

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 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 8 questions on 9 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. Expressions | 16 | |
| 3. Multiple Choice | 7 | |
| 4. Print v. Return | 4 | |
| 5. Superb Owl | 5 | |
| 6. NumTester | 3 | |
| 7. Body Mass Index | 9 | |
| 8. findChar | 9 | |
| Total: | 62 | |

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] increment

Solution: increment - The process of increasing a variable, typically by one.
 $aVar = aVar + 1$

(b) [3 pts] str (string)

Solution: In python, an immutable compound data type (specifically, a sequence) made up of characters. Strings in python can be enclosed in single or double quotes.

(c) [3 pts] syntax error

Solution: An error in a program that makes it impossible to parse – and therefore impossible to interpret.

2. (16 points)

Pretend you are the python interpreter. Evaluate each of the expressions below. Write down the value that they evaluate to, and the type of that value in the provided columns. If the expression is not valid python syntax, or will throw an exception, simply write "Error". The first line has been provided as an example.

| Expression | Value of Result | Type of Result |
|---|-----------------|----------------|
| <code>1 + 2 * 3</code> | 7 | int |
| <code>"hello" * 2</code> | | |
| <code>int(4.2) + 0.3</code> | | |
| <code>(7.0 + 3.1) - 5*3</code> | | |
| <code>1//3.0</code> | | |
| <code>False or (3.0+0.0 == 3)</code> | | |
| <code>range(10,2,-2) == [10, 8 , 6, 4, 2]</code> | | |
| <code>"I have {:.3f} beans.".format(56.823866)</code> | | |
| <code>int(5.9)**2+1</code> | | |

Solution:

| Expression | Value of Result | Type of Result |
|---|------------------------|----------------|
| <code>1 + 2 * 3</code> | 7 | int |
| <code>"hello" * 2</code> | "hellohello" | str |
| <code>int(4.2) + 0.3</code> | 4.3 | float |
| <code>(7.0 + 3.1) - 5*3</code> | -4.9 | float |
| <code>1//3.0</code> | 0.0 | float |
| <code>False or (3.0+0.0 == 3)</code> | True | Boolean |
| <code>range(10,2,-2) == [10, 8 , 6, 4, 2]</code> | False | Boolean |
| <code>"I have {:.3f} beans.".format(56.823866)</code> | "I have 56.824 beans." | str |
| <code>int(5.9)**2+1</code> | 26 | int |

Grading: +1 point for each correct answer.

3. (7 points)

For each of the following multiple choice questions, indicate the best answer by circling it.

(a) [1 pt] Examine the following code:

```
def countBy2(aNum):
    counter = 0
    for i in range(aNum):
        counter = counter + 2
    return counter

return counter
```

```
myNum = countBy2(4)
```

After the above code is executed, what does the `myNum` variable refer to?

A. 0 **B. 2** C. 4 D. 8 E. ERROR OCCURS

(b) [1 pt] What numbers will the following code print once executed?

```
def foo(n):
    for i in range(n):
        print(str(i))
    return print(n)
    print(n+1)
```

`foo(3)`

A. 1, 2, 3 B. 0, 1, 2 **C. 0, 1, 2, 3** D. 3 E. ERROR OCCURS

(c) [1 pt] Convert 110110_2 to decimal (base 10):

A. 29 B. 52 C. 53 **D. 54** E. 118

(d) [1 pt] Convert 129_{10} to binary (base 2):

A. 01000011 B. 10000011 C. 01000111 D. 11001101 **E. 10000001**
F. 01010101

(e) [1 pt] FORTRAN is known as the first:

- A. calculator
- B. successful high level programming language**
- C. computer game
- D. commercially available dynamic memory chip
- E. personal computer

(f) [1 pt] Who is widely recognized as the first programmer?

A. Grace Hopper B. Charles Babbage C. Alan Turing **D. Ada Lovelace**
E. Douglas Englbart

(g) [1 pt] What is the final value of `x` after running this recursive code?

```
def recursion(s):
    if s == "":
        return s
    else:
        return recursion(s[1:]) + s[0]
x = recursion("hello")
```

- A. "olleh"**
- B. "hello"
- C. "ol"
- D. Program generates an error
- E. None of the above.

4. (4 points)

Pretend you are the Python interpreter and the following code has been entered and executed. Write down exactly what would be printed beside the code!

```
def isEven(n):
    if n % 2 == 0:
        print("It's even")
        return True
    else:
        print(False)
```

```
a = isEven(2)
b = isEven(3)
print(b)
print(a)
```

Solution:

```
It's even
False
None
True
```

Grading:

```
+1 for each correct line.
-1 for each extra/incorrect item.
-1 if they put quotes around anything
```

5. (5 points)

Pretend you are the python interpreter and the following code is executed. Write what the code prints next to the code.

```
def superbOwl(wins):
    if wins >= 6:
        print("Your team is Steelers")
    elif wins == 4:
        print("Your team is Patriots or Packers")
    elif wins == 0:
```

```
        print("Your team is either Lions or Jaguars")
upto10 = 10 - wins
print("Your team needs {} more wins to reach 10 wins".format(upto10))
if wins % 2 == 0:
    print("Even number")
if wins / 2 == 3:
    return None
elif wins // 2 == 2:
    print(wins)
else:
    print("Great job")
print("Superbowl is awesome")
return wins

result = superbOwl(6)
```

When the code is finished, what value does the **result** variable refer to?

Solution: Printed to screen (vertically):

Your team is Steelers

Your team needs 4 more wins to reach 10 wins

Even number

Grading: +4 points for getting the printout 100% correct.

-1 for each incorrect line or line in incorrect order.

-1 if not printed vertically.

Result = None (+1 point for correct answer)

6. (3 points)

What is printed when the following code is executed? Write down exactly what is printed beside the code:

```
def numTester():
    for number in range(2, 6):
        newNumber = number + 2
        if (newNumber < 6):
            print(newNumber)
        elif (newNumber < 10):
            print(newNumber * 2)
            return "That's a lot of numbers!"
        else:
            print(newNumber - 5)

numTester()
```

Solution:

4
5
12

Grading: +1 point for each correct line. -1 if not vertical. -1 for each extraneous line.

7. (9 points)

Write a function named `bodyMassIndex`. Prompt the user to enter their weight in kilograms and height in meters. Make sure to use a descriptive prompt for each value. You may assume that the user will enter valid floating point numbers (e.g. 44.8). Your function should calculate the Body Mass Index of that person using the following formula: $BMI = Weight/Height^2$

Then print the result. The result should be formatted to one significant digit after the decimal point. For example, your function should print something like: "Your BMI is 18.5".

Example run:

```
>>> bodyMassIndex()
Please enter your weight in kg: 79.3
Please enter your height in meters: 1.82
Your BMI is 23.9
>>>
```

Solution:

```
def bodyMassIndex():
    weightStr = input(Please enter your weight in kilograms: )
    heightStr = input(Please inters your height in meters: )
    weight = float(weightStr)
    height = float(heightStr)
    bmi = weight/(height*height) #or weight / (height**2)
    print( "Your BMI is {0:.1f}".format( bmi) )
```

Grading: 1 point for a correct header.

1 point for getting weight

1 point for getting height

2 points for correctly converting weight/height to float

2 points for correct math.

2 points for correct output formatting.

8. (9 points)

Write a function named **findChar** which takes one character as a parameter. The function should prompt the user to enter a sentence. The function should then print a statement exactly as follows: "There are **n** occurrences of **c**.", where n is the number of occurrences in the sentence the user entered and c is the character. You may assume the argument will always be a single character.

Example Test Case:

```
>>>findChar('o')
Please enter a sentence: I love Python.
There are 2 occurrences of o.
>>>
```

Solution:

Sample solutions:

```
def findChar(char):
    print(There are {} occurrences of {}".format(input('Please enter a sentence').co

def findChar(char):
    userString = input("Please enter a sentence")
    count = 0
    for i in userString:
        if char == i:
            count = count + 1
    print("There are {} occurrences of {}".format(count, char))
```

Grading:

- 1 point for correct header
- 1 point for getting input from the user
- 2 points for looping through the letters of the input string
- 2 points for correct conditional to detect the letter
- 1 point for counting number of occurrences correctly
- or– 6 points for a correct usage of count method
- 2 points for printing out the string in the correct format