Algorithms

FOURTH EDITION

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http://algs4.cs.princeton.edu

1.4 Binary Search Demo

Binary search demo

Goal. Given a sorted array and a key, find index of the key in the array?

Binary search. Compare key against middle entry.
- ☐ Too small, go left.
- ☐ Too big, go right.
- ☐ Equal, found.

successful search for 33

6	13	14	25	33	43	51	53	64	72	84	93	95	96	97
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14

lo ↑ (0)   mid ↑ (7)   hi ↑ (14)

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↑ lo   ↑ mid   ↑ hi

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successful search for 33

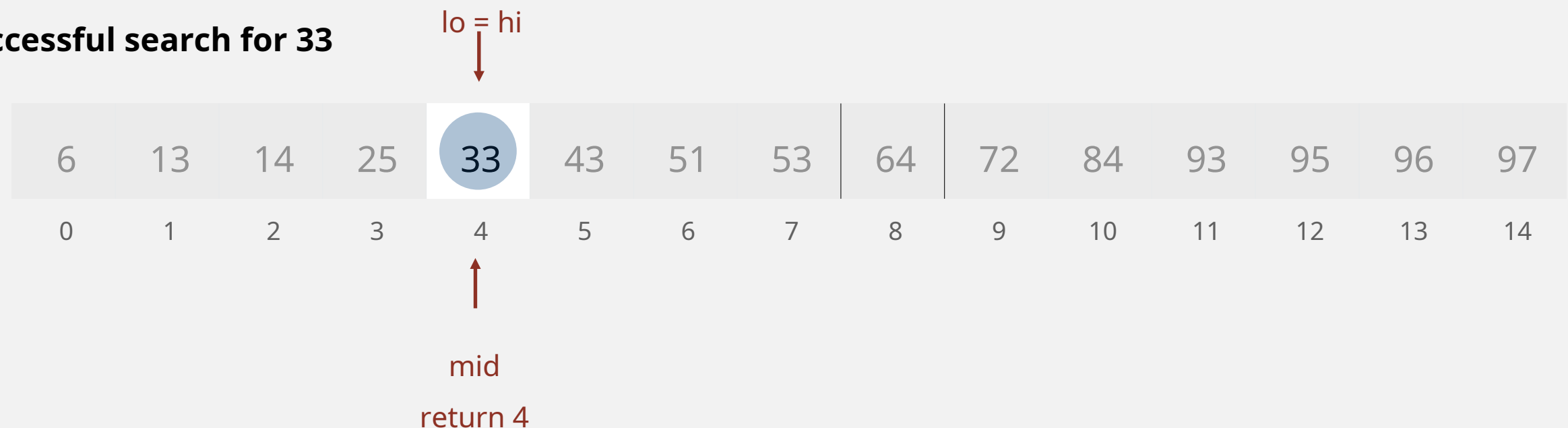| 6	13	14	25	33	43	51	53	64	72	84	93	95	96	97
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14

↑ ↑ ↑

lo mid hi

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successful search for 33

lo = hi

6	13	14	25	33	43	51	53	64	72	84	93	95	96	97
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14

mid

return 4

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unsuccessful search for 34

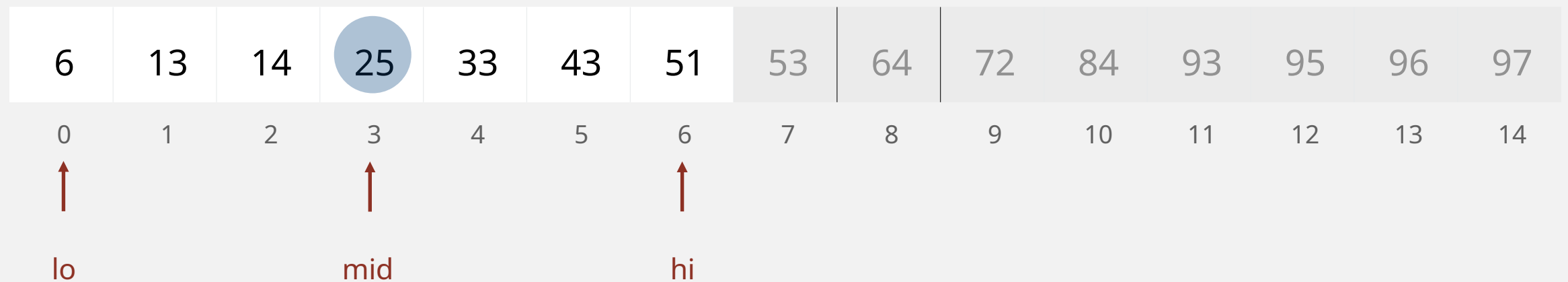| 6	13	14	25	33	43	51	53	64	72	84	93	95	96	97
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lo   mid   hi

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unsuccessful search for 34

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0	1	2	3	4	5	6	7	8	9	10	11	12	13	14

↑   ↑   ↑

lo   mid   hi

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unsuccessful search for 34

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0	1	2	3	4	5	6	7	8	9	10	11	12	13	14

↑ ↑ ↑

lo   mid   hi

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unsuccessful search for 34

lo = hi

6	13	14	25	33	43	51	53	64	72	84	93	95	96	97
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14

mid

return -1