UNIVERSITY OF TORONTO
Faculty of Arts and Science

CSC 108H1Y
Instructor: Daniel Zingaro

Duration — fifty minutes

Examination Aids: None.

Student Number: |___|___|___|___|___|___|___|___|___|___|

Last (Family) Name(s): _____

First (Given) Name(s): _____

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*Do **not** turn this page until you have received the signal to start.*
(In the meantime, please fill out the identification section above,
and read the instructions below *carefully*.)

This examination consists of 4 questions on 8 pages (including this one).

Instructions:

- Check to make sure that you have all 8 pages.

- Read the entire exam before you start.

- Not all questions are of equal value, so budget your time accordingly.

- You do not need to add `import` lines or do error checking

- If you use any space for rough work, indicate clearly what you want marked.

Good Luck!

Question 1.   [5 marks]

Part (a)   [2 marks]

In one or two sentences, and **without using any Python code**, briefly explain a procedure for adding an echo to a digital sound.

Part (b)   [3 marks]

Assume we have a dictionary whose keys are contexts (strings), and whose associated values are length-2 lists whose two elements represent the number of heads and number of tails, respectively, chosen under the context. Consider the following function, which attempts to satisfy its docstring.

```
def store_guess (context, memory, guess):
  '''Store the user's guess in memory, under the current context.
  guess is guaranteed to be t or h.'''

  if memory.has_key (context):
    counters = memory[context]
  else:
    counters = [0, 0]
  if guess == 'h':
    counters[0] += 1
  else:
    counters[1] += 1
```

In one or two sentences, and **without using any Python code**, briefly explain why this function can fail to update `memory` with the new `guess`.

Question 2. [6 MARKS]

Consider the following program.

```
def mystery (L):
  s = ''
  i = L[0]
  while i != -1:
    i = L[i]
    s = s + str (i)
  s = s + str(L[i])
  return s

print mystery ([2, -1, 4, 1, 3])
```

What is the output of this program?

Question 3.   [8 MARKS]

Part (a)   [1 MARK]

Can a dictionary be a key of another dictionary? Please answer only Yes or No.

Part (b)   [1 MARK]

Can a dictionary be a value of another dictionary? Please answer only Yes or No.

Part (c)   [3 MARKS]

Complete the following function according to its docstring description.

```
def min_vals (d1, d2):
  '''d1 and d2 are dictionaries that have exactly the same
  set of keys, and whose values are integers.
  Return a new dictionary that has the same keys as those in d1 or d2,
  and whose values are the smaller of the values associated with
  the key in d1 or d2. For example,
  min_vals ({1:3, 2:5}, {1:2, 2:-4}) returns {1:2, 2:-4}.
  '''
```

Part (d)　[3 marks]

Write a Nose test for the function `min_vals`. Your test should call `min_vals` with two dictionaries that each contain one key and one value. Your test should result in an informative error message should `min_vals` fail the test case. Do **not** `import` any modules, and do **not** write an `if __name__` block.

```
def test_min_vals_one_key ():
```

Question 4.   [6 MARKS]

Complete the following function according to its docstring description.

```
def line_info (f):
  '''Given open file object f, return a tuple whose first component
  is the number of lines in f, and whose second component is the
  total number of characters, not including newlines, in f.
  '''
```

*[Use the space below for rough work. This page will **not** be marked, unless you clearly indicate the part of your work that you want us to mark.]*

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