Sample Python Assessment
for the Online AI executive Certificate

1. Which of the following is TRUE about variable and parameter names in Python?
   a. A name declaration in Python involves specifying a data type.
   b. A name may start with a letter, digit, or underscore.
   c. A name may refer to different objects at different times.
   d. Assigning a variable to an object (or passing an object to a parameter) creates a copy of the object.
   e. Other: ____________________________________________

2. Indentation is optional in Python.
   a. True
   b. False

3. What does the following program print?

```python
list1 = [4,1,2,9,3,1,7,8]
x = 0
for i in range(len(list1)):
    if list1[i] < list1[x]:
        x = i
print(x)
```

   a. Choose: 0,1,2,3,4,5,6,7,8, or 9

4. What objects in Python are immutable?
   a. Lists
   b. Strings
   c. Tuples
   d. Integers
   e. Dictionaries

5. Which exception might occur at runtime in the following program?

```python
with open('data.txt') as f:
    total = 0
    count = 0
    for line in f:
        total += int(line.strip())
        count += 1
    average = total / count
```

   a. ZeroDivisionError
   b. NameError
   c. ValueError
   d. All of the Above
6. Let $n$ be a positive integer. What is the big-O running time of the following program?

```python
k = 0
while k < n*n:
    if k % 2 == 1:
        while k < n*n*n:
            k += 1
    k += 1
```

a. $O(\log(n))$
b. $O(n)$
c. $O(n^2)$
d. $O(n^3)$
e. $O(n^5)$
f. $O(2^n)$

7. What does the following program print?

```python
class Version(object):
    def __init__(self, name):
        self.subversion = 0
        self.name = name
    def update(self):
        self.subversion += 1
        return Version(str(self.name) + "." + str(self.subversion))

v = Version("1")
w = v.update()
y = w.update()
x = w.update()
print(x.name)
```

a. 1.3
b. 1.2.3
c. 1.1.1
d. 1.1.2
e. 4

8. Which of the following is TRUE about dictionaries?
   a. The key value pairs in dictionaries are sorted.
   b. The keys in a dictionary need to be immutable.
   c. The in operator can be used to check if a value is present in the dictionary.
   d. Tuples may not be used as keys.
   e. The values in a dictionary are unique.
9. What does the following program print?

```python
import copy

a = ['a':[1, 2, 3], 'b':[3, 2, 1]}
d ['c'] = d['a']
d ['a'] = [4, 5, 6]
d ['a'] . append (7)

print (d ['c'])
```

a. [4, 5, 6]
b. [4, 5, 6, 7]
c. [1, 2, 3]
d. [1, 2, 3, 7]
e. Other:

10. Consider `a` as the NumPy ndarray below. Which of the following doesn't return `array([[4, 5, 0], [6, 9, 4]])`?

```python
import numpy as np

a = np.array(
    [[7, 8, 9, 3, 2, 3],
     [2, 1, 4, 5, 0, 8],
     [0, 6, 9, 4, 1],
     [3, 9, 2, 8, 5, 2],
     [6, 4, 2, 3, 0],
     [2, 3, 1, 9, 7, 4]]
)
```

a. a[1:3, 2:5]
b. A[1:3][2,3,4]
d. a[1:3][:, 2:5]
e. a[[1,2],2:5]