Name : _____

Grading TA: _____

- INTEGRITY: By taking this exam, you pledge that this is your work and you have neither given nor received inappropriate help during the taking of this exam in compliance with the Academic Honor Code of Georgia Tech. Do NOT sign nor take this exam if you do not agree with the honor code.

- DEVICES: If your cell phone, pager, PDA, beeper, iPod, or similar item goes off during the exam, you will lose 10 points on this exam. Turn all such devices off and put them away now. You cannot have them on your desk.

- ACADEMIC MISCONDUCT: Academic misconduct will not be tolerated. You are to uphold the honor and integrity bestowed upon you by the Georgia Institute of Technology.

    - Keep your eyes on your own paper.

    - Do your best to prevent anyone else from seeing your work.

    - Do NOT communicate with anyone other than a proctor for ANY reason in ANY language in ANY manner.

    - Do NOT share ANYTHING during the exam. (This includes no sharing of pencils, paper, erasers).

    - Follow directions given by the proctor(s).

    - Stop all writing when told to stop. Failure to stop writing on this exam when told to do so will result in a substantial grade penalty.

    - Do not use notes, books, calculators, etc during the exam.

- TIME: Don't get bogged down by any one question. If you get stuck, move on to the next problem and come back once you have completed all of the other problems. This exam has 7 questions on 6 pages including the title page. Please check to make sure all pages are included. You will have 50 minutes to complete this exam.

I commit to uphold the ideals of honor and integrity by refusing to betray the trust bestowed upon me as a member of the Georgia Tech community. I have also read and understand the requirements outlined above.

Signature: _____

Question	Points	Score
1. Vocabulary	9	
2. Fill a Dictionary	3	
3. Functional: Count Threes	4	
4. Multiple Choice	7	
5. Regular Expressions	9	
6. Get Users	12	
7. Draw Tree	8	
Total:	52	

1. *(9 points)*

    For each of the following vocabulary terms, write a concise 1-2 sentence definition. Be brief, and to the point.

    (a) [3 pts] lambda

    (b) [3 pts] keyword

    (c) [3 pts] delimiter

2. *(3 points)*

    Examine the code below. Write the contents of the dictionary after the code runs. You may either list a table of key/value pairs, or write what would be printed to the screen if you executed `print(myD)` at the python prompt.

```
myD = {}

for i in range(5):
    myD[i] = i*20
```

3. *(4 points)*

   Entirely re-write the following function using functional programing instead of iteration. You may **not** use iteration (for/while loops) or recursion. The function counts the number of three's in a list and returns the count.

```
def countThrees( aList ):
  counter = 0
  for item in aList:
    if item == 3:
        counter = counter + 1
  return counter
```

4. *(7 points)*

   For each of the following multiple choice questions, indicate the single most correct answer! Indicate your selected answer by circling it.

   (a) [1 pt] Which of the following ways will correctly place attributes in an XML Element? You may assume etree is the correct import.

         A. `myDict = {"key1": "value1"}`
            `element = etree.Element("tag", myDict)`

         B. `element = etree.Element("tag", key1="value1", key2="value2")`

         C. `element = etree.Element("tag")`
            `element.get("key1", "value1")`

         D. `element = etree.Element("tag")`
            `element.set(value1 = "key1")`

   (b) [1 pt] Which of the following statements is correct of proper XML?

         A. A particular XML tree may posess only one root.

         B. An element may have only one child.

         C. Every element must have an opening and closing tag.

         D. An element may not have an attribute named 'text'.

   (c) [1 pt] Every element in an XML tree has at least one parent.
       A. True   B. False

(d) [1 pt] Given the following line of XML, what is the correct term for "mystery1"?

```
<mystery1 mystery2="mystery3">mystery4</mystery1>
```

      A. Tag

      B. Attribute

      C. Text

      D. Element

(e) [1 pt] Which of the following is the return type of a PyMySQL cursor object's execute method?

    A. `None`   B. `int`   C. `float`   D. `<pymysql.cursors.Cursor object>`

(f) [1 pt] Which of the following python expressions is invalid? Assume that all named variables exist, refer to data of the type implied by their name, and all indexed subelements exist.

      A. `aList[2] = aList[4]+aList[5]`

      B. `dictionary1.append(23)`

      C. `tupleA = tupleA+(3,)`

      D. `aNum = 24+ord('a')`

      E. All statements above are valid.

(g) [1 pt] Given the following code:

```
request = urllib.request.urlopen("http://www.google.com"):
```

      A. `print( request )` will output the HTML

      B. `print( html(request) )` will output the HTML

      C. `print( request.read() )` will output the HTML

      D. `print( str(request) )` will output the HTML

5. *(9 points)*

(a) [3 pts] Write a regular expression that will match undergraduate class labels. A class label has between 2 and 4 capital letters, followed by a space, followed by a 4 digit number. The four digit number must begin with a 1,2,3 or 4 only!

(b) [3 pts] Write a regular expression that will match any product code from the ACME Widget Corp. An ACME Widget Corp product code follows one of the following two formats: AAAA-DDDD or DD-DDDD (where A represents an upper or lowercase letter, and D represents a digit.)

(c) [3 pts] Write a regular expression that will atch dollar amounts inside of square brackets, such as: `[$42]` or `[$234321]` Match the entire pattern, including brackets. The dollar amount will have one or more digits, but will not have periods or commas.

6. *(12 points)*

   A BrokerageTransaction table has been created with the following command:

   ```
   CREATE TABLE BrokerageTransaction (
   TransactionID INTEGER NOT NULL AUTO_INCREMENT,
   User  TEXT, Type TEXT, Stock TEXT, Quantity INTEGER);
   ```

   Each record in this table represents a stock transaction by a particular User. You have been asked to generate a report in CSV format that has each User listed once, with the total number of GT stocks they have ever purchased (Stock = "GT" and Type="Buy"). Please order the CSV file output alphabetically by username. Note that users may have made multiple transactions. For example, if the User "Bob" had bought 3 GT stocks in one transaction, sold 1 GT stock, purchased one UGA stock, and then purchased 2 GT stocks in another transaction, his line in the CSV output file would look like:

   ```
   Bob, 5
   ```

   (Showing the total number of GT stock purchased, not the current holding of GT stock.)

   Write a function named **exportGTTotals** that opens a connection to the academic-mysql.cc.gatech.edu database using the "cs2316db" database and the "cs2316" username with "SECRET" as the password. It should download the data and write the output to a CSV file named "GTExport.csv".

7. *(8 points)*

Draw the object tree hierarchy that is encoded by the following textual XML:

```
<?xml version="1.0" encoding="UTF-8">
<game>
 <inning num="8">
  <atbat pitcher="Zach Duke" type="S">Strike</atbat>
  <atbat pitcher="David Carpenter" type="FF">Ball</atbat>
 </inning>
</game>
```

Draw each element indivdually as a circle that contains the tag name, attribute key/value pairs on separate lines, and any text, in that order. Draw a line betwen each parent and (direct) child element, with an arrow head pointing towards the child element.