This quiz has 3 questions, for a total of 10 points.

1. 3 points  Suppose that L is a Python “list” (array) of length n. Categorize the worst-case execution time of the below operations as either

   1. constant time (takes the same amount of time no matter what n is).
   2. logarithmic time (takes time proportional to lg n).
   3. linear time (takes time proportional to n)
   4. quadratic (takes time proportional to n²)

Label each operation with the above item number.

   • L.append(5)
   • 2 in L
   • L[7]

Solution:

   • (1), L.append(5) is constant time, (1 point)
   • (3), 2 in L is linear time, (1 point)
   • (1), L[7] is constant time, (1 point)

2. 3 points  What is the output of the following Python program?

D = {(0,0): 'green', (0,1): 'blue', (1,0): 'red'}
print(D[(0,1)])
print((1,1) in D)
D[(1,0)] = 'purple'
print(D[(1,0)])

Solution:

   blue
   False
   purple

Grading rubric: Looking up the key (0,1) in D returns the associated string blue (1 point). The key (1,1) is not in D (1 point). Finally, the value for (1,0) is overwritten with purple, so that’s the last output (1 point).
3. 4 points  Complete the following implementation of the insert_front method.

```python
class Node:
    def __init__(self, data, next):
        self.data = data
        self.next = next

class List:
    def __init__(self):
        self.head = None
        self.tail = None

    def insert_front(self, data):
        n = Node(___(a)___, ___(b)___)
        self.head = ___(c)___
        if self.tail == None:
            ___(d)___

Solution:

(a) data (1 point)
(b) self.head (1 point)
(c) n (1 point)
(d) self.tail = n (1 point)