Computer Science

COMPSCI 210 S1 T 2007

Assignment One – Version 3

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) 212_{10}
b) 78_{10}
[8 marks]
Answer: * MUST SHOW WORKING

Decimal	Binary	Octal	Hex
212	**11010100**	**324**	**D4**
78	**1001110**	**116**	**4E**

(2) Convert the following octal numbers to hexadecimal, showing all working:
a) 115_8
b) 415_8
[4 marks] *** MUST SHOW WORKING**

Octal	Binary	Hex
115	**001 001 101**	**4D**
415	**100 001 101**	**10D**

(3) Perform the following binary addition
01010101 + 00110011
[2 marks]
Answer = 10001000

(4) Perform the following binary subtraction
01100101 - 00110110
[2 marks]
Answer = 0010 1111

(5) Perform the following binary multiplication
101 * 100
[3 marks]
Answer = 10100
(6) Perform the following octal multiplication

123 * 321
[5 marks]
Answer = 41703

(7) Perform the following hexadecimal division
73F / 38
[5 marks]
Answer: Quotient=21, reminder=7

(8A) Convert 10110011 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 = 179
Excess = 51
Two's complement = -77

(8B) Convert 00110101 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 = 53
Excess = -75
Two's complement = 53

(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) Valid answer = 10000100
b) Invalid answer 00010110

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

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i)   10101010  & 11101001
ii)  10101010  | 11100101
iii) 01111011 << 2
iv)  10111011 >>> 2
v)   10111011 >> 2
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[5 marks]
i) 1010 1000
ii) 1110 1111
iii) 1110 1100
iv) 0010 1110
v) 1110 1110