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# BLG231E Digital Circuits

## Quiz 1

Duration: 20 Minutes

Grading: 1) 20%, 2) 80%,

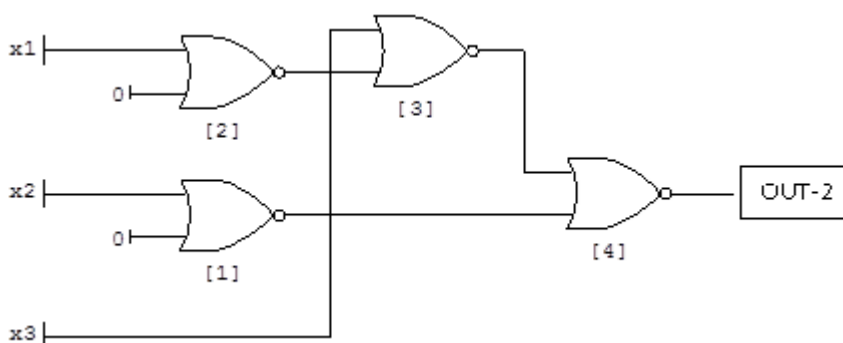
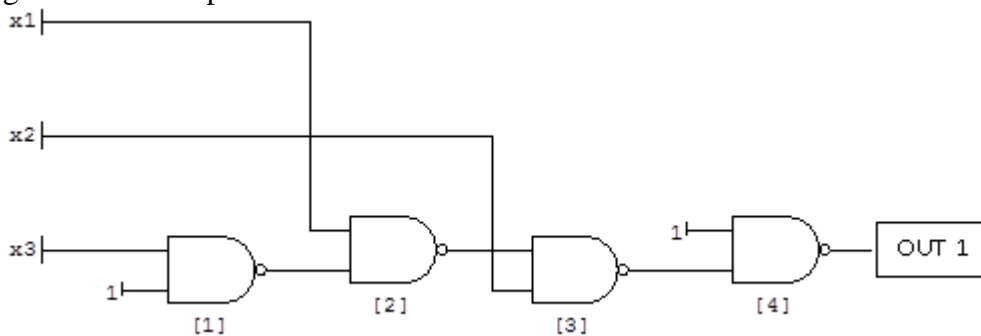
Quiz is in closed-notes and closed-books format

For your answers please use the space provided in the exam sheet

GOOD LUCK!

1. Answer the following statements with T(true) or F(false) only. (do not guess: points are deducted for wrong answers. If you do not know the answer, leave it blank)
- a) \_\_\_\_ Finite decimal fraction can be always converted to finite binary fraction
  - b) \_\_\_\_ Finite hexadecimal fraction can be always converted to finite binary fraction
  - c) \_\_\_\_ (The population of Burundi was 10.16 million in 2013) NOR (sweet corn is tastier than apple)
  - d) \_\_\_\_ A circuit performing a binary addition of two  $n$ -bit numbers needs  $n$  outputs.
  - e) \_\_\_\_ A circuit performing a binary multiplication of two  $n$ -bit numbers needs  $2n$  outputs.

2. Consider the below two circuits having three inputs  $x_1$ ,  $x_2$ , and  $x_3$  as well as 0 and 1 inputs. The one consisting of NAND2 gates has an output OUT 1 and the other one having NOR2 gates has an output OUT 2.



- a) Derive Boolean expressions of OUT 1 and OUT 2 in terms of the Boolean variables  $x_1$ ,  $x_2$ , and  $x_3$ . Try to simplify them.
- b) Derive truth tables of these two expressions obtained in a).
- c) What is the result of  $(\text{OUT } 1) + (\text{OUT } 2)'$ ?