

40-126 : Computer Structure and Language
Computer Engineering Department
Sharif University of Technology
Fall 2006

Distributed: 1385/7/16

Assignment #1

Due: 1385/7/23

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Problem 1)

Perform the following operations on 16-bit two's complement hex numbers. Indicate (YES or NO) whether signed overflow occurs.

- | | | |
|------------|------------|------------|
| (a) \$AF76 | (b) \$FF06 | (c) \$8701 |
| + \$1701 | + \$AF76 | - \$70CD |

Problem 2)

Perform the following operations on the 16-bit unsigned hex numbers. In each case, indicate whether unsigned overflow occurs.

- | | |
|------------|------------|
| (a) \$AF76 | (b) \$7FFF |
| + \$10FA | + \$FFFE |

Problem 3)

For 6-bit signed magnitude numbers, give the representation for each of the following decimal numbers:

- (a) 31 (b) -31

What is the range of these numbers?

Problem 4)

For 6-bit one's complement numbers give the representation for each of the following decimal numbers:

- (a) 31 (b) -31

What is the range of these numbers?

Problem 5)

What is the state of the CF, OF (overflow flag), SF and ZF flags after the following additions? (Note that the numbers are all in two's complement system)

00001011	10001011	00110011	11001100	10000001
+10101011	+10101000	+01100100	+00101001	+10000000

Problem 6)

Given the bit pattern

11111111111000000000000000000000

What does it represent, assuming that it is

- (a) An IEEE single precision number (you may use <http://grouper.ieee.org/groups/754/> for understanding the IEEE 754 standard)
- (b) An unsigned number
- (c) A two's complement number

Problem 7)

What is the IEEE 754 binary representation of 16 in single and double precision.