27.09.2013

Istanbul Technical University

Department of Computer Engineering

BLG 231E - Digital Circuits

Assignment 1

Due Date: 03.10.2013, **Thursday,** 17.00.

- Please **write <u>neatly</u>**.
- If you are not preparing your homework in a computer, please show complement of a symbol by putting a **dash** over the symbol (e.g. do not use *x'* use $\bar{x}$).
- Plagiarized assignments will be given a negative mark.
- **No late submissions** will be accepted.

Submissions: Please submit your solutions to the Digital Circuits Course Assignment Box at the department secretary's office.

1. ***A*** and ***B*** are two 8-bit integers. ***B*** is given as **1110 0001**. For the operation ***A - B***, answer the following questions:
   a. If A and B are *signed* numbers, what is the maximum and minimum values of A in order to get a valid result after the operation? Explain.
   b. If A and B are *unsigned* numbers, what is the maximum and minimum values of A in order to get a valid result after the operation? Explain.

2. E and F are two expressions, which do not include the literal a.
   a. Write the expression in PoS form, of which E+F is the consensus term respect to a. Prove the consensus theorem in PoS form using the axioms and theorems of the Boolean algebra.
   b. Assume that E= $\overline{b}\,c + d$ and F= $bc + bd$. Write the expression in a) for these expressions again. Apply the consensus theorem and show that it is valid using axioms and theorems.