ECE 379

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Homework Assignment #1 Solution

1. Problem 1.2. No. A high-level language is essentially converted to a lower-level programming language when it is compiled.

2. Problem 1.10. Definiteness: each step is precisely stated.
   Effective Computability: each step can be carried out by a computer.
   Finiteness: the procedure terminates.

3. Problem 1.13. Both computers, A and B, are capable of solving the same problems. Computer B can perform subtraction by taking the negative of the second number and adding it to the first one. As A and B are otherwise identical, they are capable of solving the same problems.

4. Problem 1.18. A single microarchitecture typically implements only one ISA. However, many microarchitectures usually exist for the same ISA.

5. Problem 2.1. The answer is 2^n

6. Problem 2.2. For 26 characters, we need at least 5 bits. For 52 (26 lowercase + 26 uppercase) characters, we need at least 6 bits.

7. Problem 2.5. If each number is represented with 5 bits,
   7 = 00111 in all three systems
   -7 = 11000 (1's complement)
   = 10111 (signed magnitude)
   = 11001 (2's complement)

8. Problem 2.15. Dividing the number by two.

9. Problem 2.27. The problem here is that overflow has occurred as adding 2 positive numbers has resulted in a negative number.

10. Problem 2.42. The ASCII values are being added, rather than the integer values. (ASCII ‘5’ is 53 in decimal, and ASCII ‘8’ is 56 in decimal, adding to 109, which is ASCII ‘m’.)

11. Problem 2.45. (a) xD1AF
(b) x1F
(c) x1
(d) xEDB2

12. Problem 2.50. Show your work.
(a) x5468
(b) xBBFD
(c) xFFFF
(d) x32A3