NAME: _____ RPI ID _____

CS1010 Introduction to Computer Programming Spring 2019 Exam 1

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 50 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 (2 pages 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_____

Total (From 100 points): _____

Question 1. Write in the appropriate expression, term or phrase (**One or two words only**). [2 points each]

1. What is an electronic device for storing and processing data, typically in binary form, according to instructions given to it in a variable program, called? Computer
2. What component of your computer executes the code? CPU
3. What component of a computer 'tells' the computer what to do? Software
4. Program written in a high level language is called? Source Code
5. What core things do Python Programs manipulate? Objects
6. What object type in Python describes Whole Numbers? Int or Integers
7. What sign is used for variable assignment in Python? '='
8. What object types take only True or False values in Python? Boolean
9. A special constant used to denote a null value or a void is called None
10. What built-in function in Python reads in user provided values? Input()

Q2. **Python as Calculator:** Create a simple calculator which can perform basic arithmetic operations like addition, subtraction, multiplication or division depending upon the user input. (**30 points**)

Write the Python code for this problem only (algorithm is not required) such that the program does the following:

a. Asks the user: The formatting must be same as shown. The Program must also take care of any invalid user input i.e. apart from 1,2,3,4.

```
Please select operation -

1. Add

2. Subtract

3. Multiply

4. Divide

Select operations from 1, 2, 3, 4 :
```

b. Once the user provides the answer, the program must ask

```
Enter first number :

Enter second number :
```

b. Print the result with the message that clearly states what operation (addition, subtraction etc.) was done on what two numbers (user provided).

Solution:

```
# Python program for simple calculator

# Function to add two numbers
def add(num1, num2):
    return num1 + num2

# Function to subtract two numbers
def subtract(num1, num2):
    return num1 - num2

# Function to multiply two numbers
def multiply(num1, num2):
    return num1 * num2

# Function to divide two numbers
def divide(num1, num2):
    return num1 / num2

print("Please select operation -\n" \
        "1. Add\n" \
        "2. Subtract\n" \
        "3. Multiply\n" \
        "4. Divide\n")
```

```
# Take input from the user
select = input("Select operations from 1, 2, 3, 4 :")

number_1 = int(input("Enter first number: "))
number_2 = int(input("Enter second number: "))

if select == '1':
    print(number_1, "+", number_2, "=",
                    add(number_1, number_2))

elif select == '2':
    print(number_1, "-", number_2, "=",
                    subtract(number_1, number_2))

elif select == '3':
    print(number_1, "*", number_2, "=",
                    multiply(number_1, number_2))

elif select == '4':
    print(number_1, "/", number_2, "=",
                    divide(number_1, number_2))
else:
    print("Invalid input")
```

Q3. What will be the Boolean output of the following operations (10 points)

a. 5>0 True
b. 6!=6 False
c. (not(x < 13 and y >= 5))==(x >= 13 or y < 5) True
d. x = True, y = True then what is the outcome of (x and False == False) True
e. not(a<=20 or b!=0) == (a<=20 or b!=0) False

Q4. What is wrong with the following code. Assume each of the following is a separate program. Find the first error in the code that prevents it from generating output. If there is an error describe it in the solutions box on the right. If there is no error simply write NO ERROR. (20 points: 5 points for each part)

Code	Solution
import math def f1(x,y,z): p=x*y*z p=math.sqrt(p) return p print("square root is",f1(3,3,3,3))	The number of arguments used to call the function f1 is 4. It should be 3.

def sorta_sum(a, b):
sum = a + b
if sum >= 10 and sum <= 19:
return 20
return sum
	NO ERROR

def isequal(a,b) return (a ==b)	Colon missing

k = 10
if (k == 10):
  # First if statement
  if (k < 15):
  print ("k is is in first if statement")
  if (k < 12):
  print ("k is in the nested if")
  else:
  print ("k is in else block of nested if")
	Indentation wrong in the first if statement

Q5.

a. String Operation: Given a string 'a', a = 'This is a new city!'
Write a single line of code to accomplish the following: (10 points: 2 points each)

Question	Solution/code
Return the string in all capital letters. For a this should be: THIS IS A NEW CITY!	a.upper()
Return the length of the string a	len(a)
Return a new string that uses only the first, ninth,eleventh and twelfth letter of a. Repeat the resulting string 3 times. For a this should give: TaneTaneTane	(a[0]+a[8]+a[10]+a[11])*3
Return the string a with all lowercase letters.	a.lower()
Return the string a such that all lower case s are replaced by upper case S.	a.replace('s','S')

b. What is the output of the following code .There is no syntax error here. (10 points: 5 points each)

Question	Code
def f(a): return 4*a f('google')	'googlegooglegooglegoogle'

def g(a):
  if len(a)<3:
  return a+'b'+'c'
  elif len(a)==3:
	Done

```
        return a
    else:
        return 'Done'
t='google'
print(g(t))
```