Directions

• Print your name and e-mail ID in the below box right now.
• Print your name and e-mail ID on the last page right now.
• Enter your signature in the below box after completing the test.

Name:

E-mail ID:

On my honor, I pledge that I have neither given nor received help on this test.

Signature:

Test rules

• Print your name, id, and pledge as requested.
• This pledged exam is closed textbook. The only device you may access during the test is your own laptop.
• You are not allowed to access class examples or your own past assignments during the test; i.e., the only Python code you may access or view are ones that you develop for this test.
• The only windows that can be open on your computer are PyCharm and a single browser with tabs only open to the class website.
• PyCharm can be used only for developing the programs to be submitted. It cannot be used for the short answer questions.
• Programs should demonstrate proper programming style; e.g., header comments, whitespace, identifier naming, etc.
• Whether a program compiles is important.
1. (10 points) Suppose the following assignments are in effect.

   
   \[
   \begin{align*}
   r &= \text{range}(2, 6) \\
   s &= [31, 41] \\
   t &= [41, 59] \\
   u &= ['AB', 'C', 'D', 'EF'] \\
   v &= ['AB', 'CD'] \\
   w &= ['CS', 1112] \\
   x &= 'CS 1112'
   \end{align*}
   \]

   a. What is the first value in range \( r \)?

   b. What is the last value in range \( r \)?

   c. Can the second value in range \( r \) be changed (yes or no)?

   d. Can the second value in list \( s \) be changed (yes or no)?

   e. What is the value of \( s + t \)?

   f. What is the value of \( 'B' \) in \( u \)?

   g. What is the value of \( u \) after \( \text{del} \ u[1:3] \)?

   h. What is the value of \( v \) after \( v.\text{reverse}() \)?

   i. Is \( w \) a legal Python list (yes or no)?

   j. What list is produced by \( x.\text{split}() \)?
2. (10 points) Suppose \( s \) is a variable representing the string 'ABCABCABC  ABC'

\[
\begin{array}{cccccccccccccc}
  & \text{A} & \text{B} & \text{C} & \text{A} & \text{B} & \text{C} & \text{A} & \text{B} & \text{C} & \text{A} & \text{B} & \text{C} \\
\end{array}
\]

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<th>Question</th>
<th>Answer</th>
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<tr>
<td>a. What is the length of ( s )?</td>
<td>( 12 )</td>
</tr>
<tr>
<td>b. What is the index of the first occurrence of 'C'?</td>
<td>( 6 )</td>
</tr>
<tr>
<td>c. What string is produced by the slicing ( s[3 : 6] )?</td>
<td>'ABC'</td>
</tr>
<tr>
<td>d. What string is produced by ( s ).replace('C', ''))?</td>
<td>'ABABABABAB'</td>
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<tr>
<td>e. What is the value of ( s ).find('b')?</td>
<td>( 1 )</td>
</tr>
<tr>
<td>f. What is the value of ( s ).rfind('C', 7)?</td>
<td>( 11 )</td>
</tr>
<tr>
<td>g. What slice of ( s ) is needed to produce the string 'C A'?</td>
<td>( s[11:12] )</td>
</tr>
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<td>h. How many elements are in the list produced by ( s ).split()?</td>
<td>( 4 )</td>
</tr>
<tr>
<td>i. What is the value of ( s ) after ( s ).lower()?</td>
<td>'abcabcabc abc'</td>
</tr>
<tr>
<td>j. What is the value of ( s ).capitalize()?</td>
<td>'ABCABCABC ABC'</td>
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3. (1 points) What type of value is printed by the following code segment?

```python
import random
r = random.randrange(0,2)
print(r)
```

4. (3 points) What are the possible values printed by the following code segment?

```python
import random
r = random.randrange(1,3)
print(r)
```

5. (3 points) Is it possible for the following code segment to print the same value twice (yes or no)?

```python
import random
r1 = random.randrange(1,3)
r2 = random.randrange(1,3)
print(r1, r2)
```

6. (3 points) Is it possible for the following code segment to print two different values (yes or no)?

```python
import random
random.seed(1112)
r1 = random.randrange(1,3)
random.seed(1112)
r2 = random.randrange(1,3)
print(r1, r2)
```
7. (1 point) What is the value of 1 + 1 * 4?

8. (1 point) What is the difference between the calculations \( \frac{x}{y} \) and \( \frac{x}{\sqrt{y}} \)?

9. (1 point) Suppose \( y \) is a numeric variable. Write a Boolean expression that is true if the value of \( y \) is a birth year for a member of the \textit{millennial generation} (i.e., \( y \) lies inclusively between 1980 and 1996).

10. (1 point) Write a statement that sets \( p \) to the value \( \frac{9801}{\sqrt{2206}} \).

11. (1 point) Consider the below code segment.

\[
x = ['12', '2', '9', '11']
y = [12, 2, 9, 11]
\]

What is \( \min(x) \)?

What is \( \min(y) \)?

12. (1 point) Consider the below code segment.

\[
s = 'wahoo 3'
t, u = s.split()
\]

What is \( t \)'s type?

What is \( u \)'s type?

13. (1 point) Suppose \( r \) is a string containing only base 10 digits. Give an assignment statement that converts \( r \) to the corresponding numeric value.

14. (1 point) The circumference \( c \) of a circle is \( 2\pi r \). Write the corresponding Python statement.
15. (20 points) Develop program one.py. The program gets an integer input value $n$. The program prints $1112^n$. There should be no other output.

Three sample runs

Enter an integer: 3
1375036928

Enter an integer: 1
1112

Enter an integer: 4
1529041063936

16. (20 points) Develop program two.py. The program gets the name of a web file as input. The web file is located in the CS 1112 web folder

http://www.cs.virginia.edu/~cs1112/datasets/testing/

The web file will contain two numbers $x$ and $y$. The program determines and prints the relationship between $x$ and $y$; that is equal, ascending, or descending. There should be no other output.

Some sample data files are available (we will use different files during testing).
- a.txt contains 31 and 41.
- b.txt contains 11 and 11.
- c.txt contains 20 and 15.

Three sample runs

Enter name of web file: a.txt
ascending

Enter name of web file: b.txt
equal

Enter name of web file: c.txt
descending
17. (20 points) Develop program three.py. The program gets two inputs. The first input is a string. The second input is a line of words. The program prints the words on the line that contain the string. There should be no other output.

When matching, case does not matter. For example, 'abc' matches 'daBChick', and 'XY' matches 'epoxy'.

Three sample runs

Enter word: stir
Enter list of words: The soup was re-stirred with STiRLING stirrups
re-stirred
STiRLING
stirrups

Enter word: abc
Enter list of words: The English alphabet goes from a to z

Enter word: DeF
Enter list of words: The defendant's reasoning was indefensible
defendant's
indefensible
Clearly print your name and e-mail id

Name

E-mail ID:

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