UNIVERSITY OF CALIFORNIA, SANTA CRUZ
BOARD OF STUDIES IN COMPUTER ENGINEERING

CMPE12/L: COMPUTER SYSTEMS AND ASSEMBLY LANGUAGE

Homework #1
Worth 122 points
Covers most of Chapter 1 and parts of Chapter 2

1. (3pts) Can a higher-level programming language instruct a computer to computer more than a lower-level programming language?
2. (3 pts) What difficulty with analog computers encourage computer designers to use digital designs?
3. (5 pts) Name three characteristics of algorithms. Briefly explain each of these three characteristics.
4. (5 pts) Identify one advantage of programming in a higher-level language compared to a lower-level language. Identify one disadvantage.
5. (5 pts) Name at least three things specified by the ISA.
6. (5 pts) Briefly describe the difference between an ISA and a micro architecture.
7. (12 pts) Convert the following numbers to unsigned binary.
    a. 26
    b. 49
    c. 255
    d. 129
8. (25 pts) Convert the following unsigned binary numbers to base 10 and hexadecimal.
    a. 00101010
    b. 00111111
    c. 10000000
    d. 11101001
    e. 00001001
9. (12 pts) Convert 100_{10} to the following bases.
    a. 3
    b. 4
    c. 5
    d. 6
10. (12 pts) Convert the arbitrary base to base 10.
    a. 210_3
    b. 321_4
    c. 432_5
11. (35 pts) Convert the following numbers to 8-bit 2's complement and perform the mathematical operation in binary.
    a. -6+20

b. 67+30
c. 42-20
d. -44-23
e. 26-26