Quiz 5 – Name: _____

Question 1. Show what the low, high, and mid **indecies** are for *each step* in searching the list L for the value x, using a **binary search**.

```
x = "F"
L = ['A','B','D','F','H','I','K','N','O','Q','W','X','Z']   low   mid   high
     0   1   2   3   4   5   6   7   8   9   10  11  12     ----------------

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                                                             ---   ---   ---

                                                             ---   ---   ---

                                                             ---   ---   ---
```

Do the same for x="T":

```
L = ['A','B','D','F','H','I','K','N','O','Q','W','X','Z']   low   mid   high
     0   1   2   3   4   5   6   7   8   9   10  11  12     ----------------

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```
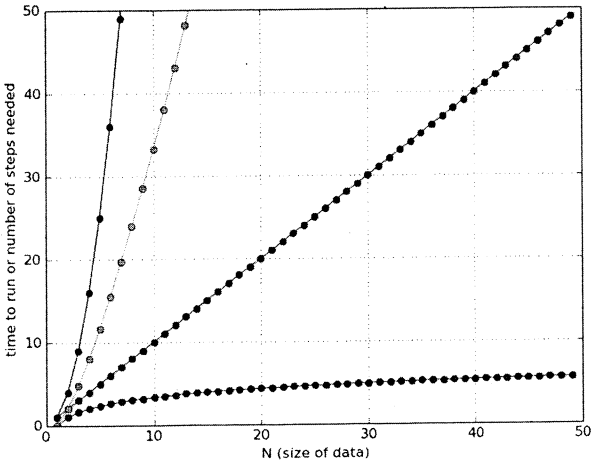

Question 2. Show the following list as it is being sorted using the **Selection Sort algorithm**. For each line, fill in what the list will look like after each iteration of the outer loop of selection sort. Also, briefly describe what is happening on each line.

```
L = [20,  89,  23,  16,   5]          Description:

L = [  ,    ,   ,    ,   ]

L = [  ,    ,   ,    ,   ]

L = [  ,    ,   ,    ,   ]

L = [  ,    ,   ,    ,   ]
```

Question 3. Attach the correct label to each line of the graph: $O(\log n)$, $O(n \log n)$, $O(n^2)$, and $O(n)$.



Question 4. Briefly describe in words what the following function does, assuming the parameter `L` is a python list of integers. Be specific about how the function works (e.g., what does the inner loop accomplish?).

```
1 def mystery(L):
2
3   for i in range(1,len(L)):
4     j = i
5     while j != 0 and L[j] < L[j-1]:
6        L[j],L[j-1] = L[j-1],L[j]
7        j -= 1
8     print("%d: %s" % (i,L))
```

4-1: If `mystery` is called with `L = [44, 33, 0, 15]`, show what will be printed:

4-2: If the previous call to `mystery` takes 1 second to run, approximately how long will it take if I double the size of the list? Why?

Question 5. Assume you have two lists of words in `main()`:

```
words = ["happy","prety","pony","teh",...]
dictionary = ["a", "aardvark", "aardvarks", "abaci", "aback", "abacus",...]
```

Write a function that takes these two lists and returns all items in the first list that aren't in the second list.