CS61A Final Review Session Fall 2011

Here are some questions that the TAs have written to help you review for the final. This review sheet covers only some of the topics after the second midterm – be sure to review other course material as well!

Exceptions
What would Python print?

```
def a():
   print("Steven says")
   int("what happens here")
   print("hello")

def b():
   try:
       print(1)
       a()
       print(2)
       return 3
   except ValueError:
       print(4)
       return 5

def c():
   b()
   a()
   return 6
```

```
>>> a()
```

```
>>> b()
```

```
>>> c()
```

Dynamic Scope

```
x = 10
def car(x):
   return van()

def van():
   if x == 10:
       return "honk"
   return "tumble"
```

What would `car(11)` return in lexical scope?

What would `car(11)` return in dynamic scope? Draw an environment diagram.

Concurrency

x = 10

Assume the following 2 lines are run in parallel.

```
>>> x = x + x
>>> x = x * x
```

Correct values of x:

Other possible values of x:

Parsing

Write the function `tokenize_html`. Given a string that includes HTML tags and text between the HTML tags, return a list which consists of HTML tags and the text between the HTML tags. See the doc-string for examples.

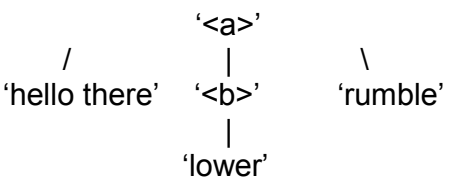
```
def tokenize_html(str):
   """Given a well-formed HTML string, return a list where each element is a token.

   HTML tags are considered elements, and text between tags are elements.

   An HTML tag starts with a < and ends with a >.  Any time a < appears, you
   can assume there is a corresponding >, and another < will not appear before the
   corresponding >.

   For example, you will NOT have to worry about a string like "<html <asdf>>".

   You may assume that the string starts and ends with an HTML tag.

   >>> tokenize_html("<html>hi</html>")
   ['<html>', 'hi', '</html>']
   >>> tokenize_html("<body>hello there    </body>")
   ['<body>', 'hello there    ', '</body>']
   """
```

Interpreters

Given a list returned by a call to `tokenize_html`, turn that list into a Tree structure. For example,

```
['<a>', 'hello there', '<b>', 'lower', '</b>', 'rumble', '</a>']
```

should turn into the tree structure:



The tag <a> corresponds to the closing tag , so the elements between those two tags become children of the Tree whose datum is '<a>'. Relevant Tree code has been included below.

```
class Tree(object):
   def __init__(self, datum, children=[]):
       self.datum = datum
       self.children = children

def print_tree(t, prefix=""):
   print prefix+t.datum
   for child in t.children:
       new_prefix = "  |___";
       for _ in prefix:
           new_prefix = " " + new_prefix
       print_tree(child, new_prefix)

def is_tag(token):
   return token.startswith("<")

def is_end_tag_of(tag, token):
   return token == tag[0] + "/" + tag[1:]

#continued on next page
```

```
def list_to_tree(lst):
```

Iterators

The basic idea behind the Sieve of Eratosthenes that you saw in class was that a number *n* is prime if it is not divisible by any primes less than *n*. Write an iterator that produces prime numbers in order forever.

```
class Primes(object):
```

Streams

Write interleave, a function that takes two streams and returns a stream where the elements of each stream are interleaved.

```
def interleave(s1, s2):
```

Now create a stream of all positive and negative integers. *Hint*: The first element in the stream should be 0.

```
def all_integers_stream():
```