

**Computer Structure - Spring 2007**  
Assignment No. 1

**Firm Deadline: 6.3.07 – 10 AM before the beginning of the lecture**

1. Answer Question 2.3 from the lecture notes.
2. Answer Question 2.4 from the lecture notes.
3. Answer Question 2.5 from the lecture notes.

4. **Definition:**

A Boolean function  $f : \{0,1\}^n \rightarrow \{0,1\}$  is *monotone* if  $x \geq y \rightarrow f(x) \geq f(y)$   
(where  $x \geq y$  means  $\forall i : x_i \geq y_i$ ).

Prove the following claim:

$f : \{0,1\}^n \rightarrow \{0,1\}$  is *monotone* **iff**  $f$  can be implemented by a combinational circuit that contains only **AND-gates** and **OR-gates**.