



**Computer
Science**

COMPSCI 210 S1 T 2007

Assignment One – Version 2

The work done on this assignment must be your own work. Think carefully about any problems you come across, and try to solve them yourself before you ask anyone else for help. Under no circumstances should you work together with another student to solve problems posed in assignments. Note: You must show all your working steps; otherwise no mark will be given even if your answer is completely correct.

Assessment

Due: **4:00 pm 16 March 2007** (No Bonus/Penalty)
Worth: **3.33%** of your final mark

Questions

(1) Convert the following decimal numbers to 8-bit unsigned binary, octal and hexadecimal, showing your working:

- a) 142_{10}
- b) 87_{10}

[8 marks]

Answer: * MUST SHOW WORKING

Decimal	Binary	Octal	Hex
142	1000 1110	216	8E
87	1010111	127	57

(2) Convert the following octal numbers to hexadecimal, showing all working:

- a) 125_8
- b) 425_8

[4 marks]

[4 marks] *** MUST SHOW WORKING**

Octal	Binary	Hex
125	001 010 101	55
425	100 010 101	115

(3) Perform the following binary addition

$$00110100 + 01010101$$

[2 marks]

Answer = 1000 1001

(4) Perform the following binary subtraction

$$01010101 - 00110011$$

[2 marks]

Answer = 0010 0010

(5) Perform the following binary multiplication

$$100 * 10$$

[3 marks]

Answer = 01000

(6) Perform the following octal multiplication

231 * 246

[5 marks]

Answer = 61466

(7) Perform the following hexadecimal division

5A6 / 38

[5 marks]

Answer: Quotient 19, remainder = 1A

(8A) Convert 10100011 to decimal if the number is represented as:

- i) Unsigned 8-bit number,
- ii) Signed 8-bit Excess (biased),
- iii) Signed 8-bit two's complement.

[4 marks]

Unsigned = 163

Excess = 35

Two's complement = -93

(8B) Convert 01010011 to decimal if the number is represented as:

- i) Unsigned 8-bit number,
- ii) Signed 8-bit Excess (biased),
- iii) Signed 8-bit two's complement.

[4 marks]

Unsigned = 83

Excess = -42

Two's complement = 83

(9) Perform the following binary subtractions by adding the 2's complement of the subtrahend. Indicate the carry bits and indicate which binary subtraction result in an overflow:

a) 1010 1001 - 0010 0101

b) 1000 1100 - 0111 0110

[8 marks]

a) Invalid, Answer = 1101 0001

b) Valid answer = 0010 1110

(10) The following binary numbers are 8-bit binary signed values. What is the result of each calculation? Leave your answer in binary form.

i) 01010101 & 01101010

ii) 01010101 | 01000111

iii) 01011011 << 1

iv) 11101011 >>> 4

v) 11101011 >> 2

[5 marks]

i) 0100 0000

ii) 01010111

iii) 10110110

iv) 00011101

v) 11111010