & ~mask) | (b << itimes8);
}
```

- **Welcome: Sean**

  - LogOut