Selection sort

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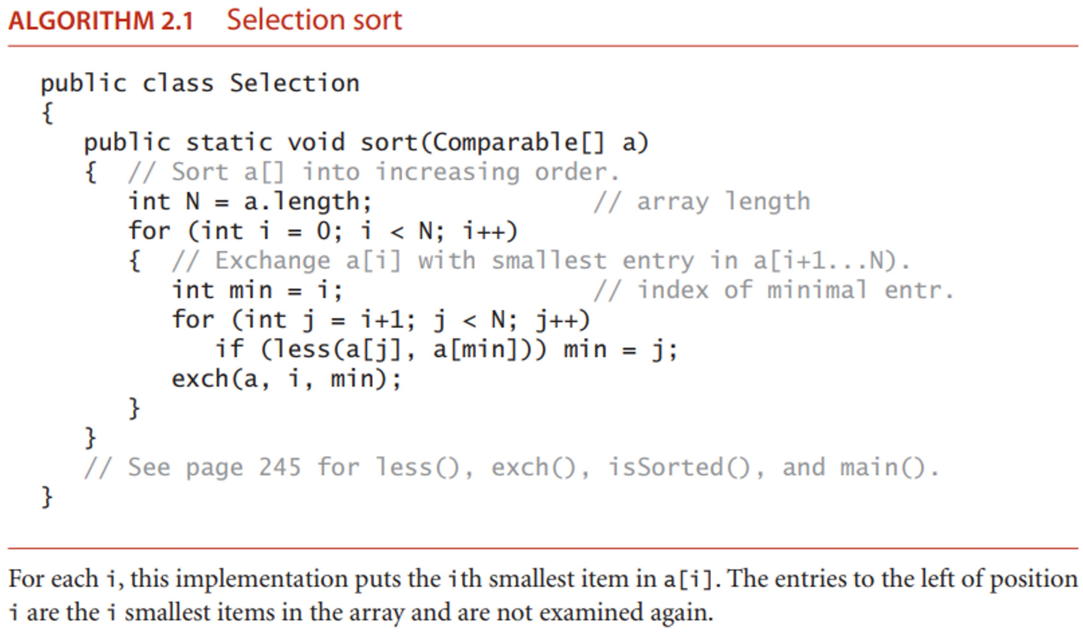
Find the smallest item in the array and exchange it with the first entry.
Then, find the next smallest item and exchange it with the second entry.
Continue in this way untilt he entire array is sorted.

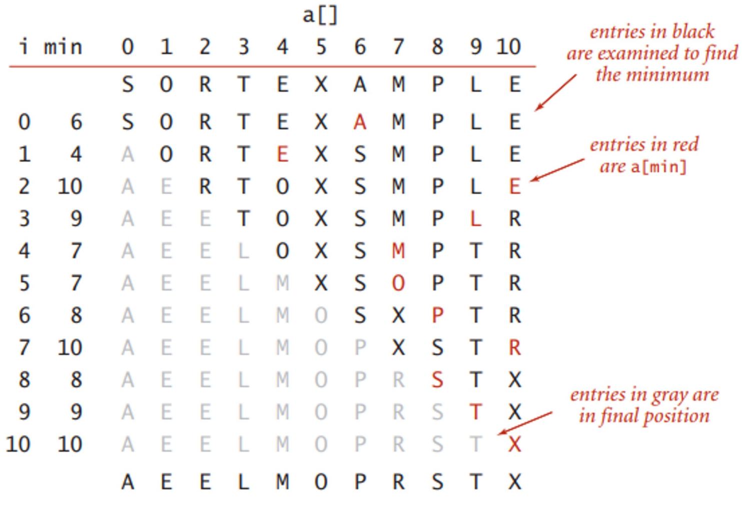
This is the simplest sorting algorithms. The running time for both the best and the worst scenerios are all N^2/2



ALGORITHM 2.1 Selection sort

```
public class Selection
{
   public static void sort(Comparable[] a)
   {  // Sort a[] into increasing order.
      int N = a.length;                // array length
      for (int i = 0; i < N; i++)
      {  // Exchange a[i] with smallest entry in a[i+1...N).
         int min = i;                  // index of minimal entr.
         for (int j = i+1; j < N; j++)
            if (less(a[j], a[min])) min = j;
         exch(a, i, min);
      }
   }
   // See page 245 for less(), exch(), isSorted(), and main().
}
```

For each i, this implementation puts the ith smallest item in a[i]. The entries to the left of position i are the i smallest items in the array and are not examined again.



		a[]										
i	min	0	1	2	3	4	5	6	7	8	9	10
		S	O	R	T	E	X	A	M	P	L	E
0	6	S	O	R	T	E	X	A	M	P	L	E
1	4	A	O	R	T	E	X	S	M	P	L	E
2	10	A	E	R	T	O	X	S	M	P	L	E
3	9	A	E	E	T	O	X	S	M	P	L	R
4	7	A	E	E	L	O	X	S	M	P	T	R
5	7	A	E	E	L	M	X	S	O	P	T	R
6	8	A	E	E	L	M	O	S	X	P	T	R
7	10	A	E	E	L	M	O	P	X	S	T	R
8	8	A	E	E	L	M	O	P	R	S	T	X
9	9	A	E	E	L	M	O	P	R	S	T	X
10	10	A	E	E	L	M	O	P	R	S	T	X
		A	E	E	L	M	O	P	R	S	T	X

entries in black are examined to find the minimum

entries in red are a[min]

entries in gray are in final position

Trace of selection sort (array contents just after each exchange)