Embedded Processors UESTC
Assignment 1

Due on Friday, the 18th of November at the beginning of class.
Homework turned in late will be penaltised as described in the Student Handbook.

Question 1 (15 points):

True or False (T or F)

	The terms microcontroller and microprocessor have the same definition.
	The maximum unsigned binary number that a computer with a 32-bit architecture can store is 2^{32} bits.
	To add two signed binary numbers A + (-B), the negative binary number is first converted to its 2's complement.
	Even and odd parity are used to detect errors in a binary string.
	A string is an arbitrary number of bits while the number of bits in a word is set by the computer architecture.

Question 2 (25 points): Each row of the following table is to contain an equal value expressed in binary, hexadecimal, and decimal. Complete the missing values. Assume each value is 8 bits. The first row illustrates the process.

signed binary	hexadecimal	decimal	1's complement	2's complement
10000010	**0xF2**	**-2**	**11111101**	**11111110**
	0xED			
		-92		
01111011				
	0xA4			

Question 3.a (15 points): Give an approximation of $\sqrt{2}/2$ using the decimal fixed-point (0.001) format.

Question 3.b (15 points): A signed 18-bit binary fixed-point number system has a resolution of 1/256. What is the corresponding value of the number if the integer part stored in memory is 384?

Question 4 (30 points): There are three 16-bit variables: **p**, **n** and **m**.

$$p = 0110011001100110$$
$$n = 1010101010101010$$

Using logical operations you have learned in the review of C programming, answer the following questions:

1) What is the value of not **m** ($\bar{\bar{\mathbf{m}}}$) when **m** is defined as the bitwise addition of **p** and **n**?

2) Write the lines of code to perform the calculation in part 1).

3) If **m** is used as a mask, which bits in a 16-bit number will be unmasked or available for arithmetic and logical bitwise operations?