Name: ________________________

1. (4 pts) Fill in the missing code for a linear search. Pay close attention, some variable names have changed compared to the review sheet. Use the correct variable name according to what is listed here.

```python
items = [2, 5, 7, 9, 12, 15, 18, 19, 22, 24]
desired_element = 23
# Linear search
position=0
while                         and                 != desired_element:
    ____________________________
    ____________________________

if ________________
    print( "Not Found" )
else:
    print( "Found at position",i)
```

2. (1 pt) If a list has \( n \) elements, in the best case how many elements would the computer need to check before it found the desired element?

3. (1 pt) If a list has \( n \) elements, in the worst case how many elements would the computer need to check before it found the desired element?

4. (1 pt) If a list has \( n \) elements, how many elements need to be checked to determine that the desired element does not exist in the list?

5. (1 pt) If a list has \( n \) elements, what would the average number of elements be that the computer would need to check before it found the desired element?
6. (5 pts) Fill in the missing code for a binary search:

```python
# Binary search
number_list = [2, 5, 7, 9, 12, 15, 18, 19, 22, 24]
desired_element = 23
lower_bound = 0
upper_bound = _________________
found = False

while ____________________ and found == False:
    middle_pos = (int) (_______________________)
    if ________________________________
        lower_bound = middle_pos+1
    elif ______________________________
        upper_bound = middle_pos
    else:
        found = True
    if found:
        print("Found at position", middle_pos)
    else:
        print("Not found.")
```

7. (1 pt) If a list has \( n \) elements, in the worst case how many elements would the computer need to check before it found the desired element?

8. (1 pt) Under what circumstances would a linear search work well, but a binary search would not work at all?
Given the following grid of numbers:

```
   0 1 2 3 4
0 0 0 0 0 0
1 0 0 0 0 0
2 0 1 0 0 0
3 0 0 0 0 2
4 0 0 0 0 0
```

9. (1 pt) Write the code that would print the cell that contains the number 1

10. (1 pt) Write code that would set the cell that contains a 2, to the number 3 instead.

11. (1 pt) Write code that would set each cell to the number 5.
12. (2 pts) Explain 2 points about the following line of code:

   class Cat(Animal):

13. (2 pts) Explain 2 points about the following code:

   def __init__(self):
       Animal.__init__(self)

14. (1 pt) How does a programmer create his/her own library file in Python?

15. (3 pts) Write a function that takes two numbers and returns the largest.
16. (4 pts) Write code for a function that will take in an array and set each element to zero.

17. (4 pts) Write code that creates a class called Cat. Give it one attribute and one method.

18. (3 pts) Write code that creates an instance of Cat. Set the attribute and call the method.