



**Computer  
Science**

## COMPSCI 210 S1 T 2007

**Assignment One – Version 4**

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)  $216_{10}$
- b)  $83_{10}$

[8 marks]

**Answer: \* MUST SHOW WORKING**

Decimal	Binary	Octal	Hex
<b>216</b>	<b>11011000</b>	<b>330</b>	<b>D8</b>
<b>83</b>	<b>1010011</b>	<b>123</b>	<b>53</b>

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

- a)  $162_8$
- b)  $377_8$

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

Octal	Binary	Hex
<b>162</b>	<b>001110010</b>	<b>72</b>
<b>377</b>	<b>01111111</b>	<b>FF</b>

(3) Perform the following binary addition

$$01000011 + 01010101$$

[2 marks]

**Answer=1001 1000**

(4) Perform the following binary subtraction

$$00110110 - 00011001$$

[2 marks]

**Answer = 0001 1101**

(5) Perform the following binary multiplication

$$101 * 101$$

[3 marks]

**Answer = 11001**

(6) Perform the following octal multiplication

126 \* 512

[5 marks]

**Answer=67334**

**(7)** Perform the following hexadecimal division

9B3 / 38

[5 marks]

**Quotient=2C, remainder=13**

**(8A)** Convert 10111011 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 = 187**

**Excess = 59**

**Two's complement = -69**

**(8B)** Convert 01101100 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 = 108**

**Excess = -20**

**Two's complement = 108**

**(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 = 1110 0000**

**b) Valid answer = 0010 0011**

**(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) 10101001 & 11101010

ii) 10101001 | 11100101

iii) 01011111 << 3

iv) 10101111 >>> 1

v) 10101111 >> 2

[5 marks]

i) 1010 1000

ii) 1110 1101

iii) 1111 1000

iv) 0101 0111

v) 1110 1011