Name : _____

Grading TA: _____

- 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 is academic misconduct.
  – 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 7 pages including the title page. Please check to make sure all pages are included. You will have 50 minutes to complete this exam.

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. I have also read and understand the requirements outlined above. Do NOT sign nor take this exam if you do not agree with the honor code.

Signature: _____

Question	Points	Score
1. Vocabulary	9	
2. Sort Process	6	
3. OnlyAs	10	
4. Read Functionals	6	
5. Picture Mystery	4	
6. ColorBlock	15	
7. Top Student	20	
Total:	70	

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] clone

    (b) [3 pts] file

    (c) [3 pts] proprioception

2. *(6 points)*

    For each kind of sort named in the table below, choose the correct process when sorting the list [3,1,4,2]. Write the letter associated with the correct process in the table. (Only 3 of the available choices will be used.) Also, write the Big O time Complexity class of each sort in the table.

Sort	Process	Big O Complexity
Merge Sort		
Bubble Sort		
Insertion Sort		

```
A. [3] ---> [1,3] ---> [1,3,4] ---> [1,2,3,4]
B. [3,1,4,2] ---> [3,1,2,4] ---> [1,3,2,4] ---> [1,2,3,4]
C. [3,1,4,2] ---> [1,3,4,2] ---> [1,3,2,4] ---> [1,2,3,4]
D. [3,1,4,2] ---> [3,1][4,2] ---> [3][1][4][2] ---> [1,3][2,4] --->
        [1,2,3,4]
E. [3,1,4,2] ---> [1,3,4,2] ---> [1,3,4,2] ---> [1,3,2,4] --->
        [1,3,2,4] ---> [1,2,3,4] ---> [1,2,3,4]
```

3. *(10 points)*

   The function below accepts a file name (as a string) and writes every line in that file that begins with a capital letter A to a new file named newFile.txt.

   Fill in the blanks appropriately:

```
def onlyAs(filename):
    inF  = _____   ( _____ , _____ )
    outF = _____    ( _____ , _____ )

    lines = inF._____
    for line in lines:
        if _____:
            outF._____

    inF.close()
    outF.close()
```

4. *(6 points)*

   For each of the following lines, write what it would return when evaluated:

   (a) [2 pts] `map( lambda x: x*2, (1,2,3,4) )`

   (b) [2 pts] `filter( lambda x: x%3 == 1, range(5) )`

   (c) [2 pts] `reduce( lambda x,y: x**y, range(5) )`

5. *(4 points)*

What will this function do to the picture that is passed into it?

```
def mysteryFunc(pic):
   for pixel in getPixels(pic):
       average = (getRed(pixel) + getGreen(pixel) + getBlue(pixel)) / 3
       setRed(pixel, average)
       setGreen(pixel, average)
       setBlue(pixel, average)
```

6. *(15 points)*

    Write a function named `colorBlock` that accepts a picture as a parameter. Conceptually, divide the picture into three columns of almost equal size. (being off by 1 or 2 pixels is OK if the width of the picture is not an even multiple of 3...)

    Set the red value of all pixels in the first column to 255. Set the green value of all pixels in the middle column to 255. Set the blue value of all the pixels in the last column to 255.

    Your method should return None.
    Some functions that might be helpful for this question:

    - `getPixels(picture)`
    - `getPixel(picture, x, y)`
    - `getWidth(picture)`
    - `getHeight(picture)`
    - `getX(pixel)`
    - `getY(pixel)`
    - `getRed(pixel)`
    - `setRed(pixel,value)`

7. *(20 points)*

   Write a function named `topStudent` that accepts the name of a file to open as a string parameter. The file contains a list of student names and their course grade (as a percentage between 0 and 100, which will always be an integer value) in physics I at Georgia Tech. The topStudent function should return the name of the person with the highest course grade. If more than one students have the same highest grade, you may return the name of any student who shares the same high grade. The list of students is unsorted. Each student name is listed on one line with his/her associated average separated by a comma. Example file contents below:

   ```
   Sally Smith, 44
   Albert Johnston, 20
   David Jones, 55
   Sam Walker, 12
   Ashley Garcia, 34
   Tara Hayes, 60
   ```