

Instructions:

- Please write clearly. What I cannot read, I will not grade.
- Show all your work in detail. I give partial credit.
- This exam has 6 pages including the title page. Please check to make sure all pages are included.
- This exam is closed book, closed notes, no calculators.
- Don't get bogged down on any one question. 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.

Signature: _____

| Question | Points | Score |
|-------------------------|--------|-------|
| 1. Vocabulary | 12 | |
| 2. Searching | 8 | |
| 3. Map, Filter & Reduce | 6 | |
| 4. Mystery Code | 4 | |
| 5. CountBright | 8 | |
| 6. BigNumbersOnly | 12 | |
| Total: | 50 | |

1. For each of the following vocabulary terms, write a concise 1-2 sentence definition. Be brief, and to the point.
 - (a) (3 points) aliases

 - (b) (3 points) compound data type

 - (c) (3 points) exception

 - (d) (3 points) global variable

2. (a) (2 points) Here is a sequence of numbers: 1, 2, 3, 6, 8, 13, 15
If you were to perform a linear search on the above sequence, looking for the number '8', in what order does the computer search through the items in the sequence? Write them below.

- (b) (2 points) If you were to perform a binary search on the original sequence for the number 8, in what order does the computer search through the items in the sequence? Write each item that is examined in the order that it is examined below.

- (c) (2 points) What advantage does the binary search give us?

- (d) (2 points) Why might we use a linear search instead of a binary search?

Code Understanding

3. (6 points) After the following code runs, what would be the contents of varB, varC, and varD?

```
a = ['a', 'bb', 'ccc', 'dddd', 'eeee' ]

varB = map( lambda x: len(x), a )
varC = filter( lambda x: x%2 == 0, varB)
varD = reduce( lambda x,y: str(x) + str(y), varC)
```

varB = _____

varC = _____

varD = _____

4. (4 points) Examine the following code:

```
def mystery( aParameter):
    try:
        aParameter = int(aParameter)
        result = aParameter ** 2
    except:
        result = None
        print "Sorry, aParameter is invalid!"
    return result
```

a) What does this mystery function try to do?

b) Briefly explain why the try/except block is needed:

c) Give a sample function call to the mystery function which would return None:

```
>>>
```

d) Give a sample function call to the mystery function with a valid input that does not trigger the try/catch. Indicate what the expected return value is.

```
>>>
```

Code Writing Questions

5. (8 points) Write a function named `countBright` that accepts a picture as a parameter. It should *return* the number of pixels in the picture where the pixel's Red, Green, and Blue values sum to 500 or more. For example, if a pixel has (200,100,200) for its color values, it should be counted because (200+100+200) is 500. A pixel with values of (0,255,0) should NOT be counted, because (0 + 255 + 0) is less than 500.

Some functions that might be helpful for this question:

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

6. (12 points) Write a function named `bigNumbersOnly` that accepts the name of a file to open as a string parameter. The function should open the file, which will be formatted as follows (one number per line):

```
54
4.0
23.3
765.2
54
876.8
34
238
45
50
```

Your function must read in the file and return a *list* of all the numbers greater than 50 (numbers should be stored as floats). Remember to close your file after you are finished reading it. If you find duplicate numbers greater than 50, DO NOT include duplicates in the list!

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