NAME: _____ RPI ID _____

CS1010 Introduction to Computer Programming Fall 2019 Exam 2 (Make-up)

Please read the following pledge, then sign and print your name on the spaces provided, certifying the statement:
On my honor as a Rensselaer Polytechnic Institute student, I have abided by academic integrity standards on this exam, which means that I will not give or take answers from anyone.

_____

Your Signature and Date

_____

Your PRINTED name

Rules: There are ***5 questions*** in all to be completed in ***1 hour 30 minutes***.

1. Work entirely alone. Do not give or solicit assistance from any other student. Academic dishonesty will not be tolerated.
2. Sit in your assigned seat.
3. Turn off cell phones and smart phones.
4. The exam allows use of hand written notes (1 page A4 size) for reference.
5. Feel free to use the restrooms as necessary. Just leave all your materials at your seat.
6. If you have a question, bring it down to the front so as to minimize disruption.

Question 1_____

Question 2_____

Question 3_____

Question 4_____

Question 5_____

Question 6_____

Total (From 100 points): _____

Question 1. What is the output of the following code? There is no error in this code. **(25 points: 5 points each)**

	Code	Output

1	x=40
	while x in range(40,50):
	  if x%2==0:
	  print(x, end=' ')
	  x+=1	

2	L = [["A", [1,2,3]],["B", [4,5,6]],["C", [7,8,9]]]
	ctr = -1
	while True:
	  ctr += 1
	  if L[ctr][0] == "a":
	  break
	  elif L[ctr][0] == 'B':
	  continue
	  for val in L[ctr][1]:
	  print(val, end="|")
	  if L[ctr][0] == "C":
	  break
	  print("Loop")	

3	rows=6
	for i in range (0, rows):
	  for j in range(0, i + 1):
	  print("*", end=' ')
	  print("\n")	

4	a = 0
	while a < 5:
	  b=0
	  while b<5:
	  print('*', end='')
	  b+=1
	  print()
	  a+= 1	

5	l1=[1,2,3,4]
	l2=[-2,3,1,0]
	l3=[]
	i=0
	while i<len(l1):
	  y=l1[i]+l2[i]
	  l3.append(y)
	  i+=1
	print(l3)	

Page intentionally left blank for scratch work

Question 2. [**20 points: 10 points each**]

Given a list of whale population at 5 different sites on earth. Each tuple corresponds to three measurements each taken at a gap of 4 months in a year.

Whale_population = [(896,810,821),(911,899,880),(700,709,718),(850,829,828),(789,756,800)]

a) Using the list given above, write code to find the maximum average population from the given data and output this value. The value must be rounded to 2 decimal places.

b) Write code to output the site that has the maximum average population. Sites can be called site 1, site 2, site 3 , site 4 and site 5(in that order in the given list). You may use the code from the previous part. If site 2 has the maximum average population, then the output should be printed like this:
Maximum average population is at site 2.
If site 4 has the maximum average population, then the output should be printed like this:
Maximum average population is at site 4.

Question 3. Explain what each line of code does in not more than 1 line. (**10 points: 2 points each**)

a. im = Image.open(filename)
   im.crop((0, 0, 600, 600))

b. tup1=('a','b','a')
   tup1.count('a')

c. im = Image.open(filename)
   im.size

d. im.convert('L')

e. Newobj=[1,2,3]

Question 4. **List Operations:** (**20 points: 4 points each**)
Given two lists (Students and New) each with student related information as shown:
Students= [['Daniel',3.51,
['MATH','STAT','PHYS'],'NY'],['Ryan',3.18,['MATH','STAT','CSCI'],'PA']]
New=['Sean',3.77,['CSCI','MATH','CALC'],'DE']
To answer the following questions, write code in the 'Code' column on the right. Your code can be one or more lines (There is NO restriction to the number of lines of code).

	Questions	Code
1	Modify the Students list such that all information in 'New' is also included in 'Students' and we get the following output when we print(Students): **[['Daniel', 3.51, ['MATH', 'STAT', 'PHYS'], 'NY'], ['Ryan', 3.18, ['MATH', 'STAT', 'CSCI'], 'PA'], ['Sean', 3.77, ['CSCI', 'MATH', 'CALC'], 'DE']]**	
2	Update Students List (This is the new list after the update in part 1) such that 'Ryan' has the course **'DATA'** instead of **'STAT'**	
3	You are given another list: **zip_new=[12180,19104,19716]** Each has a zip code for the students in the Students list. Order of both the lists match i.e. zip 12180 is for Daniel and so on. Write code to add this zip to each students' info. **Required output:** **[['Daniel', 3.51, ['MATH', 'STAT', 'PHYS'], 'NY', 12180], ['Ryan', 3.18, ['MATH', 'DATA', 'CSCI'], 'PA', 19104], ['Sean', 3.77, ['CSCI', 'MATH', 'CALC'], 'DE', 19716]]**	

4	Print the following from the updated list: **Daniel has GPA = 3.51** **Ryan has GPA = 3.18** **Sean has GPA = 3.77**	
5	Consider a user provided input which is saved in a variable called name as shown: **name=input('Enter the name of the student').strip()** Assuming that the user inputs one of the valid names in the Students' list (from part 3 above). Write code to output the following (assuming Daniel was the name entered by user): **Daniel is taking the following courses:** **['MATH', 'STAT', 'PHYS']** OR if Ryan was entered by the user, output will be: **Ryan is taking the following courses:** **['MATH', 'DATA', 'CSCI']**	

Question 5 (25 points)

a. Write a function called **has_33(word)**. This function should take a string as an input and return a True if the word contains three consecutive pairs of double letters and False otherwise. **(13 points)**

Test Cases:

print(has_33('faahcnffc')) : False
print(has_33('aaggxx')): True
print(has_33('vvett')) : False
print(has_33('zaddnnhhfnt')): True
print(has_33('aabbhddeg')): False

b. You are given a ratings list for restaurants where the first element in each sub-list is the name of a restaurant and the second element is its cuisine/category. The numbers are the ratings given by customers:

restaurants = [['Acme', 'Italian', 2, 4, 3, 5],['Flintstone', 'Steak', 5, 2, 4, 3, 3, 4], ['BellaTroy' , 'Italian', 1, 4], ['Shalimar', 'Indian', 2, 4, 3, 5], ['Olive garden','Italian',5,4,2,3,3]]

Write a program that outputs the name/names of restaurants that have their category as '**Italian**' and the number of ratings is 3 or more. (**12 points**)
Expected output:
Acme
Olive garden