

Student ID: _____

CS 151 Quiz 1

Name : _____ , _____
(Last Name) (First Name)

Student ID : _____

Signature : _____

Instructions:

1. Please verify that your paper contains 4 **pages** including this cover.
2. Write down your Student-Id on the top of each page of this quiz.
3. This exam is **closed book**. No notes or other materials are permitted.
4. Total credits of this midterm are **25 points**.
5. To receive full credits, you must show your work clearly.
6. **No re-grades will be entertained if you use a pencil.**
7. Calculators are **NOT** allowed.

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Q1: [Data Conversion]

9 points

(a)- Convert the following decimal number to binary using divide-by-2 method: (3 points)

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(b)- Convert the following binary number to decimal: (3 points)

1 1 1 0 1 0 1 1

(c)- Convert the following hexadecimal number to binary: (3 points)

A3B

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Q2: [Boolean algebra]

10 points

(a) Prove the following Boolean equation using Boolean algebra: (5 points)

$$xyz' + xy' + xyz + xy + yxy' = x$$

(b) Use algebraic manipulation to convert the following equation to sum-of-product form: (5 points)

$$(a + b)(cd)' + (a + d)'b + (bc)d'$$

Student ID: _____

Q3: [Combinational Logic Design]

6 points

There are three major courses X, Y and Z, and three minor courses A and B and C in a department. A student can graduate if he or she passes:

1- All the major courses from X to Z

or

2- X and Y and two of the minor courses

Write a Boolean equation to represent the graduation condition.

Hint: Use the name of the courses as the variables of your equation. i.e., X,Y, Z, A, B, C. Variable X is 1 if a student passes course X, otherwise 0.