

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**).

[20 points: 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?
2. What component of your computer executes the code?
3. What component of a computer 'tells' the computer what to do?
4. Program written in a high level language is called?
5. What core things do Python Programs manipulate?
6. What object type in Python describes Whole Numbers?
7. What sign is used for variable assignment in Python?
8. What object types take only True or False values in Python?
9. A special constant used to denote a null value or a void in Python is called:
10. What built-in function in Python reads in user provided values?

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 (algorithm is not required) such that the program does the following: (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.)

a. Asks the user:

```
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 :
```

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

Solution:

Q3. What will be the Boolean output of the following operations (**10 points: 2 points each**)

- $5 > 0$
- $6 != 6$
- $(\text{not}(x < 13 \text{ and } y \geq 5)) == (x \geq 13 \text{ or } y < 5)$
- If $x = \text{True}$, $y = \text{True}$, then what is the outcome of $(x \text{ and } \text{False} == \text{False})$
- $\text{not}(a \leq 20 \text{ or } b != 0) == (a \leq 20 \text{ or } b != 0)$

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 each**)

Code	Solution
<pre>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))</pre>	
<pre>def sorta_sum(a, b): sum = a + b if sum >= 10 and sum <= 19: return 20 return sum</pre>	
<pre>def isequal(a,b) return (a ==b)</pre>	
<pre>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")</pre>	

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!	
Return the length of the string 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	
Return the string a with all lowercase letters.	
Return the string a such that all lower case s are replaced by upper case S.	

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

Question	Output
<pre>def f(a): return 4*a f('google')</pre>	
<pre>def g(a): if len(a)<3: return a+'b'+'c' elif len(a)==3: return a else: return 'Done' t='google' print(g(t))</pre>	