Exercise 2.2-3:
Here is my linear search in python.

```python
def linear_search(a, key):
    n = len(a)
    for i in xrange(n):
        if a[i] == key:
            return i
    return -1
```

For an array of size N, let X be the number of searches needed for a key.

$\because P\{X = i\} = \frac{1}{N}, i \in \{1, 2, \ldots, N\}$

$\therefore E(X) = \sum\limits_{i=1}^{N} \frac{i}{N} = \frac{N(N+1)/2}{N} = \frac{N+1}{2}$

$\therefore$ The average time complexity is $\Theta(n)$

$\because$ Worst case requires N searches

$\therefore$ It is $\Theta(n)$ as well