

Lecture 8: approximating the square root

linear search

```
l = ["The Strokes", "Bon Iver", "Arcade Fire",  
     "The Black Keys", "Pixies", "The White Stripes",  
     "Neutral Milk Hotel", "The National", "Yo La Tengo"]
```

```
1 def find_startswith(lst,searchstr):  
2     for s in lst:  
3         if s.startswith(searchstr):  
4             return s  
5     return None
```

binary search

```
l = ['Arcade Fire', 'Bon Iver', 'Neutral Milk Hotel',  
     'Pixies', 'The Black Keys', 'The National',  
     'The Strokes', 'The White Stripes', 'Yo La Tengo']
```

```
1 def find_startswith(lst, searchstr):  
2     low = 0  
3     high = len(lst)-1  
4     while (low < high):  
5         mid = (high + low) // 2  
6         if lst[mid].startswith(searchstr):  
7             return lst[mid]  
8         elif lst[mid] < searchstr:  
9             low = mid+1  
10        else:  
11            high = mid-1  
12        return None
```

Calculating Square Roots with Binary Search

```
1 def sqrt_bisect(x, error=0.00001):
2     low = 0
3     high = x
4     m = (low + high)/2
5     while (abs(m**2 - x) > error):
6         if (m**2 < x):
7             low = m
8         else:
9             high = m
10        m = (low + high)/2
11    return m
```

Calculating Square Roots with Newton's Method