## Quiz 1 CSCI 255 Spring 2001

26 February, 2001
Name: $\qquad$
This is a closed book exam. Use of calculators is also not allowed. Be sure to show your work in order to get full credit for the problem. When possible place your answers in the provided boxes.

Problem 1 (8 points):
Convert the following two numbers from decimal notation into eight-bit twoscomplement notation.

| -25 | 17 |
| :--- | :--- |
|  |  |

Problem 2 (8 points):
Convert the following two numbers from eight-bit twos-complement notation into decimal notation.

| 00010001 | 11111000 |
| :---: | :---: |
|  |  |

Problem 3 (4 points):
Express the following decimal numbers in base 7.


Problem 4 (12 points):
Add the following two pair of eight-bit twos-complement numbers. Which, if any, of the additions results in an overflow?

| 10011110 |  |
| ---: | ---: |
| +10101000 |  |
|  | 11111100 |
|  |  |
|  |  |

Problem 5 (8 points):
Compute the following bit-wise logical operations on four-bit binary numbers.

| NOT (1010) AND 0011 | NOT (1010 OR 0011) |  |  |  |
| :--- | :--- | :--- | :--- | :--- |
|  |  |  |  |  |

Problem 6 (8 points):
Complete the following truth tables for the two given Boolean equations:

| $x$ | $y$ | $(x+y)^{\prime}+y$ |
| :--- | :--- | :--- |
| 0 | 0 |  |
| 0 | 1 |  |
| 1 | 0 |  |
| 1 | 1 |  |
| 0 | $y$ | $\left(x+x^{\prime}\right) y$ |
| 0 | 0 |  |
| 0 | 1 |  |
| 1 | 0 |  |
| 1 | 1 |  |

## Problem 7 (8 points):

Translate the following truth table into a Boolean equation.

| $x$ | $y$ | $z$ | out |
| ---: | ---: | ---: | ---: |
| 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 0 |

Problem 8 (8 points):
Assume Z is a C integer variable. Write a C statement that will set bits 8 and 9 of Z to 1 and clear bits 4 and 5 to 0 .

$$
\mathrm{Z}=
$$

Problem 9 (8 points):
Convert the following 16-bit binary numbers to hexadecimal numbers.

| 1010000001111111 | 0000110010011011 |
| :---: | :---: |

Problem 10 (8 points):
Fill in the truth table on the right to reflect the output of the circuit on the left.


## Problem 11 (20 points):

How have the following five concepts or standards been used in CSCI 255:
ASCII

Combinational circuit

IEEE floating point format

Multiplexer

P-type transistor

