JAM Electronics inc. (JE)

Group #36

C.E.O Mathieu Sylvestre #260333709

C.R&D Juan Morency Trudel #260481762

Title: Lab 1 report on the "g36_num1s" circuit

October 7th 2015

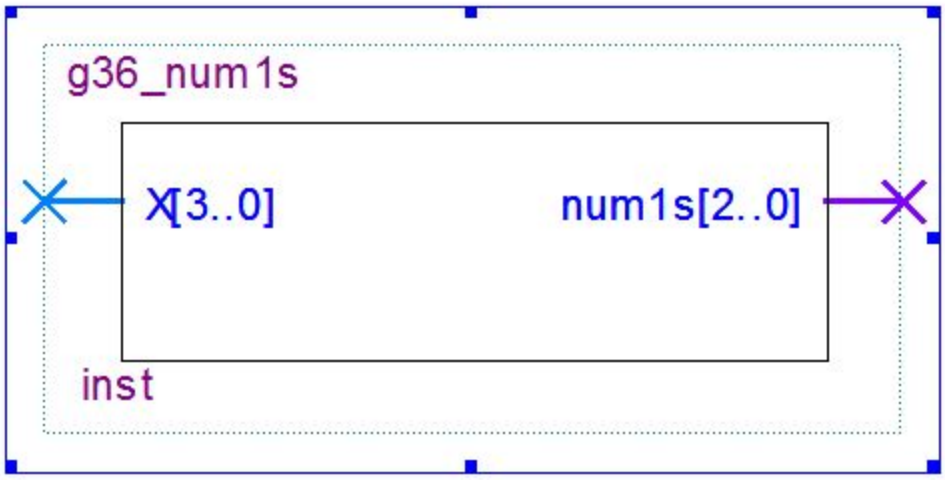
Lab report 1

Description: The “g36_num1s” circuit counts the number of “1”s in a 4-bit input array, X, and outputs the count in binary form. For example, if the input is 1101, there are 3 “1”s, hence the output is 011.

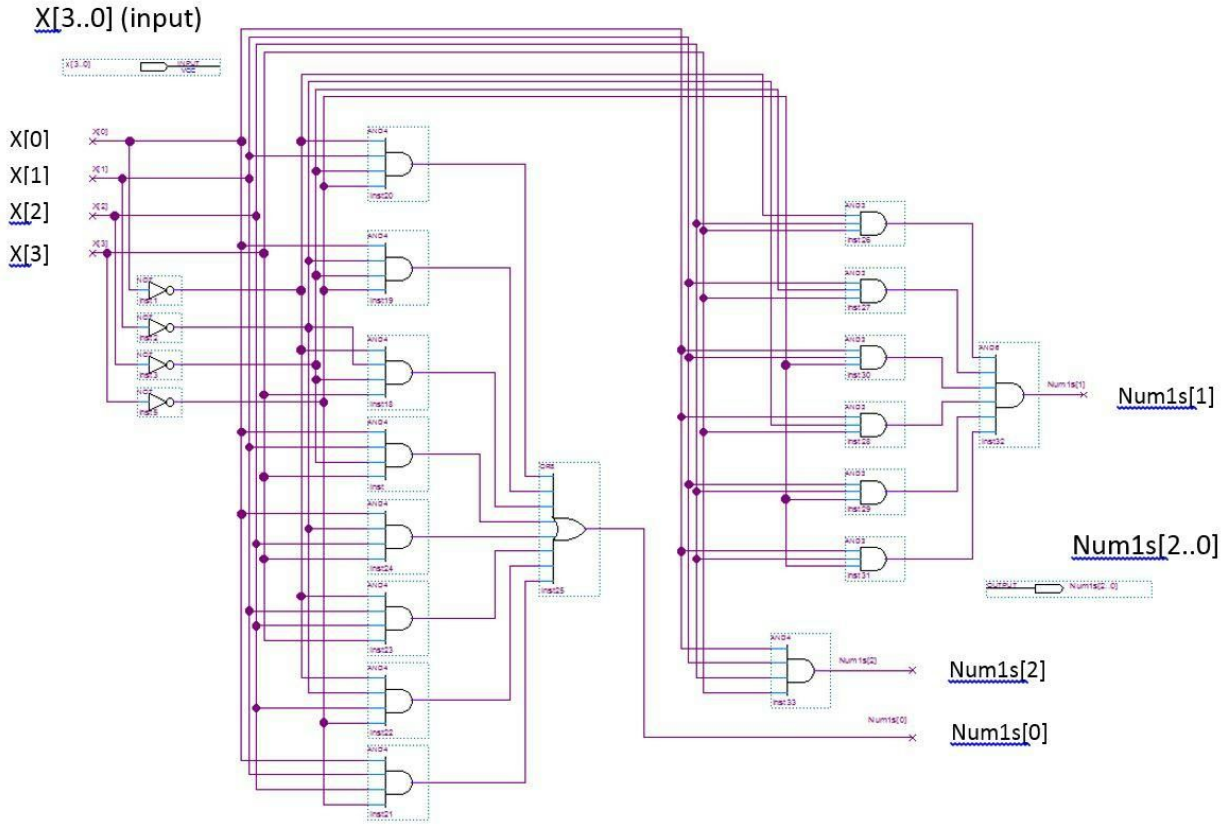
Input: X (4 std_logic_vector). X can be any array of 4 bits.

Output: num1s (3 std_logic_vector). The binary value of num1s is the number of “1”s in the input X.

Symbol diagram of the “g36_num1s” circuit

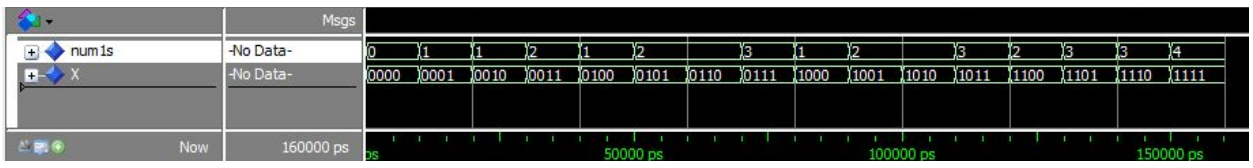


Gate level schematic of the “g36_num1s” circuit



Description of testing

In order to test the function, we created a test bench. The test bench changes the value of X every 10 ns with a for loop, such that every possible combination of the 4-bit array X is evaluated during a 10 ns interval. Given that there are 16 different possible values of X, the test lasts 160 ns. The test results are illustrated in the “Wave” tab of the Modelsim software, where values of both X and Num1s are shown (the value of Num1s are shown in decimal). Since there are only 16 possibilities, it is reasonable to visually verify that the value of Num1s does indeed correspond to the number of “1”s in X. This is what we did, and our circuit functions as expected.



Grade Sheet for Lab #1

Fall 2015.

Group Number: 36 .
Group Member Name: Juan Moreno Tirado Student Number: 260481762 .
Group Member Name: Mathieu Sylvestre . Student Number: 260333709 .

Marks			TA Signatures
2	1.	Schematic diagram for the 6-bit comparator	
2	2.	VHDL file for the 6-bit comparator	
2	3.	Initial partial simulation results for the 6-bit comparator	
2	4.	Complete simulation results for the 6-bit comparator	
2	5.	Boolean equations for the 1's counter circuit	
2	6.	VHDL description for the 1's counter circuit	
2	7.	Simulation Testbench VHDL for the 1's counter circuit	
2	8.	Simulation results for the 1's counter circuit	

Each part should be demonstrated to one of the TAs who will then give a grade and sign the grade sheet. Grades for each part will be either 0, 1, or 2. A mark of 2 will be given if everything is done correctly. A grade of 1 will be given if there are significant problems, but an attempt was made. A grade of 0 will be given for parts that were not done at all, or for which there is no TA signature.