First Midterm Exam (a) MCS 260 Jan Verschelde Friday 26 February 2016

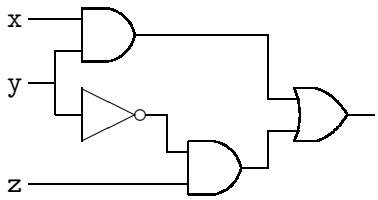
NAME :

The exam is closed book, no notes and no computer.
All your answers to the questions below must be submitted on paper.
Write your name on this sheet and submit it with your answers.
Please do not ask questions during the exam.

1. Convert the decimal number 132 into hexadecimal notation. Show your work.

2. Who was Alan Turing? Explain briefly his contribution to computer science.

3. Consider the circuit:



   Write the logical expression represented by the circuit: _____

4. Consider the list `L = [13, 31, 46, 54, 57, 78, 90]` of sorted numbers.
   Inserting a number `x` into `L` so the list `L` remains sorted requires the finding of the index of the first element in `L` that is larger than or equal to `x`.

   (a) Consider `x = 50` and let `index` denote the current index in the list `L`.
   Initially when we start the search, `index` equals 0.
   The state table of the loop starts as

step	`index`	`L[index]`
0	0	13

   Complete this table, taking one row per step, until `L[index] >= x`.

   (b) Write Python code for the loop to find `index` so `L[index] >= x`.

5. An email address consists of a user name followed by `@`, the name of the company, and then the domain name. For example, the string `email` refers to `"somename@acompany.domain"`. Give the Python commands to extract from `email` the user name and the company name. You may not make any assumptions on the length of the names.

6. What is the kernel of an operating system? What are its main functions?

7. Consider the code below:

```
def area(r, h):
    a = r*h
    return a

(d, L) = (3, 1)
A = area(d/2, L)
```

   Answer the following questions:
   (1) Which variables are global? _____
   (2) Which variables are local? _____
   (3) What is the type of `A`? _____
   (4) Fill the table with values for `r`, `h`, `a`, `d`, `L`, and `A`.

	`r`	`h`	`a`	`d`	`L`	`A`
before the call to `area(d/2, L)`						
during the call, just before `return a`						
after the call to `area(d/2, L)`						