# Assignment 3 – Some Practice Problems

## Base Conversion (6 points)

Convert each of the following from base 10 to base 2.

|  |  |  |
| --- | --- | --- |
|  | 16910 = | 10101001 |
|  | 12110 = | 1111001 |
|  | 18910 = | 10111101 |

## Unsigned Addition in Base 2 and Base 16 (12 points)

Complete each of the following, making sure to express your answer in the base that is specified for each.

|  |  |  |
| --- | --- | --- |
|  | What is 100111112 + 1000012 in base 2? | 11000000 |
|  | What is 1111011002 + 1110012 in base 2? | 1000100101 |
|  | What is 1DA71A72816 + C8D92D16 in base 16? | 1DB3A8055 |
|  | What is 53084B27916 + CC7D53116 in base 16? | 53D4C87AA |

## Bitwise Operations (14 points)

If we have

char x = C6, y = 7D;

what is the result of the following operations?

**Note**: Your answer must be in the form of exactly two hex digits (i.e. ignore the possibility of promotion to 32-bit ints and behave as though we’re living in the land of 8-bit arithmetic).

|  |  |  |
| --- | --- | --- |
| a. | x << 2 | 03 18 |
| b. | x < 1 | 00 |
| c. | x - y | 49 |
| d. | !!x | C6 |
| e. | ~x | 39 |
| f. | x & y | 44 |
| g. | x ^ y ^ y | BB |
| h. | -x | 3A |
| i. | x & 0x0F | 06 |
| j. | ~~x | C6 |
| k. | x || y | FF |
| l. | x | y | FF |
| m. | x ^ y | BB |
| n. | x && 1 | 01 |

## Addressing and Byte Ordering (8 points)

Let's say we have

**int x = 0x68AD1F04;** /\* word size = 4 bytes = 32 bits \*/

which we'll say is stored in addresses 0x100 through 0x103.

Specify the little endian vs. big endian byte ordering below.

Note: Specify only the two hex digits (so without the preceding *0x*) that make up each byte.

### Little Endian:

|  |  |
| --- | --- |
| Address | Value |
| 0x100 | 04 |
| 0x101 | 1F |
| 0x102 | AD |
| 0x103 | 68 |

### Big Endian:

|  |  |
| --- | --- |
| Address | Value |
| 0x100 | 68 |
| 0x101 | AD |
| 0x102 | 1F |
| 0x103 | 04 |