Insertion Sort

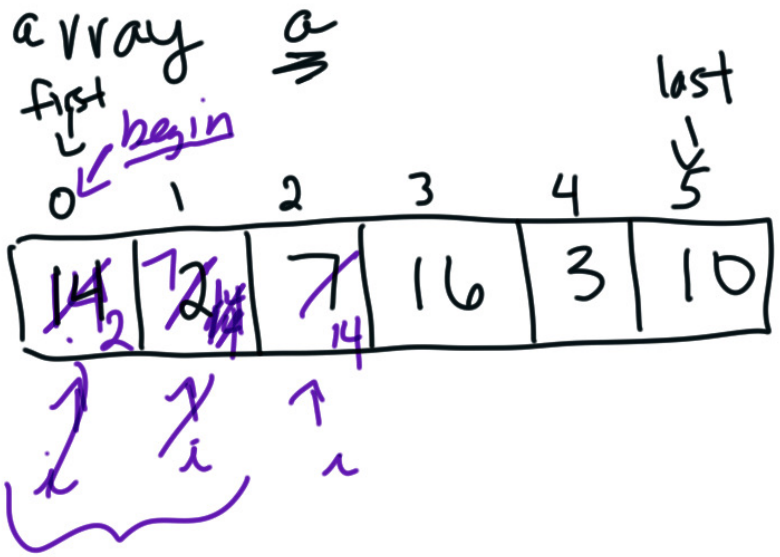
Look through each item in the unsorted portion and insert it into the sorted portion by **shifting** larger values out of the way. $O(n^2)$

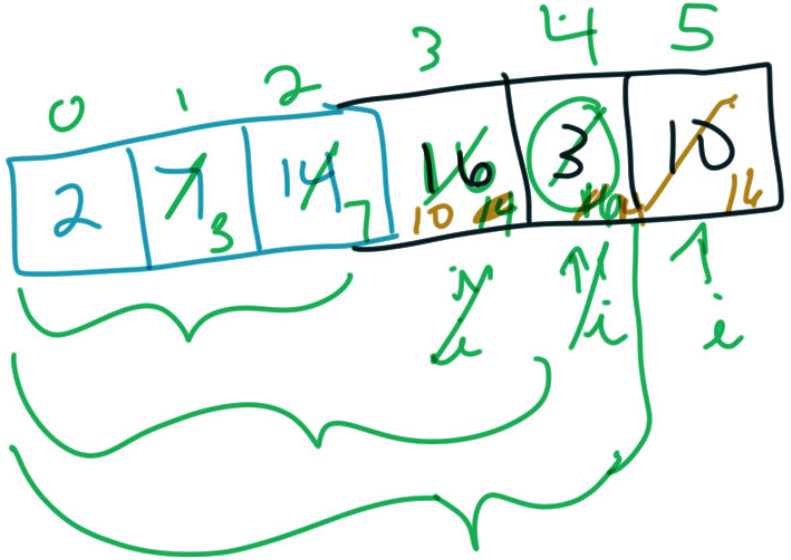
Insertion Sort

6 5 3 1 8 7 2 4

http://sonny.io/2015/12/19/insertion-sort/

```
6    public void insertionSort(int[] a, int first, int last)
7    {
8        for(int i= first; i <= last; i++) {
9            insertInOrder(a[i],a,first, i-1);
10       }
11   }
12
13   private void insertInOrder(int anEntry,
14                              int[] a,
15                              int begin,
16                              int end)
17   {
18       int index = end;
19
20       //insert into sorted portion
21       while ((index >= begin) && (anEntry < a[index])){
22           a[index + 1] = a[index];  //shift
23           index --;
24       }
25
26       a[index + 1] = anEntry;
27   }
```





an Entry	end	index	i
14	-1	-1	0
2	0	0-1	1
7	1	X 0	2
16	2	2	3
3	3	3 X X 0	4
10	4	4 3	5

2 3 7 10 14 16 ✓