Assignment 2 Solutions

2.1. The three binary representations are given as:

Decimal	Sign-and-magnitude	1's-complement	2's-complement
5	0000101	0000101	0000101
-2	1000010	1111101	1111110
14	0001110	0001110	0001110
-10	1001010	1110101	1110110
26	0011010	0011010	0011010
-19	1010011	1101100	1101101
51	0110011	0110011	0110011
-43	1101011	1010100	1010101

2.2. (a)

(a)
```
  00101
+ 01010
----------
  01111
no overflow
```

(b)
```
  00111
+ 01101
----------
  10100
overflow
```

(c)
```
  10010
+ 01011
----------
  11101
no overflow
```

(d)
```
  11011
+ 00111
----------
  00010
no overflow
```

(e)
```
  11101
+ 11000
----------
  10101
no overflow
```

(f)
```
  10110
+ 10011
----------
  01001
overflow
```

2.2. (b) To subtract the second number, form its 2's-complement and add it to the first number.

(a)
```
  00101
+ 10110
----------
  11011
no overflow
```

(b)
```
  00111
+ 10011
----------
  11010
no overflow
```

(c)
```
  10010
+ 10101
----------
  00111
overflow
```

(d)
```
  11011
+ 11001
----------
  10100
no overflow
```

(e)
```
  11101
+ 01000
----------
  00101
no overflow
```

(f)
```
  10110
+ 01101
----------
  00011
no overflow
```

2.4. The number 44 and the ASCII punctuation character "comma".

2.5. Byte contents in hex, starting at location 1000, will be 4A, 6F, 68, 6E, 73, 6F, 6E. The two words at 1000 and 1004 will be 4A6F686E and 736F6EXX. Byte 1007 (shown as XX) is unchanged. (See Section 2.6.3 for hex notation.) Alternatively, the bytes stored are: **J-o-h-n-s-o-n-XX.**

2.6. Byte contents in hex, starting at location 1000, will be 4A, 6F, 68, 6E, 73, 6F, 6E. The two words at 1000 and 1004 will be 6E686F4A and XX6E6F73. Byte 1007 (shown as XX) is unchanged. (See section 2.6.3 for hex notation.) Alternatively, the bytes stored are: **n-h-o-J-XX-n-o-s**.