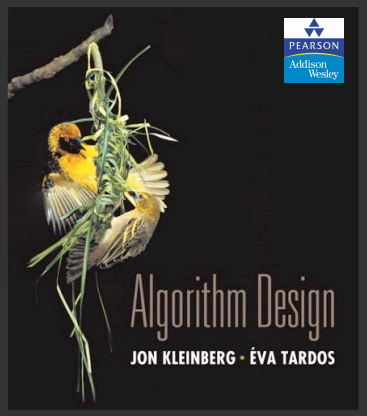

5. Divide And Conquer I

- *quickselect demo*

Last updated on Sep 8, 2013 6:33 AM

Quickselect demo

3-way partition array so that:

- Pivot element p is in place.
- Smaller elements in left subarray L.
- Equal elements in middle subarray M.
- Larger elements in right subarray R.

Recur in one subarray—the one containing the k^{th} smallest element.

select the k = 8th smallest

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
65	28	59	33	21	56	22	95	50	12	90	53	28	77	39

k = 8th smallest

Quickselect demo

3-way partition array so that:

- Pivot element p is in place.
- Smaller elements in left subarray L.
- Equal elements in middle subarray M.
- Larger elements in right subarray R.

Recur in one subarray—the one containing the k^{th} smallest element.

choose a pivot element at random and partition

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
65	28	59	33	21	56	22	95	50	12	90	53	28	77	39

k = 8th smallest

Quickselect demo

3-way partition array so that:

- Pivot element p is in place.
- Smaller elements in left subarray L.
- Equal elements in middle subarray M.
- Larger elements in right subarray R.

Recur in one subarray—the one containing the k^{th} smallest element.

partitioned array

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
28	33	21	56	22	50	12	53	28	39	59	65	95	90	77

k = 8th smallest

Quickselect demo

3-way partition array so that:

- Pivot element p is in place.
- Smaller elements in left subarray L.
- Equal elements in middle subarray M.
- Larger elements in right subarray R.

Recur in one subarray—the one containing the k^{th} smallest element.

recursively select 8th smallest element in left subarray

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
28	33	21	56	22	50	12	53	28	39	59	65	95	90	77

k = 8th smallest

Quickselect demo

3-way partition array so that:

- Pivot element p is in place.
- Smaller elements in left subarray L.
- Equal elements in middle subarray M.
- Larger elements in right subarray R.

Recur in one subarray—the one containing the k^{th} smallest element.

choose a pivot element at random and partition

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
28	33	21	56	22	50	12	53	28	39	59	65	95	90	77

k = 8th smallest

Quickselect demo

3-way partition array so that:

- Pivot element p is in place.
- Smaller elements in left subarray L.
- Equal elements in middle subarray M.
- Larger elements in right subarray R.

Recur in one subarray—the one containing the k^{th} smallest element.

partitioned array

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
21	22	12	28	28	33	56	50	53	39	59	65	95	90	77

k = 8th smallest

Quickselect demo

3-way partition array so that:

- Pivot element p is in place.
- Smaller elements in left subarray L.
- Equal elements in middle subarray M.
- Larger elements in right subarray R.

Recur in one subarray—the one containing the k^{th} smallest element.

recursively select the 3rd smallest element in right subarray

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
21	22	12	28	28	33	56	50	53	39	59	65	95	90	77

k = 3rd smallest

Quickselect demo

3-way partition array so that:

- Pivot element p is in place.
- Smaller elements in left subarray L.
- Equal elements in middle subarray M.
- Larger elements in right subarray R.

Recur in one subarray—the one containing the k^{th} smallest element.

choose a pivot element at random and partition

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
21	22	12	28	28	33	56	50	53	39	59	65	95	90	77

k = 3rd smallest

Quickselect demo

3-way partition array so that:

- Pivot element p is in place.
- Smaller elements in left subarray L.
- Equal elements in middle subarray M.
- Larger elements in right subarray R.

Recur in one subarray—the one containing the k^{th} smallest element.

partitioned array

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
21	22	12	28	28	33	39	50	53	56	59	65	95	90	77

k = 3rd smallest

Quickselect demo

3-way partition array so that:

- Pivot element p is in place.
- Smaller elements in left subarray L.
- Equal elements in middle subarray M.
- Larger elements in right subarray R.

Recur in one subarray—the one containing the k^{th} smallest element.

stop: desired element is in middle subarray

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
21	22	12	28	28	33	39	50	53	56	59	65	95	90	77