

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 10 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	26	
3. Iffy Letters	4	
4. Three Foos	6	
5. Same Behavior	4	
6. Print vs. Return	5	
7. Body Mass Index	9	
8. Square	10	
Total:	73	

## 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] conditional statement

**Solution:** A statement that controls the flow of execution depending on some condition. In Python the keywords `if`, `elif`, and `else` are used for conditional statements.

(b) [3 pts] function

**Solution:** A named sequence (block) of statements that performs some useful operation. Functions may or may not take parameters and may or may not produce a result.

(c) [3 pts] proprioception

**Solution:** Sensors that detect internal state. On your scribbler, `getName`, `time` and `battery voltage` are examples of internal sensors. For you, proprioception allows you to know the relative position of parts of your body, which allows you to do things like touch your nose with your eyes closed.

## 2. (26 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	Result	Type
6+5.5	11.5	float
12+3		
"3*5"		
3+4==2		
True and (3 < 2)		
(4+6) / 5.0		
int(4.5) / 2		
print "%.2f percent" % 6.312		
True or (4==3)		
"End" + "Program"		
"Hello" * 3		
(6-3)**2-4		
2+6/3.0		
3%2		

<b>Solution:</b>	<b>Expression</b>	<b>Result</b>	<b>Type</b>
	6+5.5	11.5	float
	12+3	15	int
	"3*5"	3*5	str
	3+4==2	False	bool
	True and (3 < 2)	False	bool
	(4+6) / 5.0	2.0	float
	int(4.5) / 2	2	int
	print "%.2f percent" % 6.312	6.31 percent	str
	True or (4==3)	True	bool
	"End" + "Program"	EndProgram	str
	"Hello" * 3	HelloHelloHello	str
	(6-3)**2-4	5	int
	2+6/3.0	4.0	float
3%2	1	int	
Grading: +1 point for each correct answer.			

## 3. (4 points)

What does the python interpreter print when the following code is executed?

```
def mathFunc(x):
    if x%2 == 1:
        print "a"
    else:
        print "b"
    if x/2 <= 5.0:
        print "c"
    if x*1.5 <= 25:
        print "d"
    elif x*1.5 <= 20:
        print "e"
    if x%4 > 2.0:
        print "f"
    elif x%4 >= 2:
        print "g"
    elif x%4 > 1:
        print "h"
```

mathFunc(10)

**Solution:** b c d g

+1 point for each correct letter. -1 point for each incorrect letter.  
-1 point if they don't draw them vertically.

4. (6 points)

Given the following functions, write what they print to the screen when they are executed. If the function produces an error, write ERROR and draw an arrow to the line that caused the error.

```
(a) def foo1(a,b,c):
    b=a++
    if b>a:
        print (True)
    else:
        return b<a
foo1(1,2,3)
```

**Solution:**

ERROR - Line 1 (a++)

Grading: 1 point for Error, 1 point for knowing where.

```
(b) def foo2(a,b,c):
    if b>c:
        if c>0:
            print ("Yes!")
        elif b>0:
            b=c-b
        elif a<0:
            print ("Uhm")
        if b!=c:
            print (b)
        else:
            print ("No.")
    else:
        print ("Finish!")
foo2(-1,8,3)
```

**Solution:**

Yes!

8

Grading: 1 point for each correct line, -1 point for incorrect lines.

```
(c) def foo3(a,b):
    if b==0:
        return a
    else:
        return foo3(b,a%b)
print (foo3(10,6))
```

**Solution:**

2

Grading: 2 points for the correct number (2)

5. (4 points)

Which two functions will have the same output when executed with the same input? You may assume that the n parameter will always be an integer.

1. 

```
def countUp(n):  
    for i in range(n):  
        print i+1
```
2. 

```
def countUp(n):  
    i=1;  
    while i<n:  
        print i  
        i = i+1
```
3. 

```
def countUp(n):  
    i=0  
    while i<n:  
        print i+1
```
4. 

```
def countUp(n):  
    i=0;  
    while i<n :  
        i = i+1  
        print i
```

Functions \_\_\_\_\_ and \_\_\_\_\_ have the same behavior when called with the same input.

**Solution:** Functions 1 and 4 are the correct answers.  
Grading: 4 points if they chose the correct two functions. Else zero.

6. (5 points)

Complete each statement below by filling in the blank with the appropriate letter from these options:

- A. return
- B. print
- C. both print and return
- D. neither print nor return

1. \_\_\_\_\_ can be used while defining the code for a function.
2. \_\_\_\_\_ can be used outside a function definition.
3. \_\_\_\_\_ can be used to terminate execution inside a function.
4. \_\_\_\_\_ will always show the result on screen.

5. \_\_\_\_\_ can assure you an A in CS 1301.

**Solution:** Grading: +1 for each correct answer.

C

B

A

B

D

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 = raw_input(Please enter your weight in kilograms: )
    heightStr = raw_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 %.1f’’ % 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. (10 points)

Write a function named `square`. This function will cause your robot to move in a square. The function will accept one integer parameter, representing the length of one side of the square in inches.

You may assume that your robot moves one inch per second (forward or backwards), and turns 360 degrees in a time of 2 seconds (when traveling at full speed). When the function finishes running, it should beep in celebration and return the total distance travelled by the robot, in inches (excluding turns, as the robot does not “travel” while rotating).

You may assume that `from myro import *` has already been executed, and that the correct `init(...)` call has already been made, so your robot is ready to execute myro robot movement functions.

**Solution:**

```
def square( numInches):  
    for i in range(4):  
        forward(1,numInches)  
        turnLeft(1,0.5)    #Turn 90 degrees!  
    beep(1,800)  
    return 4*numInches
```

Grading: 2 points for a correct header with parameter

2 points for iterating 4 times (for, while, recursion, or just repeating the code!)

2 points for traveling one/each side length correctly.

(-1 if they get it right once but mess up the others)

2 points for turning one/each 90 degree corner exactly 90 degrees

(0.5 seconds at full speed)

(-1 if they get it right once but mess up the others)

1 point for a beep at the end.

1 point for returning the correct answer.

This page intentionally left blank. You may use it for scratch paper. If you place an answer on this page, box it, indicate which problem it is for by number, and BE SURE TO WRITE “Answer on last page” at the problem location!