**Practice 7 - Mutable Sequences and Functions**

Q1 - What would Python display? In addition to giving the output, draw the box and pointer diagrams for each list to the right.

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| >>> lst1 = [1, 2, 3]  \_\_\_\_\_\_\_\_\_\_\_\_  >>> lst2 = lst1  \_\_\_\_\_  >>> lst1 is lst2  \_\_\_\_\_\_  >>> lst2.extend([5, 6])  \_\_\_\_\_  >>> lst1[4]  \_\_\_\_\_  >>> lst1.append([-1, 0, 1])  \_\_\_\_\_\_  >>> -1 in lst2  \_\_\_\_\_\_  >>> lst2[5]  \_\_\_\_\_\_  >>> lst3 = lst2[:]  \_\_\_\_\_\_  >>> lst3.insert(3, lst2.pop(3))  \_\_\_\_\_\_  >>> len(lst1)  \_\_\_\_\_\_  >>> lst1[4] is lst3[6]  \_\_\_\_\_\_  >>> lst3[lst2[4][1]]  \_\_\_\_\_\_  >>> lst1[:3] is lst2[:3]  \_\_\_\_\_\_  >>> lst1[:3] == lst3[:3] |

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### Q2: Nonlocal Environment Diagram

Draw the environment diagram that results from running the following code.

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| **def** **moon**(f):  sun = 0  moon = [sun]  **def** **run**(x):  **nonlocal** sun, moon  **def** **sun**(sun):  **return** [sun]  y = f(x)  moon.append(sun(y))  **return** moon[0] **and** moon[1]  **return** run  moon(**lambda** x: moon)(1) |

After you've done it on your own, generate an environment diagram in [python tutor](https://web.archive.org/web/20191008065943/http://tutor.cs61a.org/) to check your answer.

Q3 - Shopkeeper

Given the definition of make shopkeeper below, draw the environment diagram.

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| def make\_shopkeeper(total\_gold):  def buy(cost):  nonlocal total\_gold  if total\_gold < cost:  return 'Go farm some more champions'  total\_gold = total\_gold - cost  return total\_gold  return buy  infinity\_edge, zeal, gold = 3800, 1100, 3800  shopkeeper = make\_shopkeeper(gold - 1000)  shopkeeper(zeal)  shopkeeper(infinity\_edge) |