Basic Concepts Worksheet #1: Basic Concepts

True-False

1. The binary representation of decimal 42 is 00101010.
   - True

2. The hexadecimal representation of decimal 35 is 33h
   - False. It is 0x35 or 35h

3. The sum of the binary integers 01101101 and 00111011 is 10101001.
   - False. It is 010101000

4. The 8-bit two's complement of binary 00000010 is 11111110.
   - True. Invert bits, then add one

5. The binary representation of decimal -42 is 11010111.
   - False. It is -0b101010

6. Suppose there is a virtual machine containing levels V1 and V2, where V2 is above V1 in the machine
hierarchy. The programs written in language V2 can be executed by a program running at level V 1.
   - False. There is no interpreter for the V2 language so it cannot be run. It is a higher level language, much like C to assembler.

7. The sum of all powers of 2 from 2^0 to 2^8 is 511.
   - True

8. A virtual machine may be constructed from software.
   - True. VMWare, virtualbox, etc.
9. The sum of 3AB4h and 0429h is 3EDDh.
   - True
10. To translate an unsigned decimal integer into binary, repeatedly divide the integer by 2, saving each
remainder as a binary digit.
   - True. This also works for reversing the number. For example, you give the program 54 and it prints 45.
11. The expression !X && !Y is false when X is false and Y is true.
   - True

Short Answers

1. What are the hexadecimal and decimal representations of the ASCII character capital B?
   - 0x42
   - 66
2. What are the hexadecimal and decimal representations of the ASCII character capital G?
   - 0x47
   - 71
3. The following 16-bit hexadecimal numbers represent signed integers. Convert each to decimal:
   a. 6BF9
      - 27641

   b. C123
      - 49443
4. What is the hexadecimal representation of each of the following binary numbers?
   a. 0011 0101 1101 1010
      - 35DA
   b. 1100 1110 1010 0011
      - CEA3
   c. 1111 1110 1101 1011
      - FEDB