Retake exam DITE: Monday, March 7, 2016 -- 14:00 to17:00h

Task I (4 points): Convert the following numbers from the given base to the other listed bases in the table.

Decimal	Binary	Octal	Hexadecimal
10.3125	?	?	?
?	10100101.101	?	?
?	?	371.5	?
?	?	?	4EBA.F

Important: Show and explain the conversion procedures you use and not only the final result.

Task II (5 points): Implement one SR flip-flop using the following components: one D flip-flop, one Multiplexer 4-to-1, and one NOR gate.

Task III (5 points): Simplify the Boolean function **F**(W,X,Y,Z) = ∑m(1,2,4,5,6,8,9) which has the don't-care conditions **d**(W,X,Y,Z) = ∑m(10,11,15) by finding all prime implicants and essential prime implicants and applying the selection rule. Note that function **F** has ***don't care*** conditions **d** that you have to take into account when simplifying function **F**. After you have simplified the function, represent it using the **logic basis NAND**. Also, draw the combinational logic circuit corresponding to the function **using only 2-input NAND gates.**
Important: Show all prime implicants and essential prime implicants as well as explain all the steps you do to simplify and represent function F.

Task IV (6 points): A sequential circuit with two flip-flops A and B, one input X, and one output Z is specified by the following equations:

$A(t+1) = X(t)'A(t) + X(t)B(t)$
$B(t+1) = X(t)'A(t)'$
$Z(t) = X(t)A(t) + X(t)'B(t)'$

Transform and implement the circuit described above as **Moore Finite State Machine (FSM)** under the following conditions:

1. Use **only** NOR gates and T Flip-Flops;
2. Derive and show the state table of the Moore FSM;
3. Derive and show the state diagram of the Moore FSM;
4. Draw the logic diagram of the Moore FSM.

Important: Show and explain all the steps you do to implement the circuit above.

NOTE: The exam grade is equal to the obtained number of points divided by 2!