

Keywords

Insertion sort – each items is take in turn, compare to the items in a sorted list and placed in the correct position.

Ordered List – Elements are arranged in sequence.

Unordered List – Unarranged elements.

Algorithms

Insertion Sort

Insertion Sort



Objectives

ADVANCED:
Understand the principles of an insertion sort.

EXPERT:
Be able to perform an insertion sort on a set of data.

1. Element 1 is a 'sorted' list.
2. The rest of the elements are an 'unsorted' list.
3. Compare the first element in the 'unsorted' list to each element in the sorted list.
4. IF it is smaller, put it in in front of that element (move the others along).
5. ELSEIF it is larger, compare with the next.
6. ELSEIF there are no more elements in the 'sorted' list put it in the final position.
7. REPEAT UNTIL all element in the 'unsorted' list are in the 'sorted' list.



Insertion Sort Example

Insertion sort this list

12	9	3	15	2	7	15
----	---	---	----	---	---	----

12 is the sorted list

12	9	3	15	2	7	15
----	---	---	----	---	---	----

Take element 1 of unsorted list

12	9	3	15	2	7	15
----	---	---	----	---	---	----

Compare to first element in sorted list

12	9	3	15	2	7	15
----	---	---	----	---	---	----

First element is greater: so put it on left

9	12	3	15	2	7	15
---	----	---	----	---	---	----

Take next element or unordered list

9	12	3	15	2	7	15
---	----	---	----	---	---	----

Compare to first element in sorted list

9	12	3	15	2	7	15
---	----	---	----	---	---	----

First element is greater: so put it on left

3	9	12	15	2	7	15
---	---	----	----	---	---	----





Insertion Sort Example

Take element 1 of unsorted list

3	9	12	15	2	7	15
---	---	----	----	---	---	----

Compare to first element in sorted list

3	9	12	15	2	7	15
---	---	----	----	---	---	----

First element is smaller: so move to next element in ordered list

3	9	12	15	2	7	15
---	---	----	----	---	---	----

First element is smaller: so move to next element in ordered list

3	9	12	15	2	7	15
---	---	----	----	---	---	----

No more elements left, so insert at the end of the ordered list

3	9	12	15	2	7	15
---	---	----	----	---	---	----



C O M P U T E R S C I E N C E



Insertion Sort Example

Can you talk through the next steps in groups?

3	9	12	15	2	7	15
---	---	----	----	---	---	----

3	9	12	15	2	7	15
---	---	----	----	---	---	----

2	3	9	12	15	7	15
---	---	---	----	----	---	----

2	3	9	12	15	7	15
---	---	---	----	----	---	----

2	3	9	12	15	7	15
---	---	---	----	----	---	----

2	3	9	12	15	7	15
---	---	---	----	----	---	----

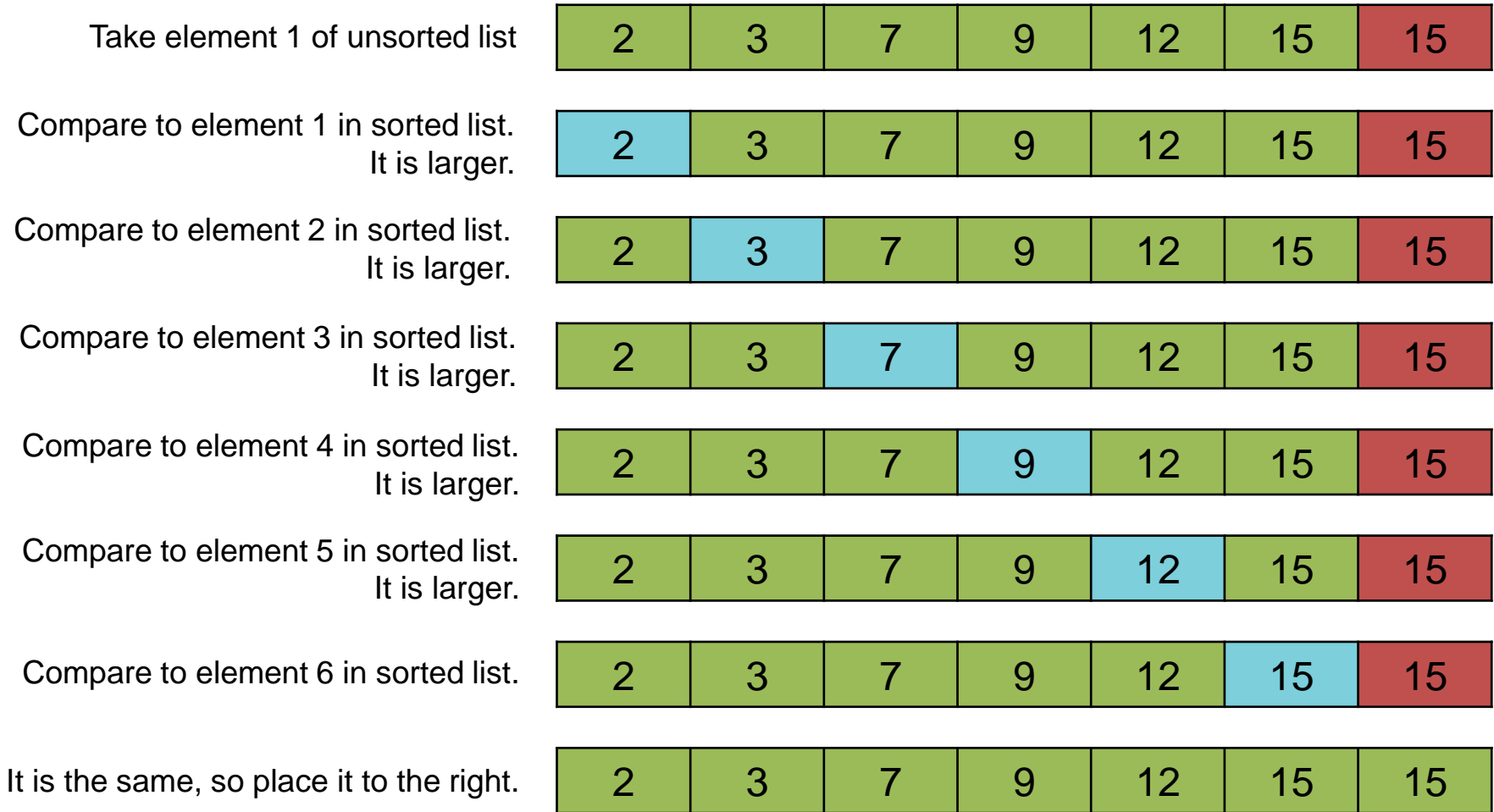
2	3	9	12	15	7	15
---	---	---	----	----	---	----

2	3	7	9	12	15	15
---	---	---	---	----	----	----





Insertion Sort Example





Insertion Sort

Objectives

ADVANCED:
Understand the principles of an insertion sort.

EXPERT:
Be able to perform an insertion sort on a set of data.

Task 1

Deal 10 cards face down.
Perform an insertion sort.
Keep the sorted list separate to the unsorted list.

Task 2

Use an Insertion Sort, to sort the list:

3	19	2	44	56	7	12	3
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