

The background of the slide is a solid yellow color. It is decorated with a network of thin, black, stylized circuit lines. These lines are most prominent on the left side, where they form a dense, vertical structure resembling a circuit board or a tree. Some lines extend towards the top right corner. The lines are composed of straight segments connected by small circles, giving them a technical, electronic appearance.

CS 1332

DATA STRUCTURES AND ALGORITHMS

Programming in Java

Dr. Mary Hudachek-Buswell

BuildHeap

- Given an array of numbers how do we convert it into a heap?
- We could iterate through the array and insert each number into the heap, but this would require a separate array, and it would also take $O(n \log(n))$ time.
- We want to convert in place and do it in linear time.
- Note: We will assume that index 0 is not used.
- Main Idea: BuildHeap will use downheap to build the heap from the bottom up, ensuring that in each iteration, we are calling downheap on an index with two valid child subheaps.

BuildHeap

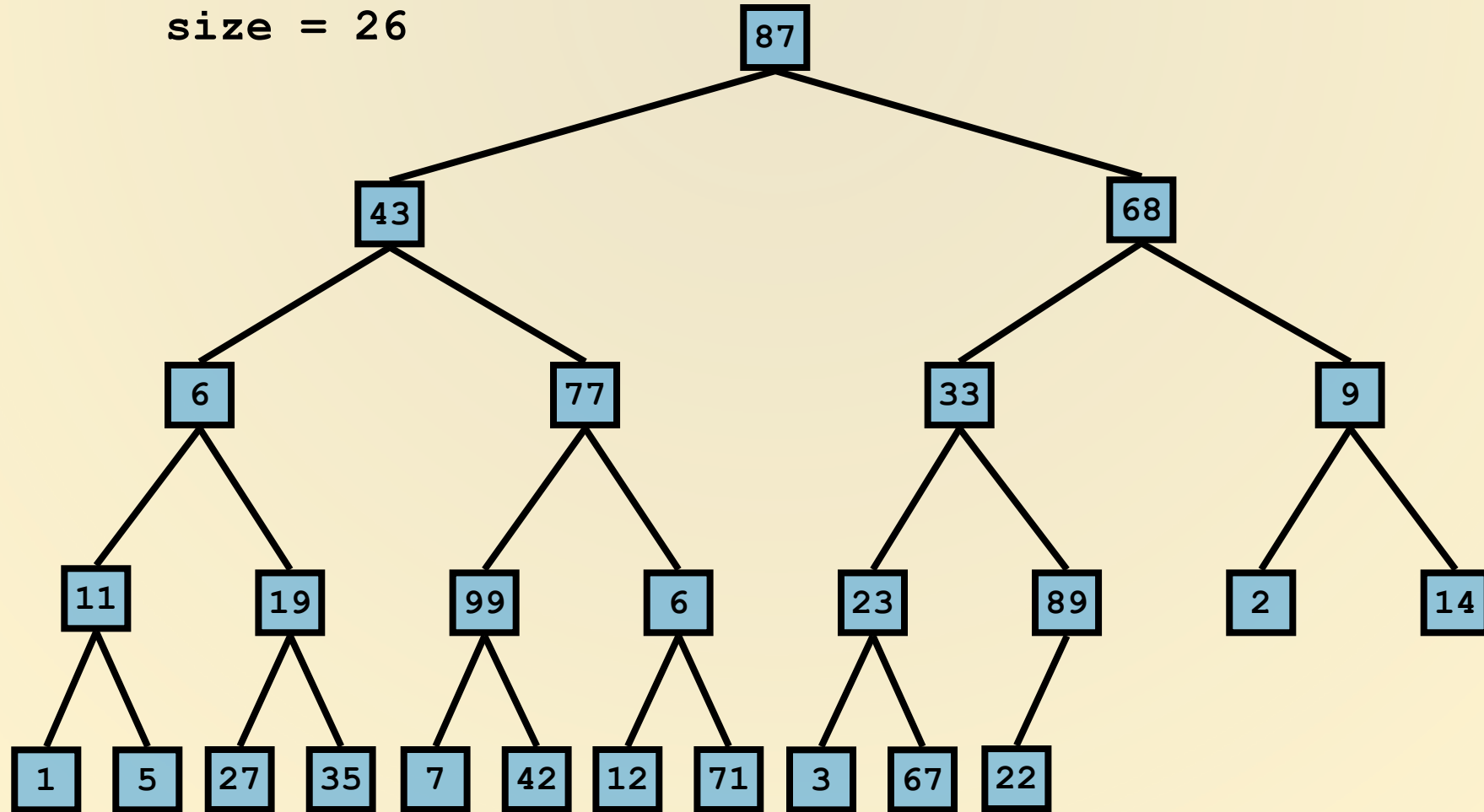
- Assume that we have the number of elements in a variable called `size`.

`Iterate index from size/2 down to 1`
`downheap(index)`

- Let's look at a large example for building a MinHeap.

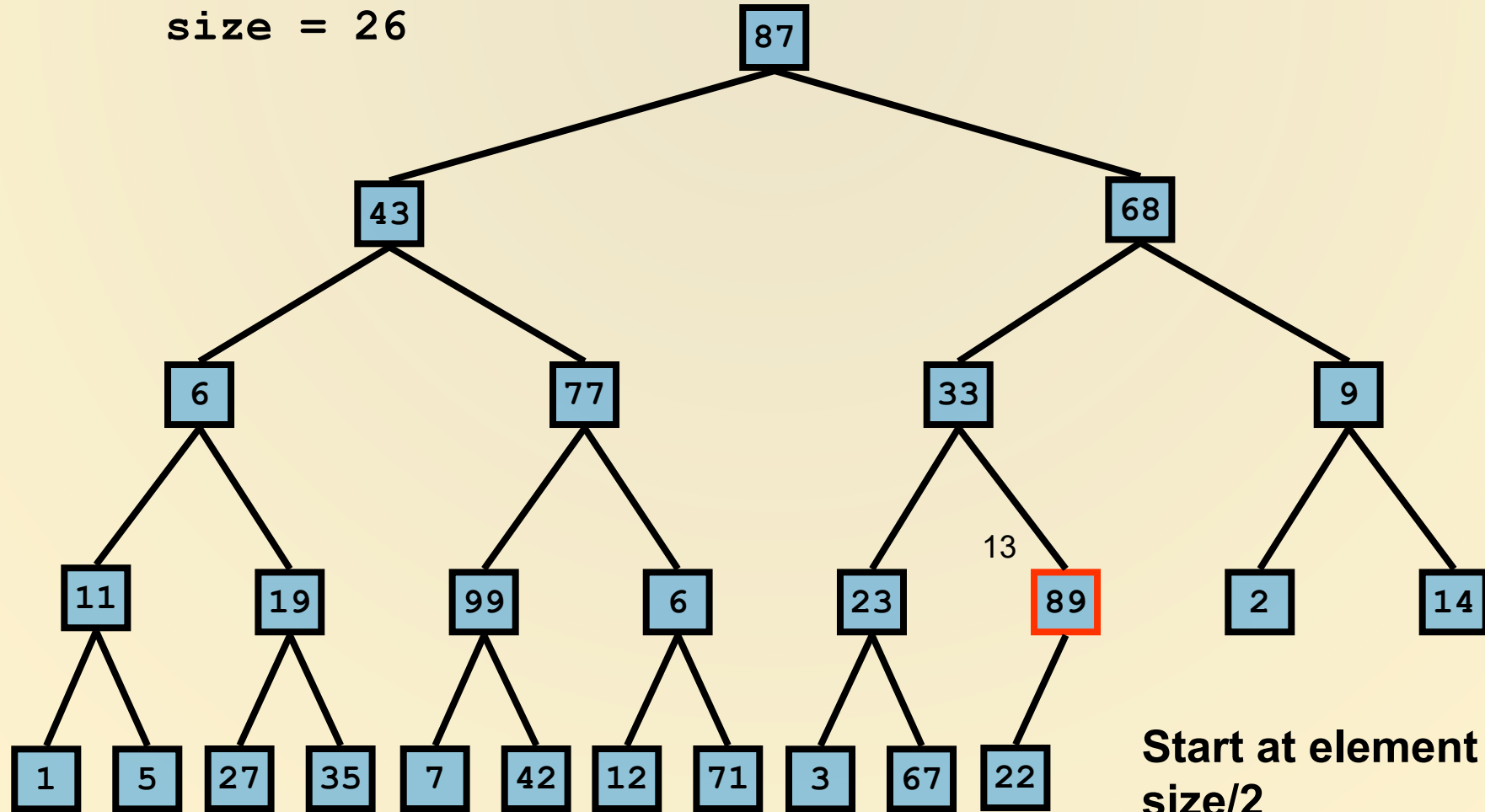
BuildHeap

size = 26



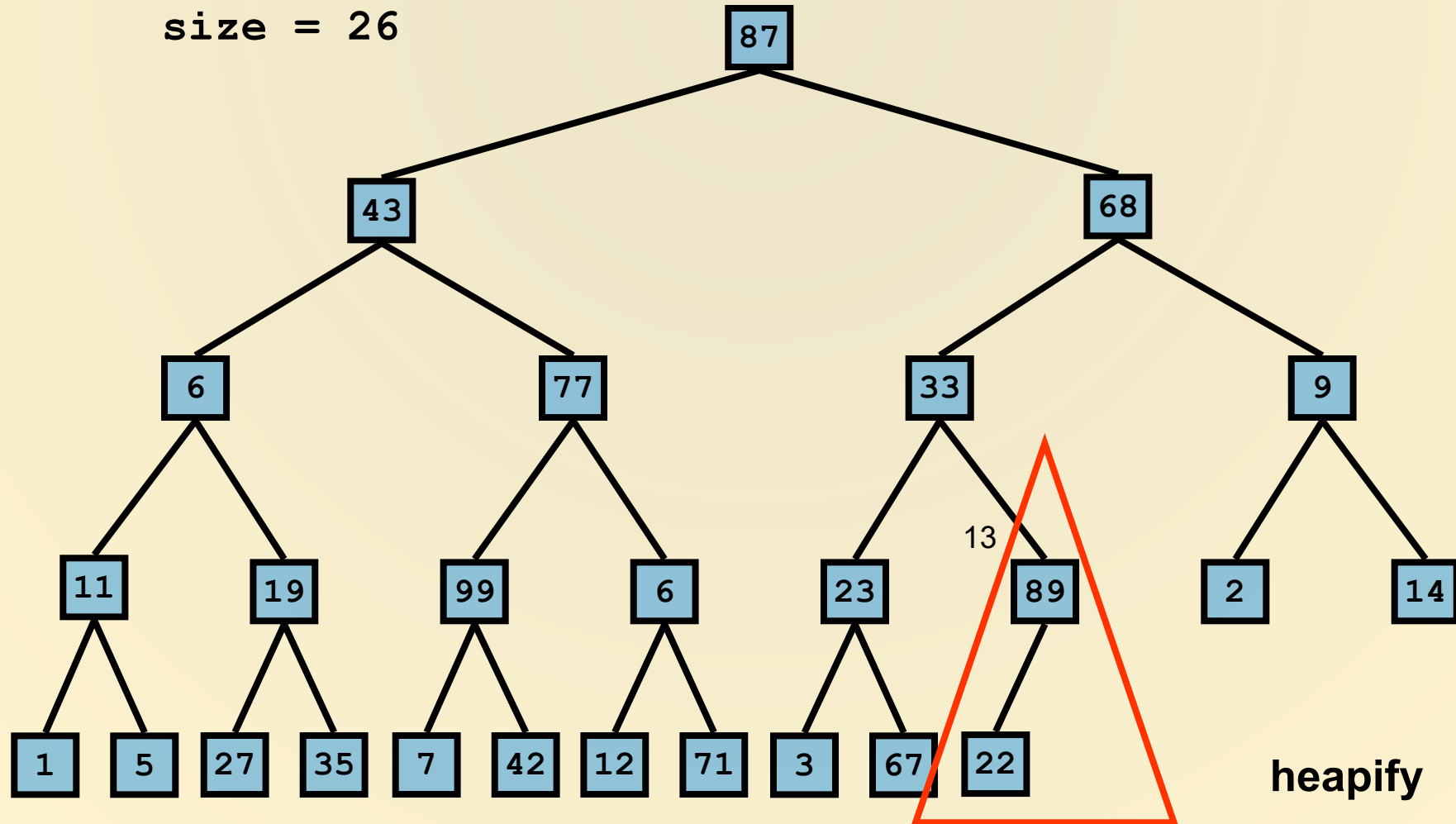
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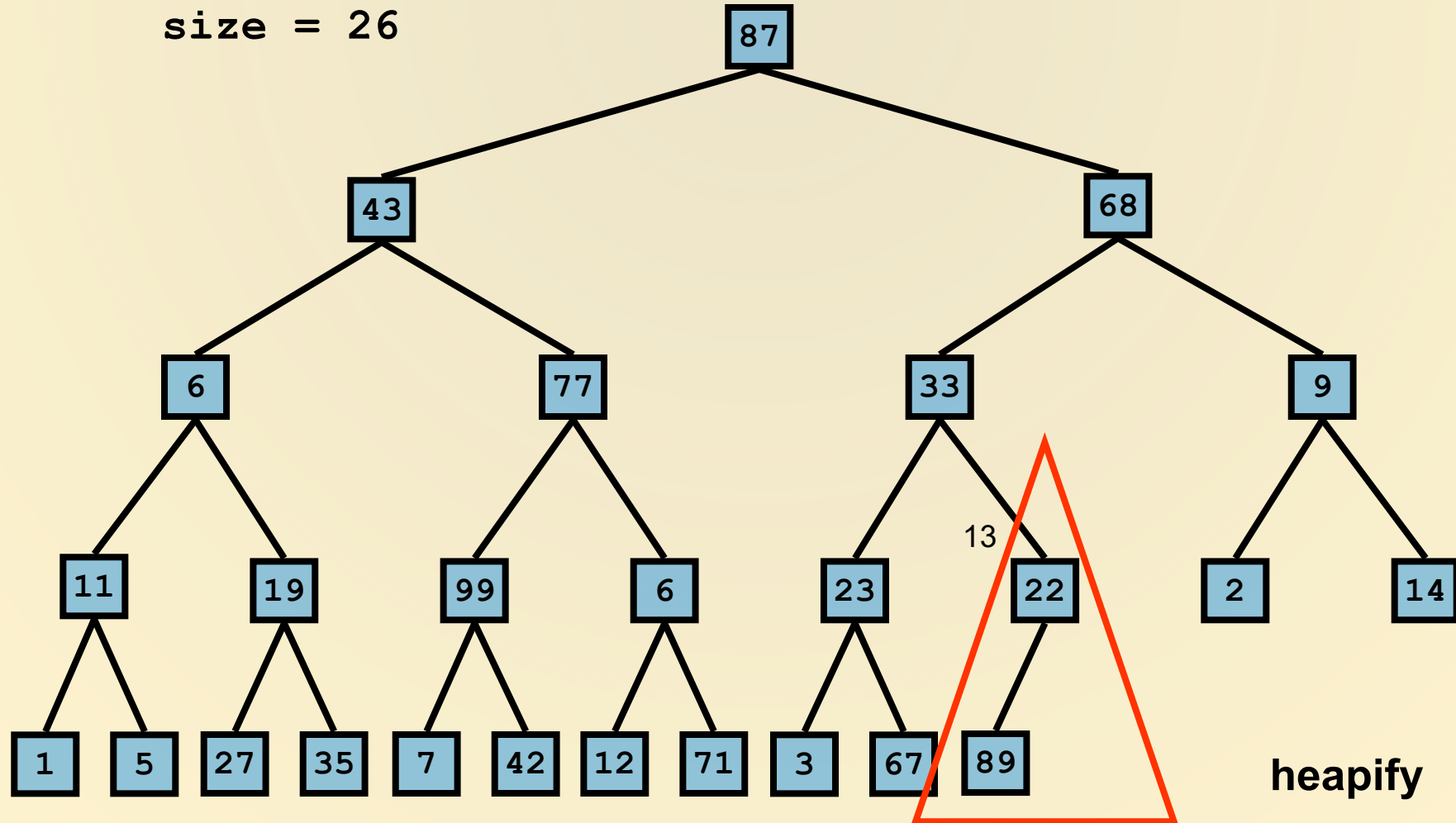
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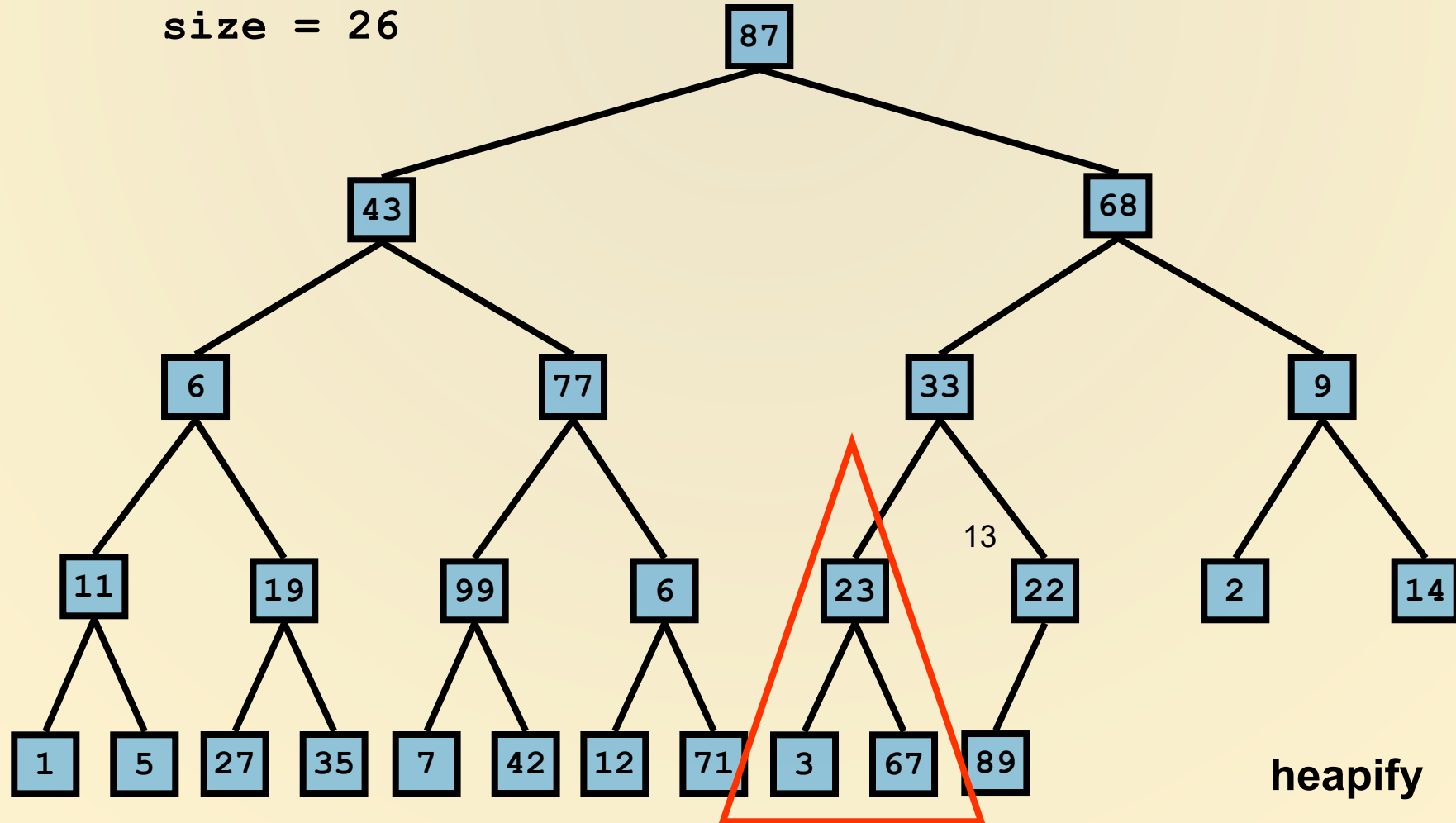
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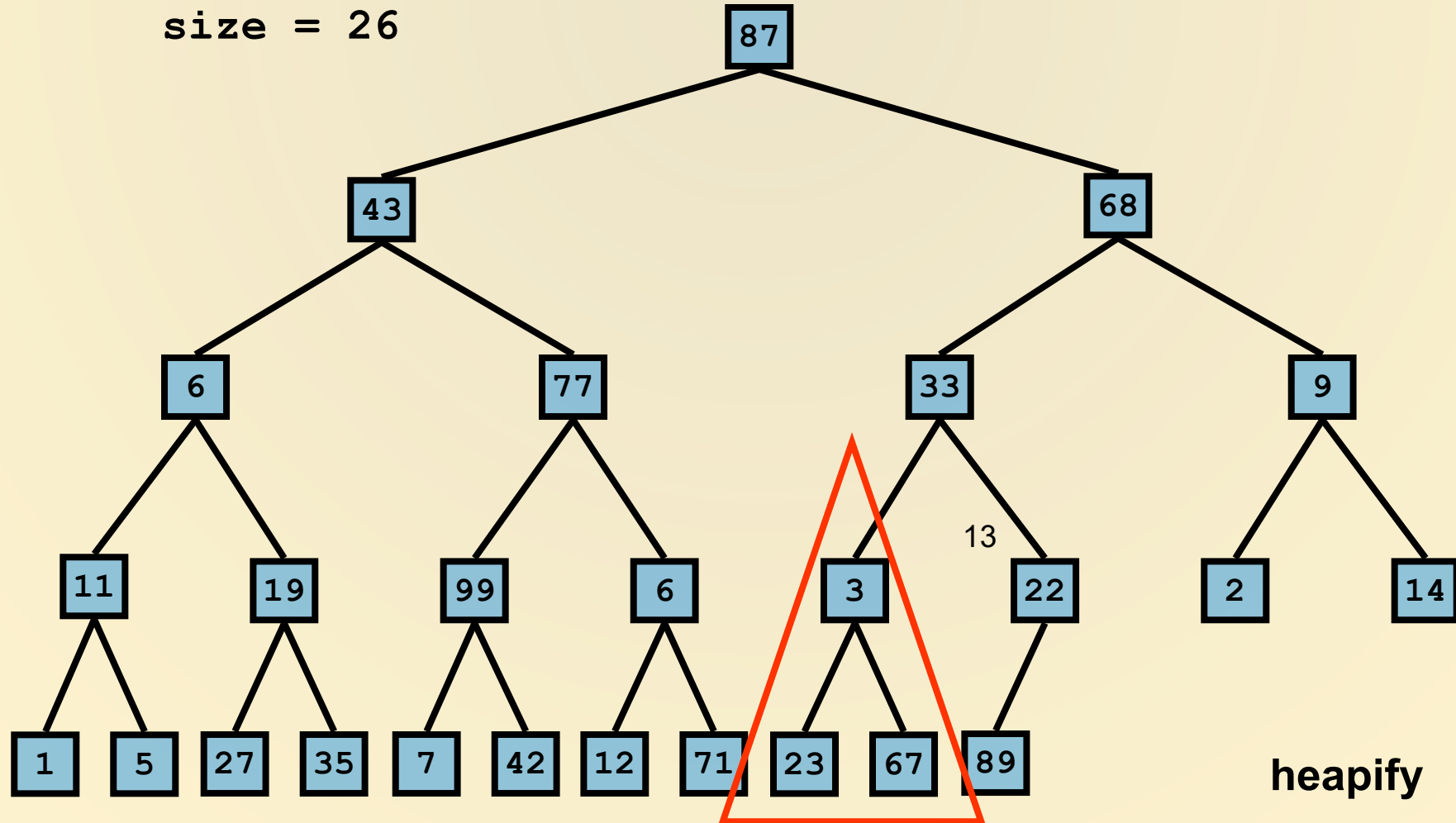
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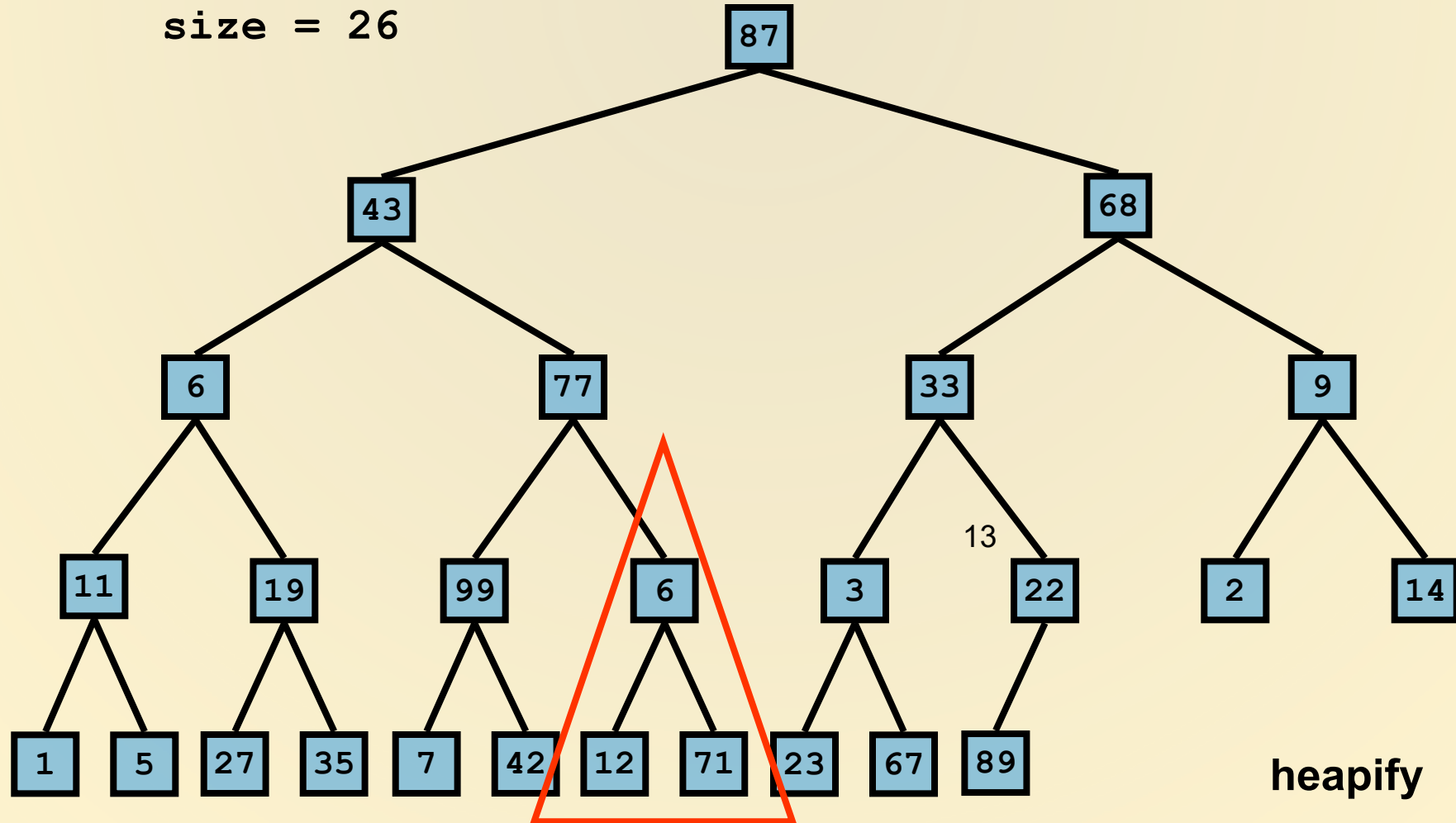
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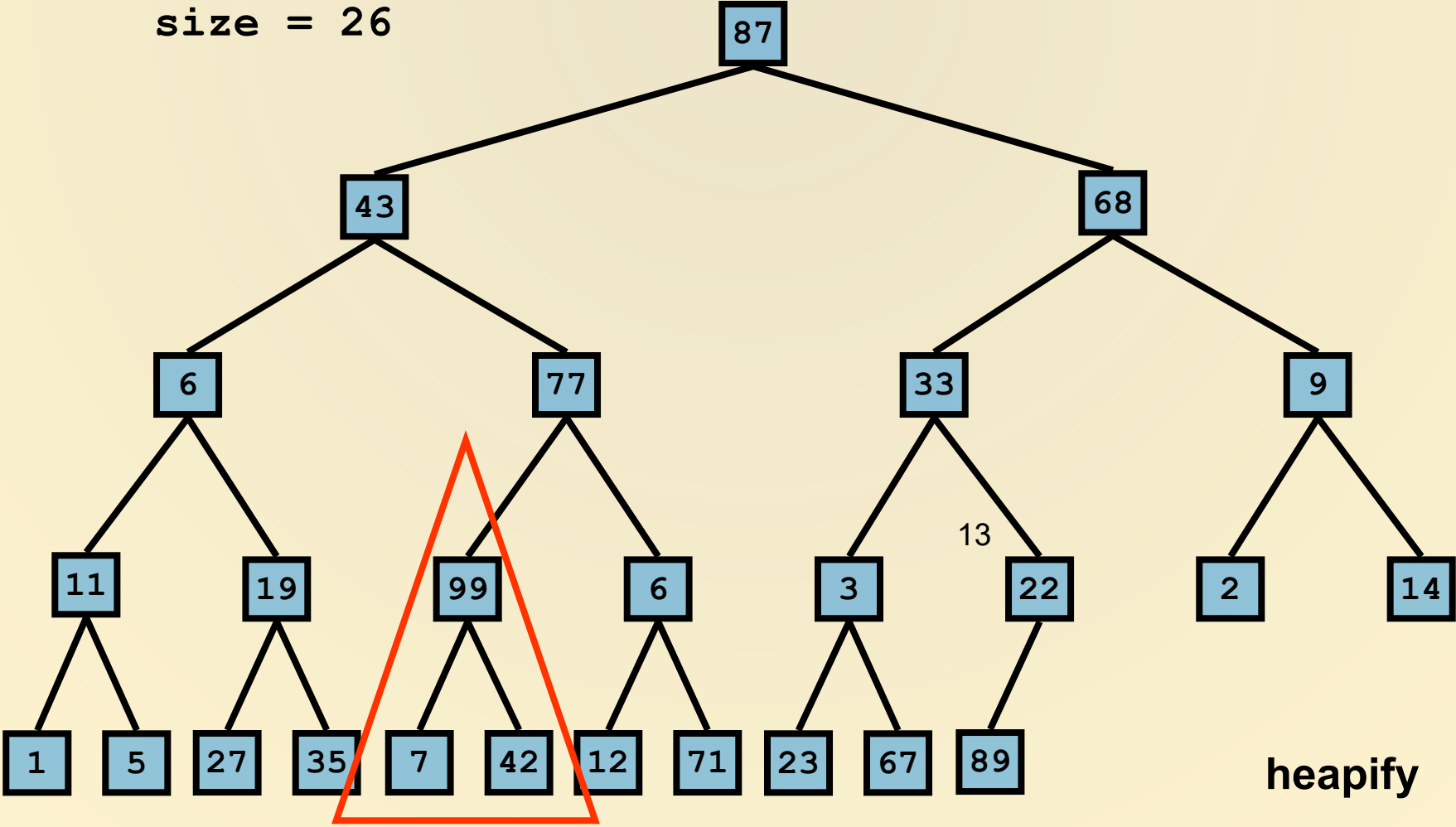
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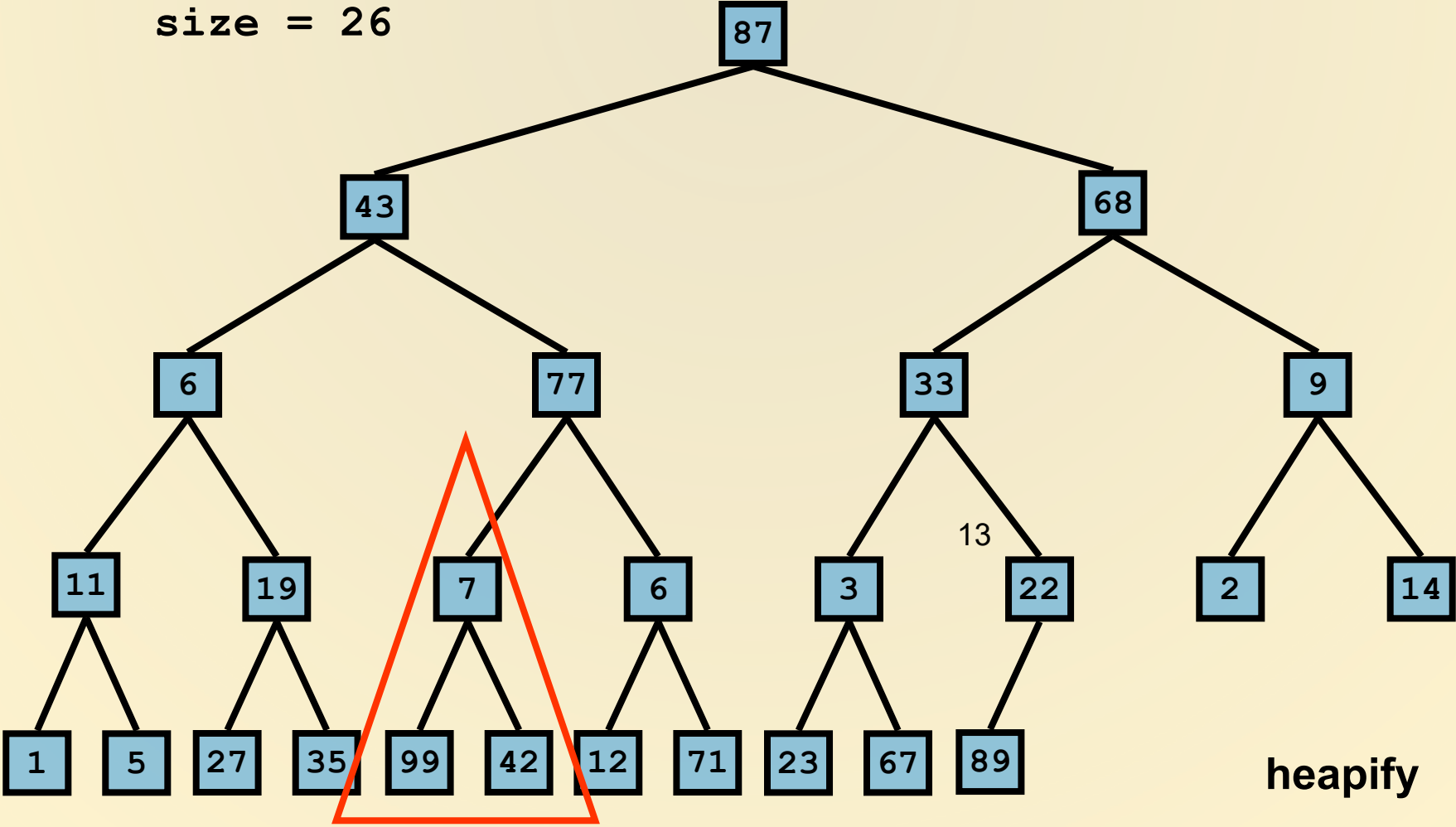
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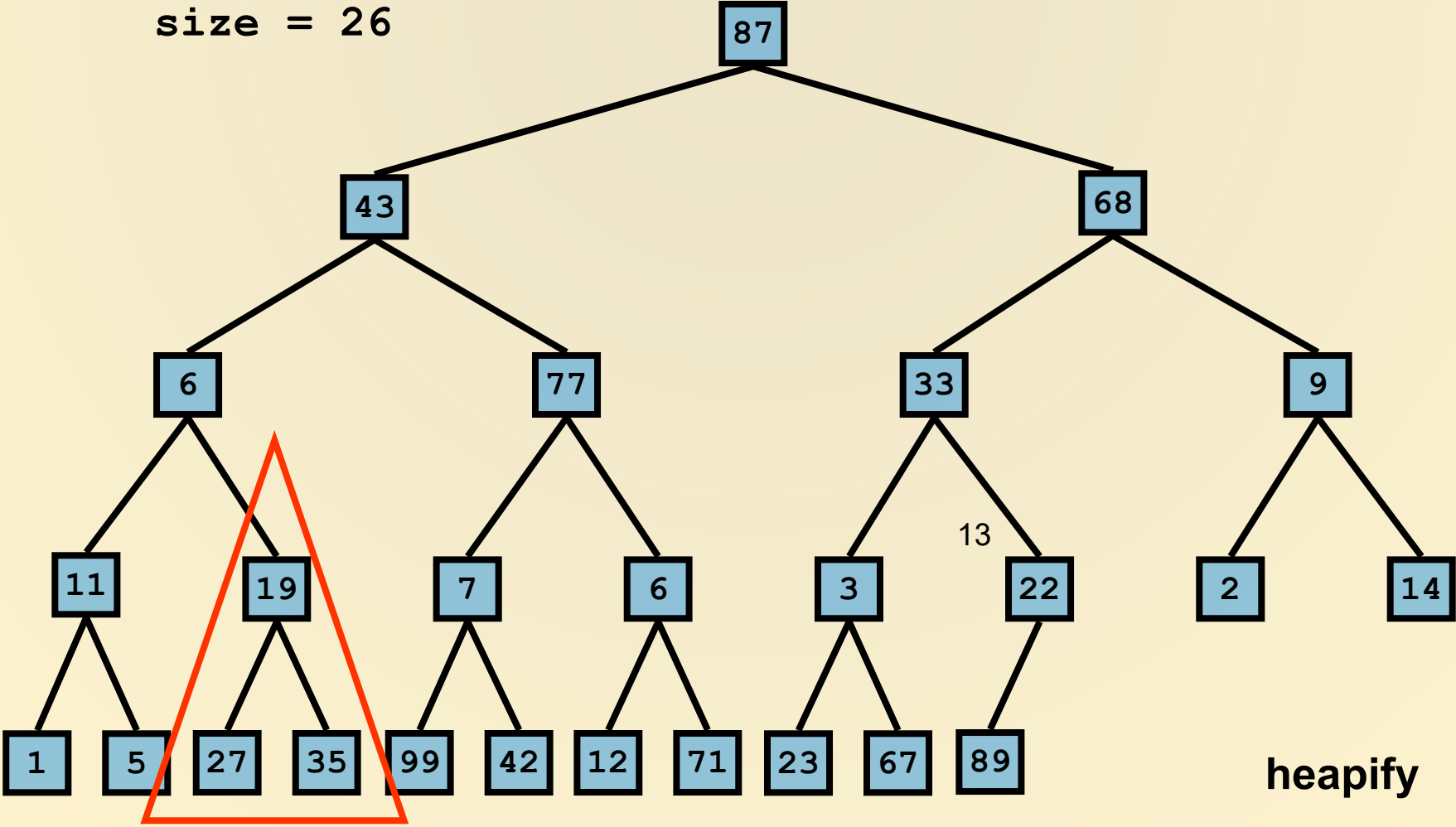
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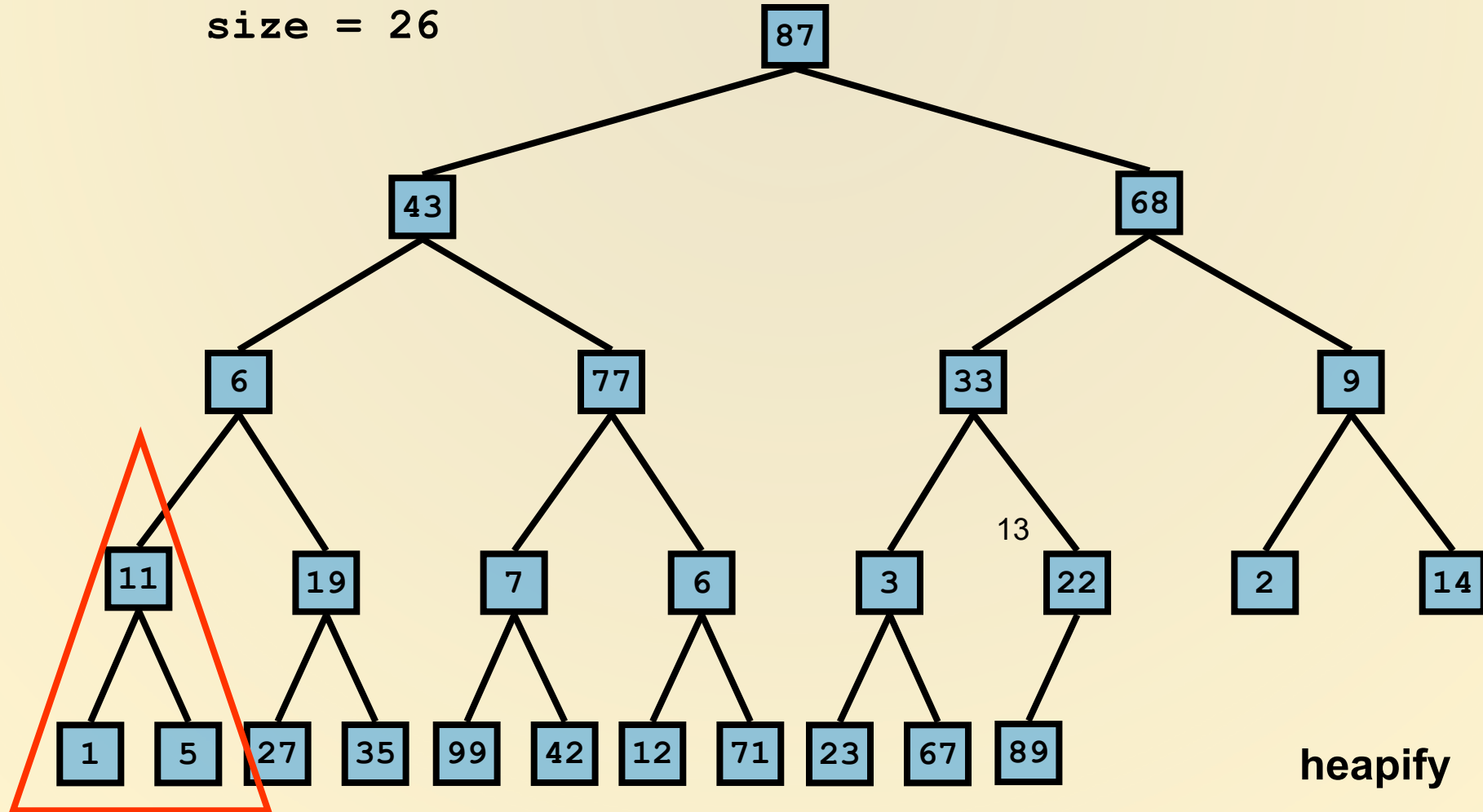
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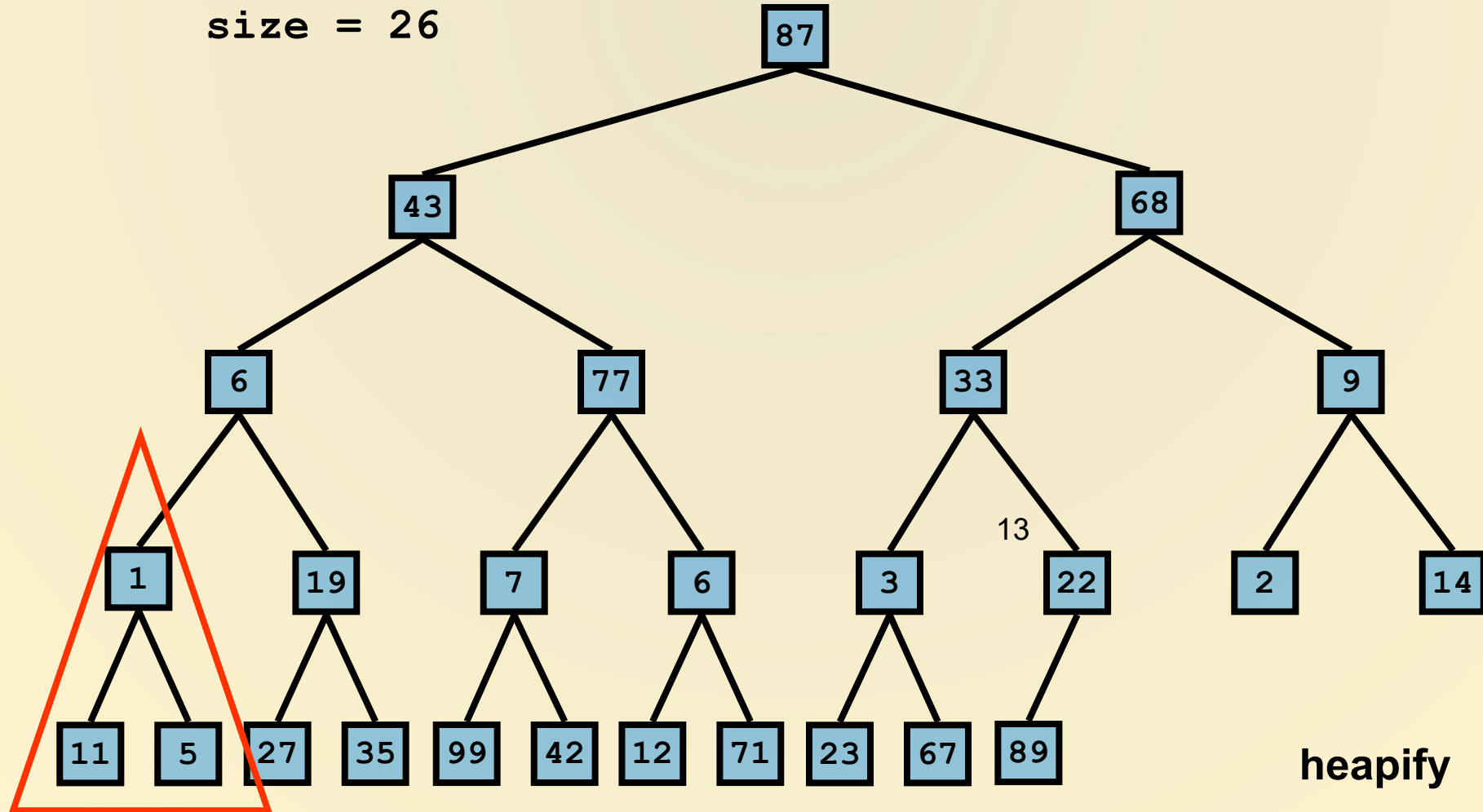
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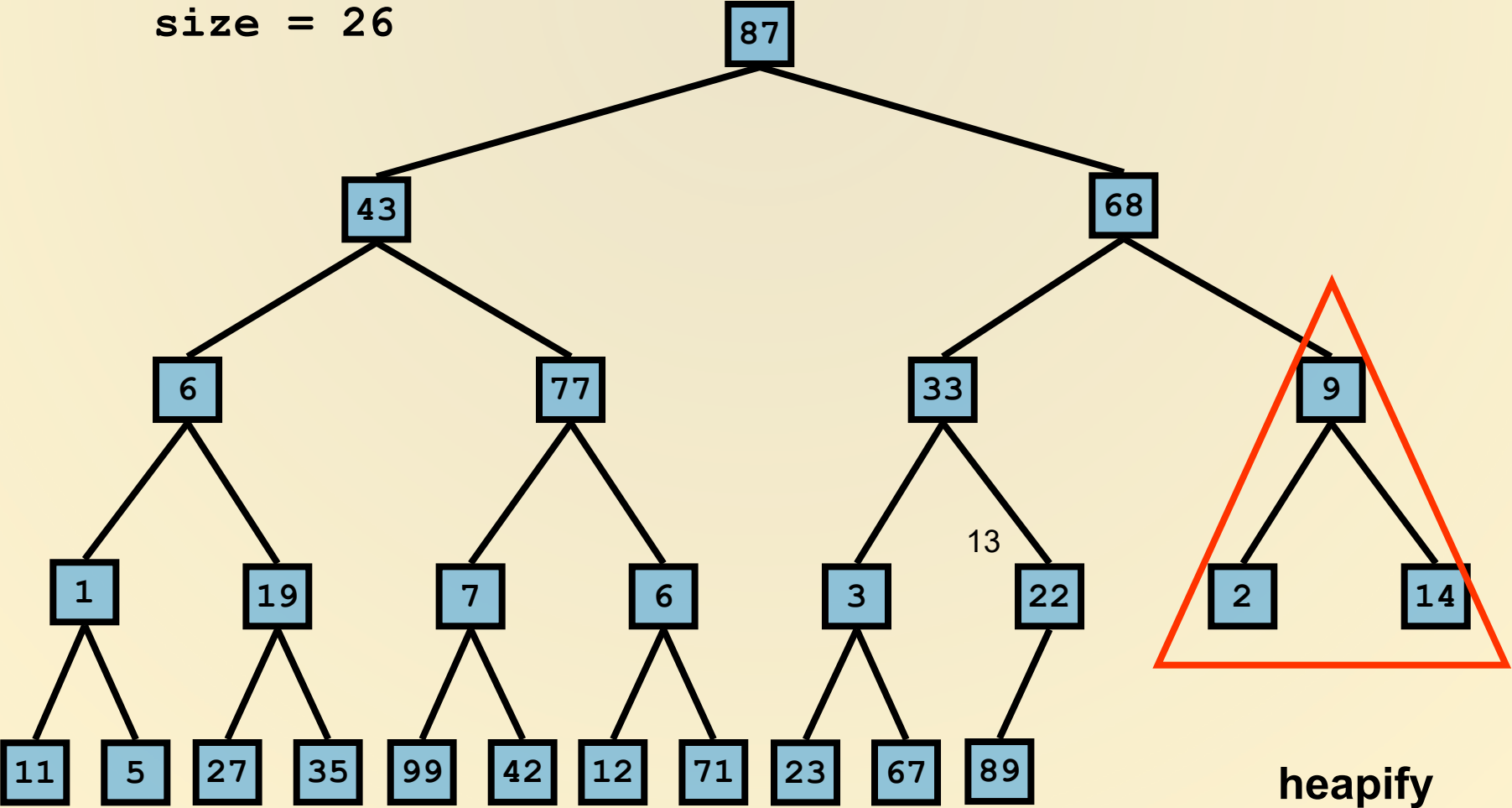
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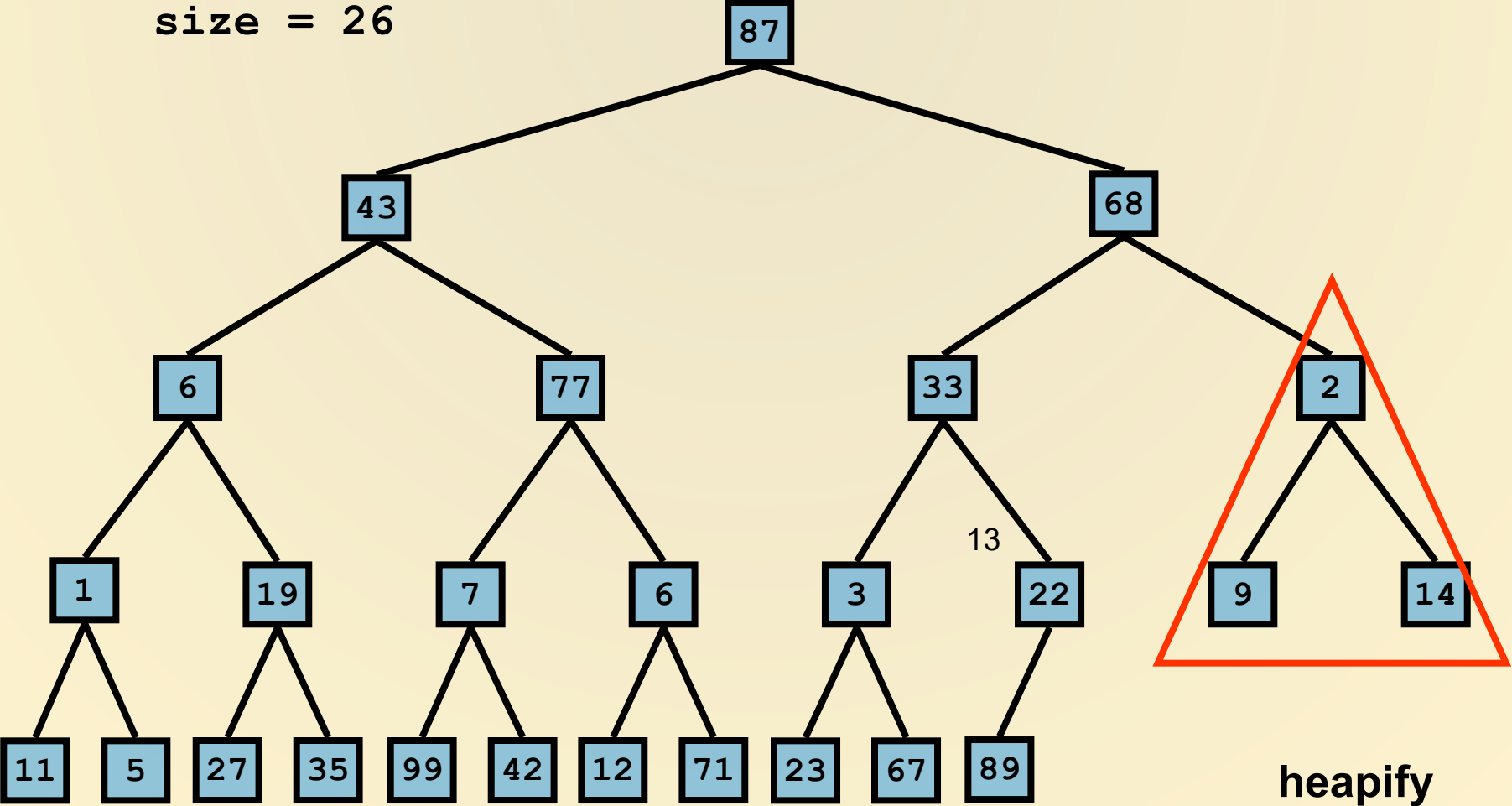
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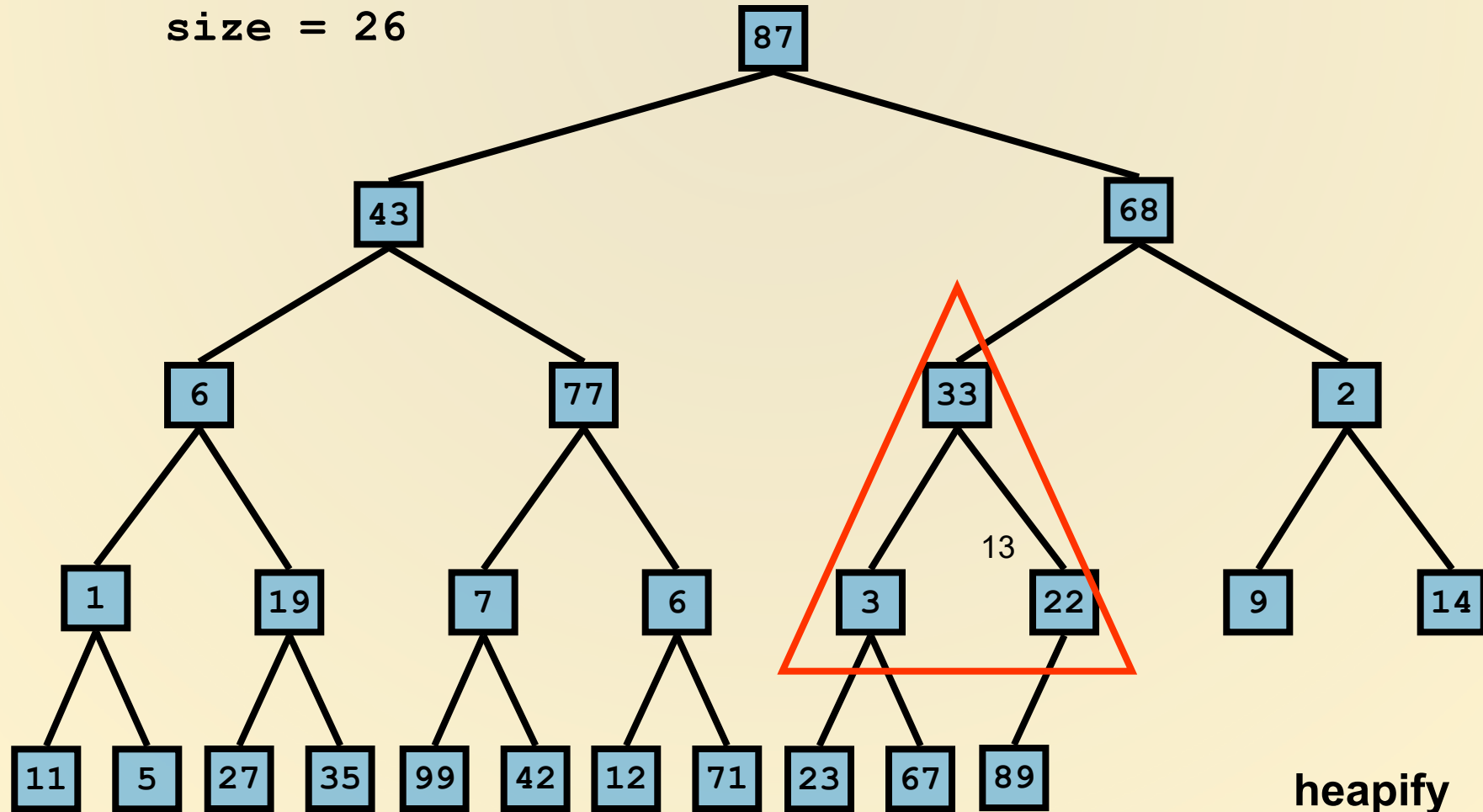
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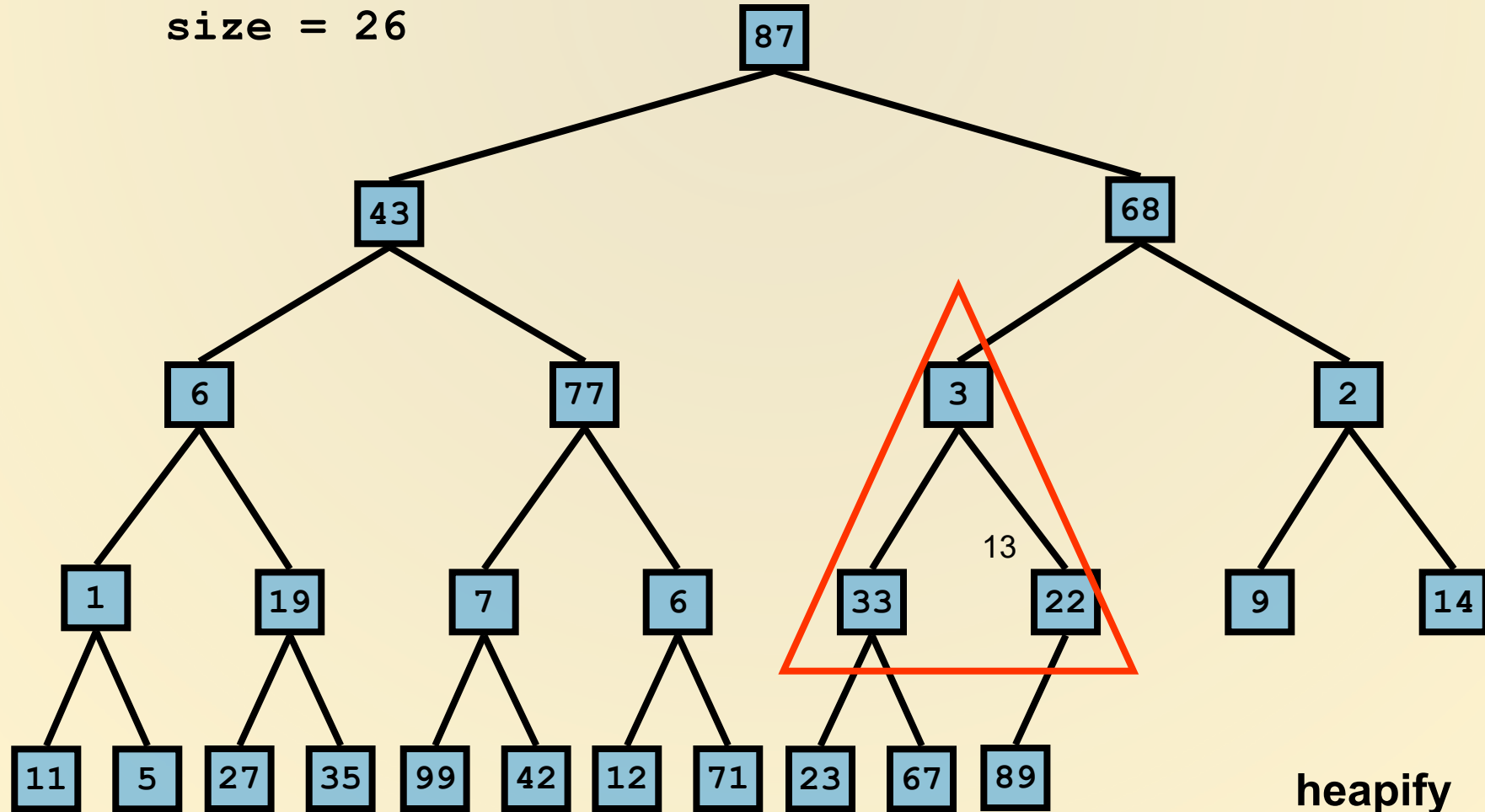
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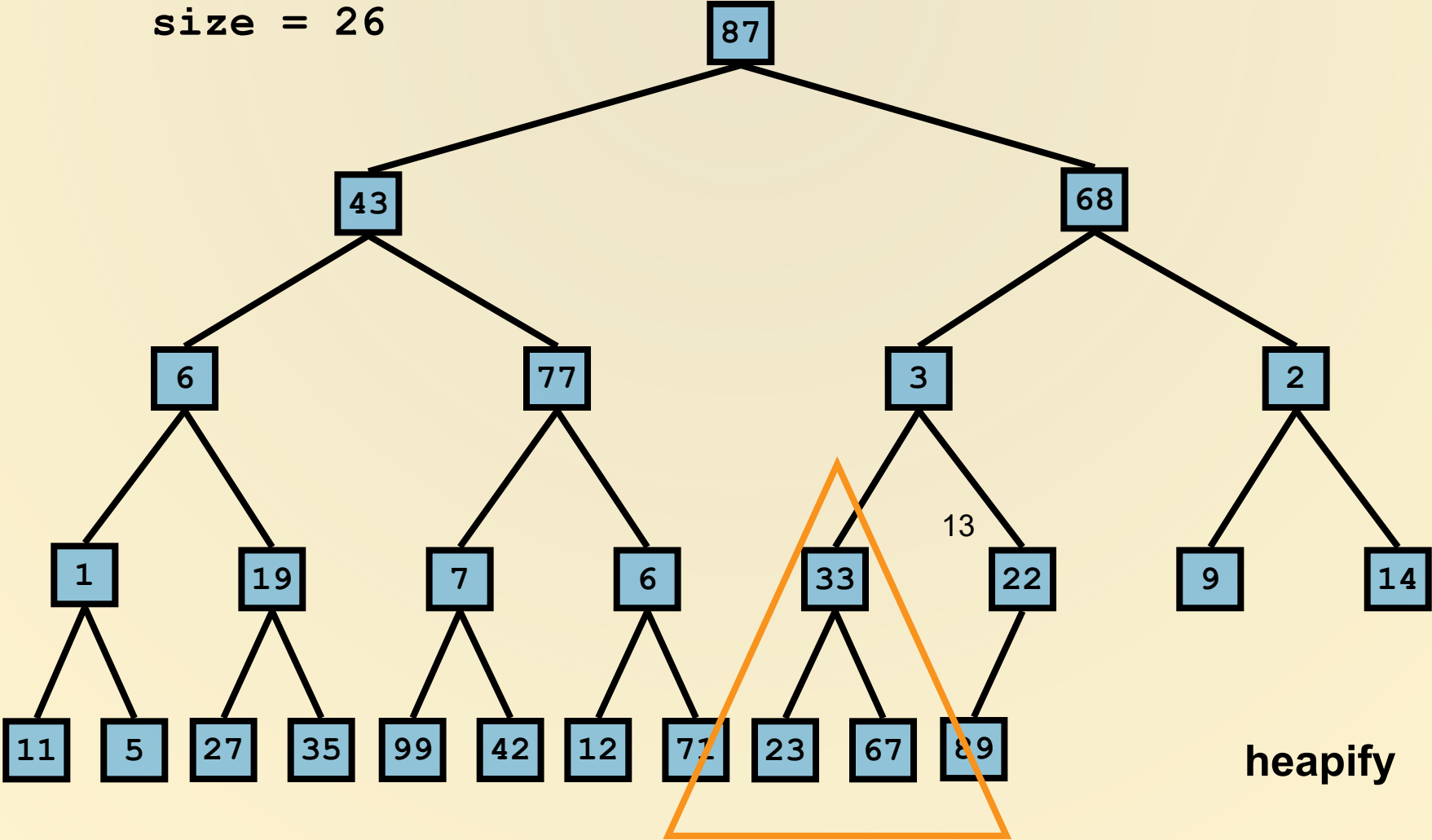
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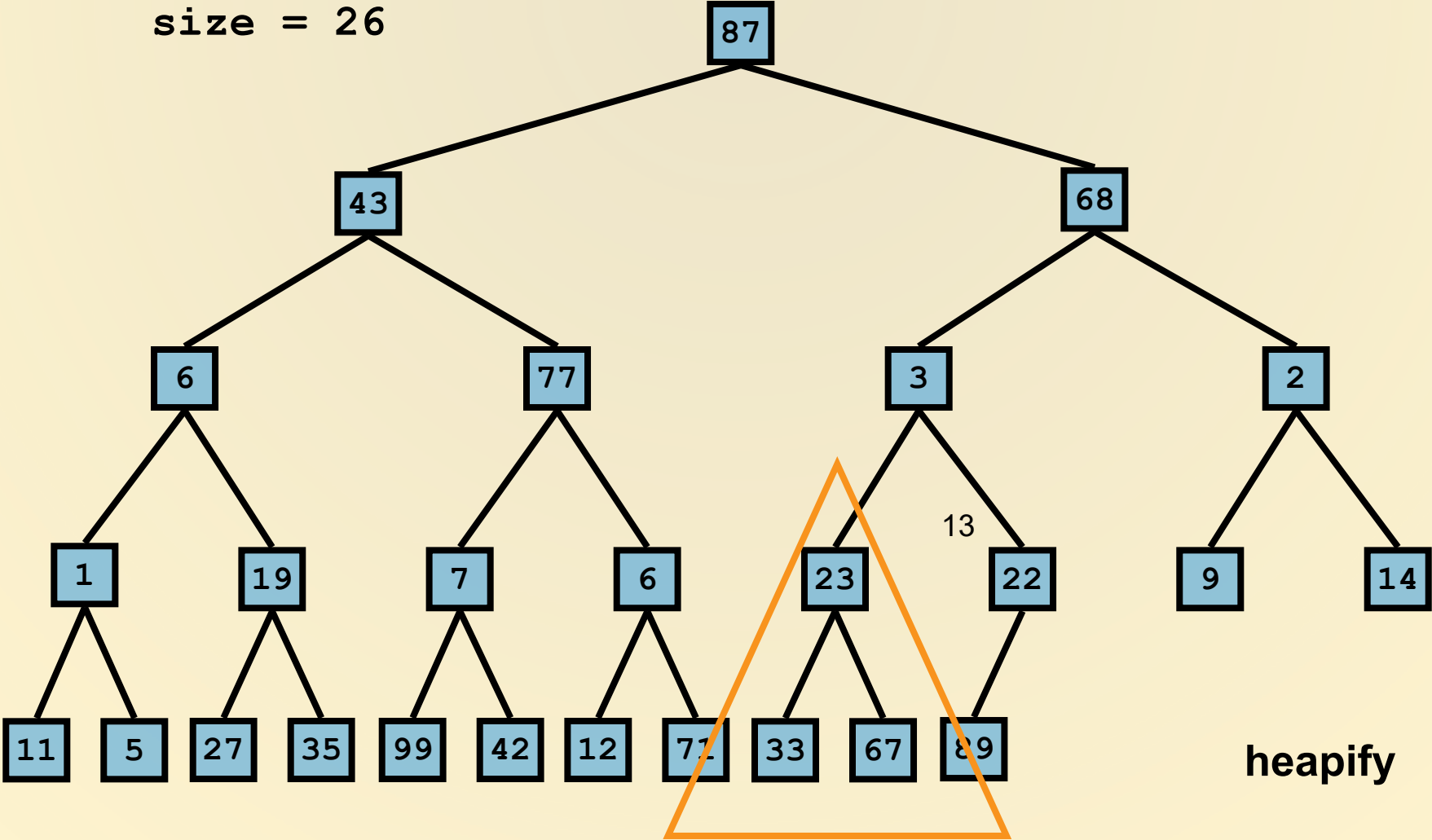
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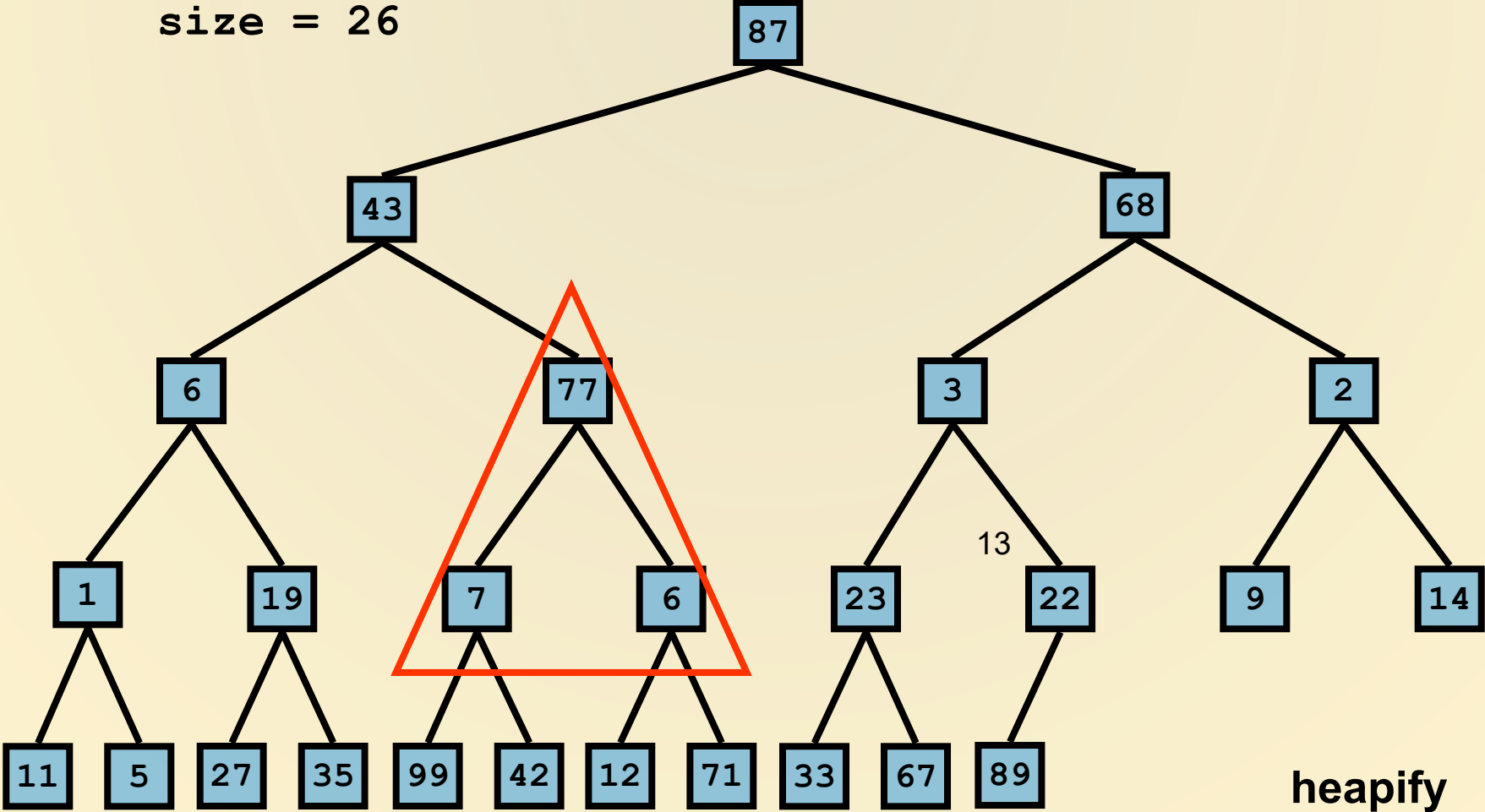
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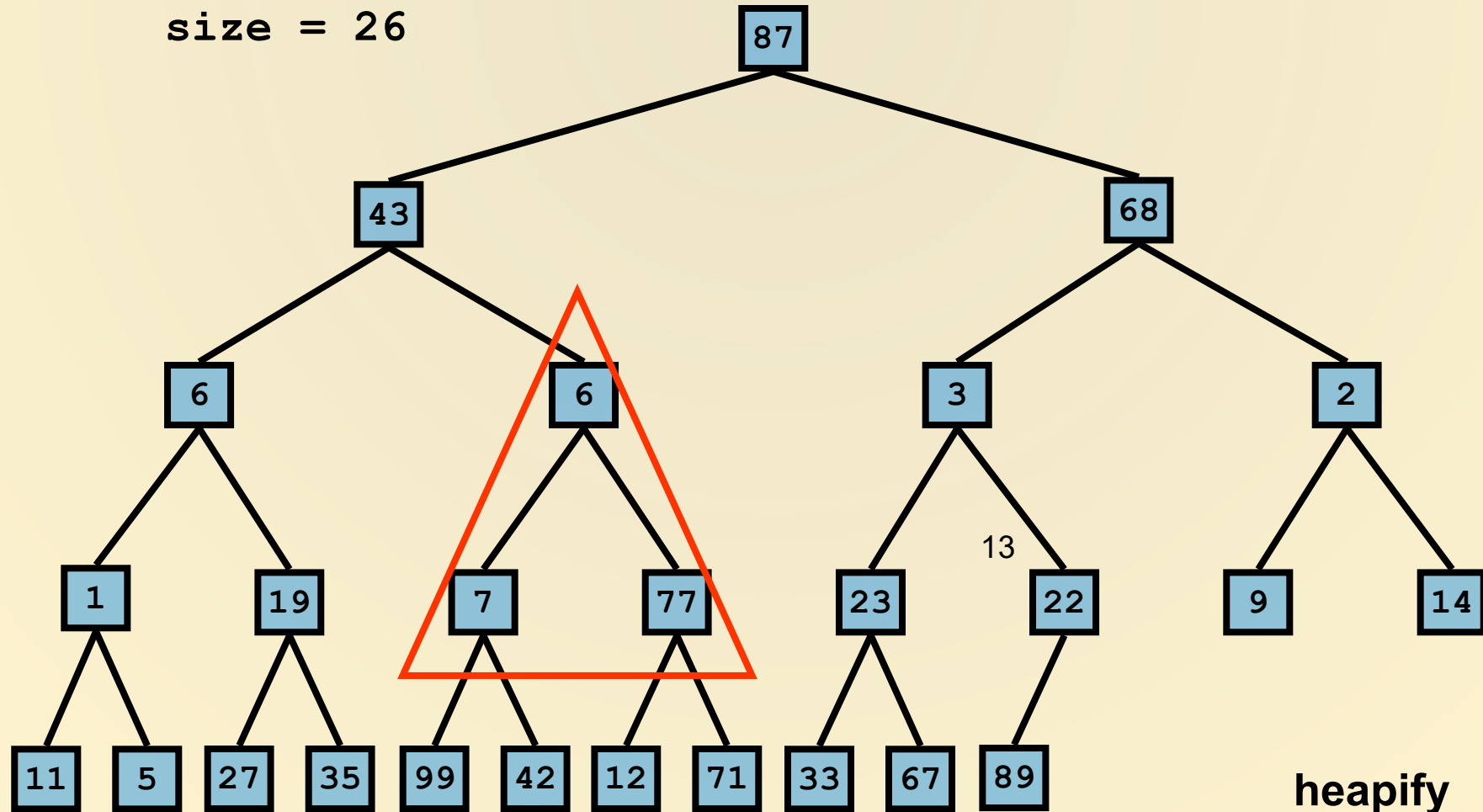
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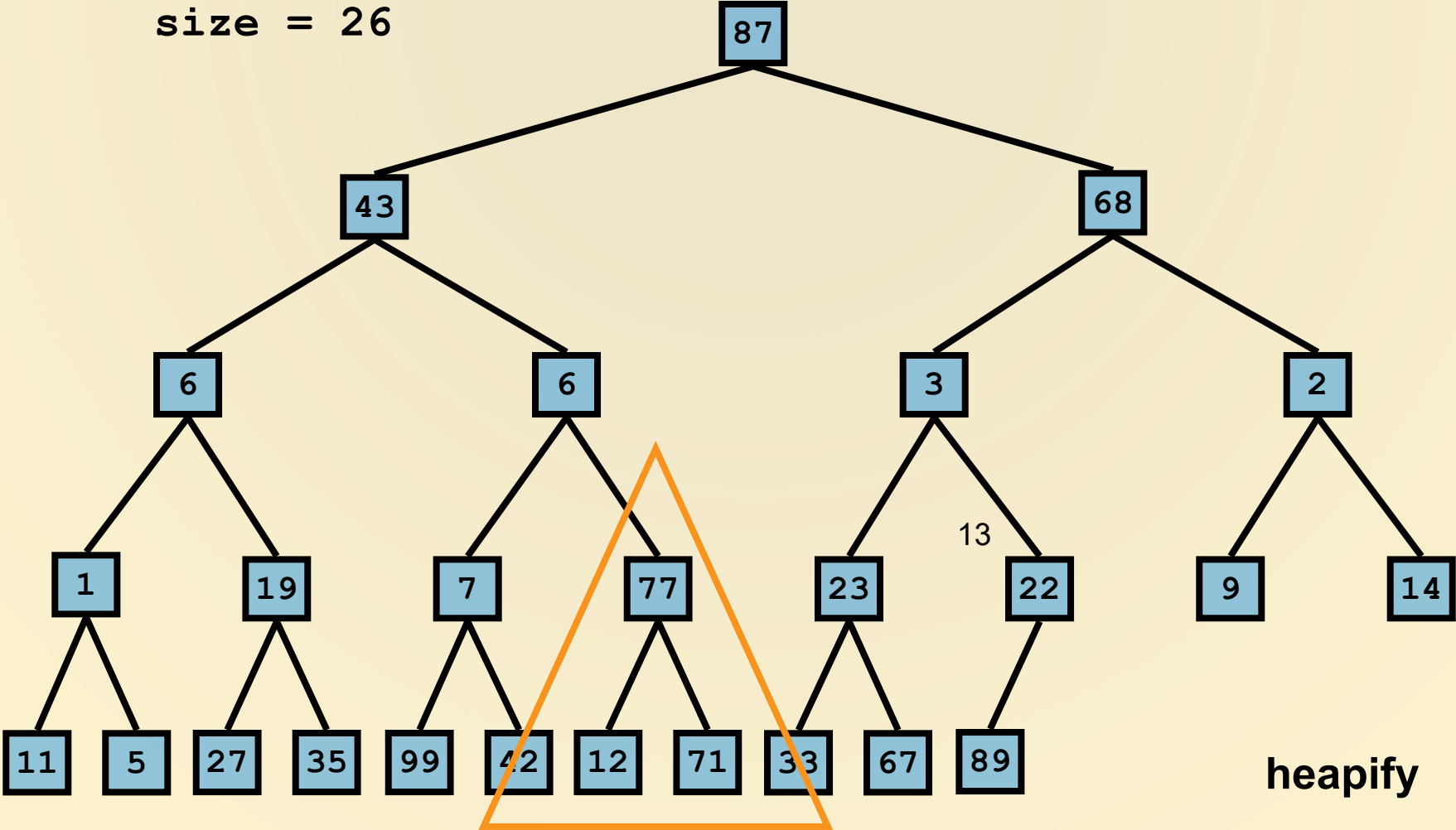
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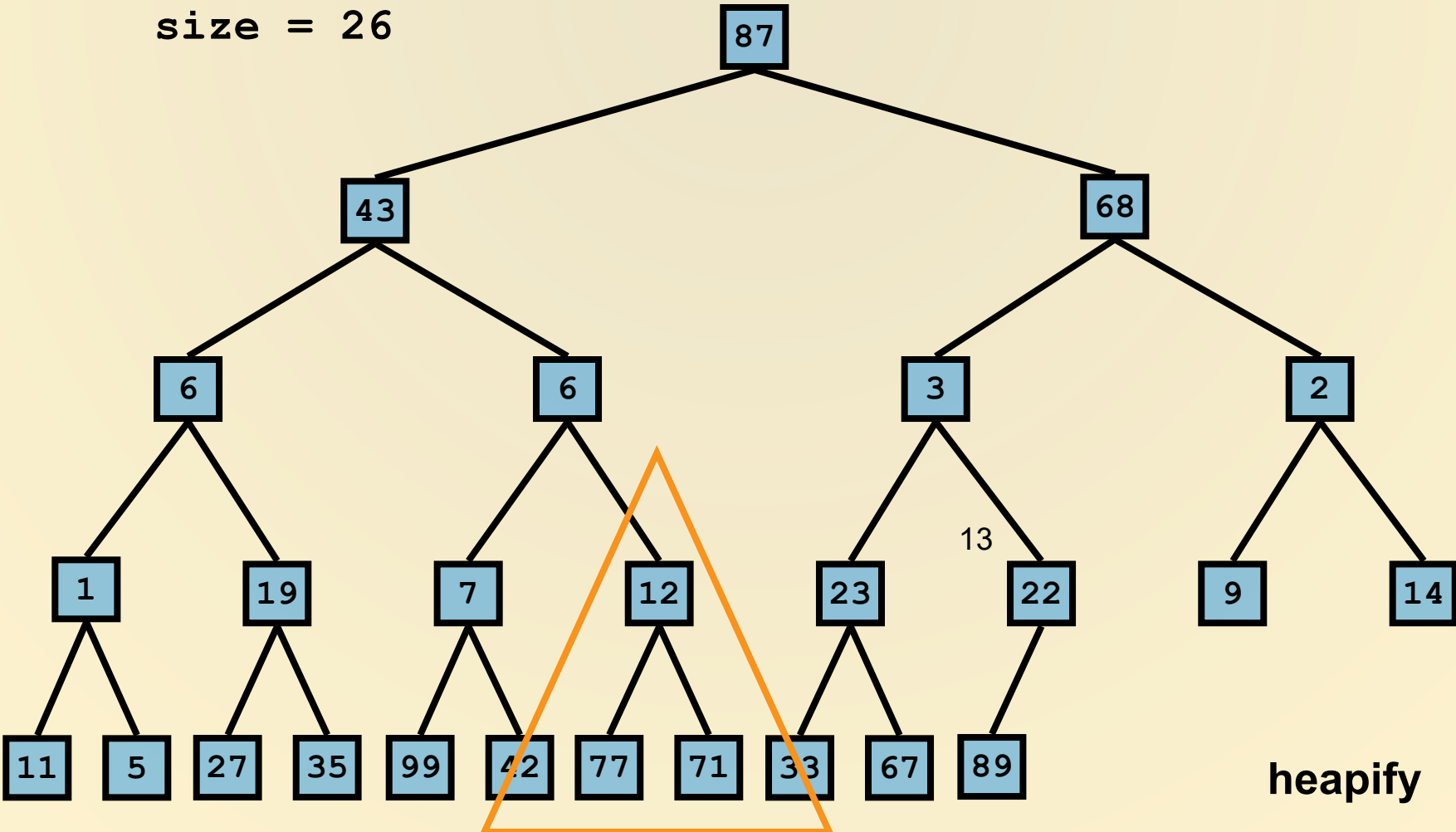
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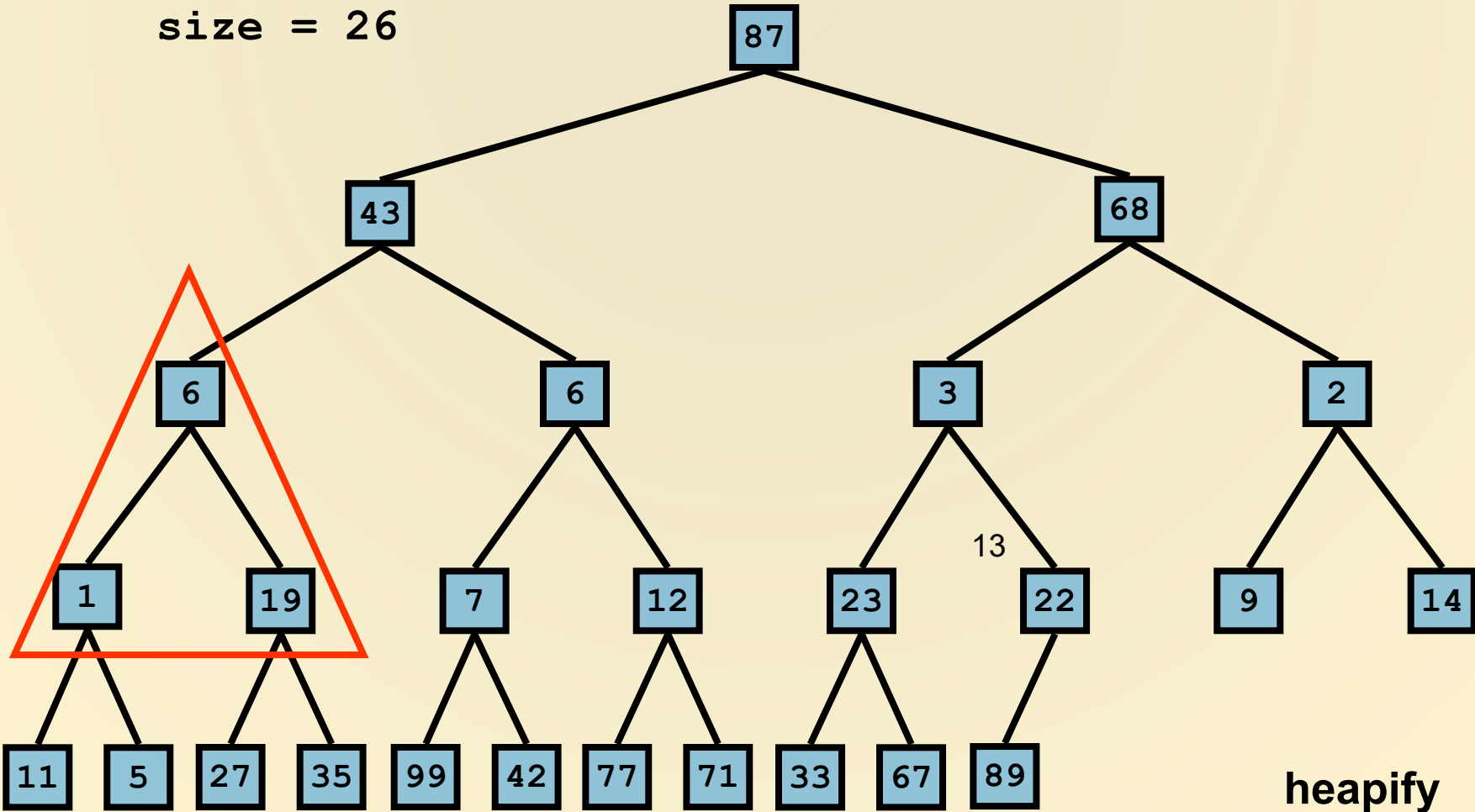
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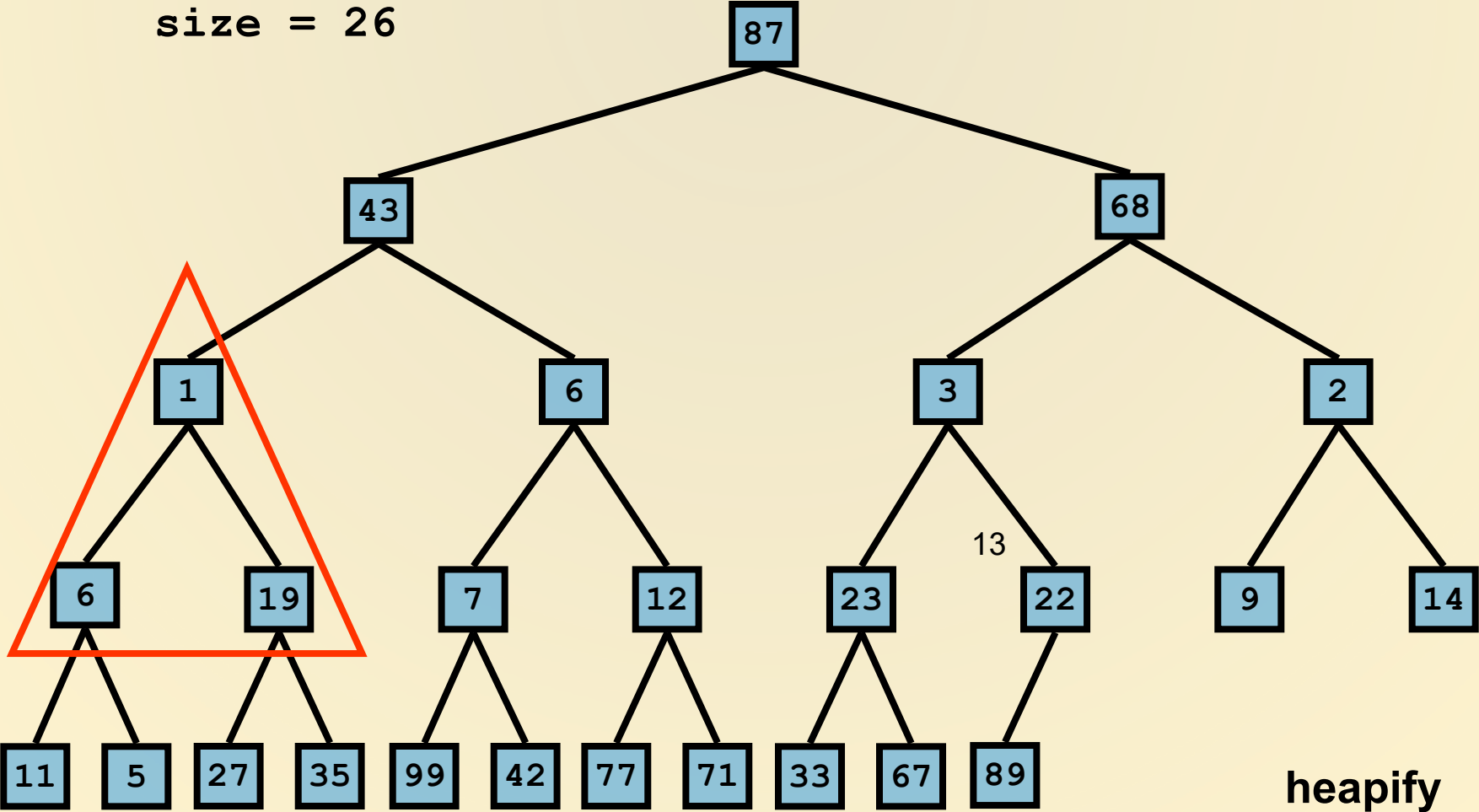
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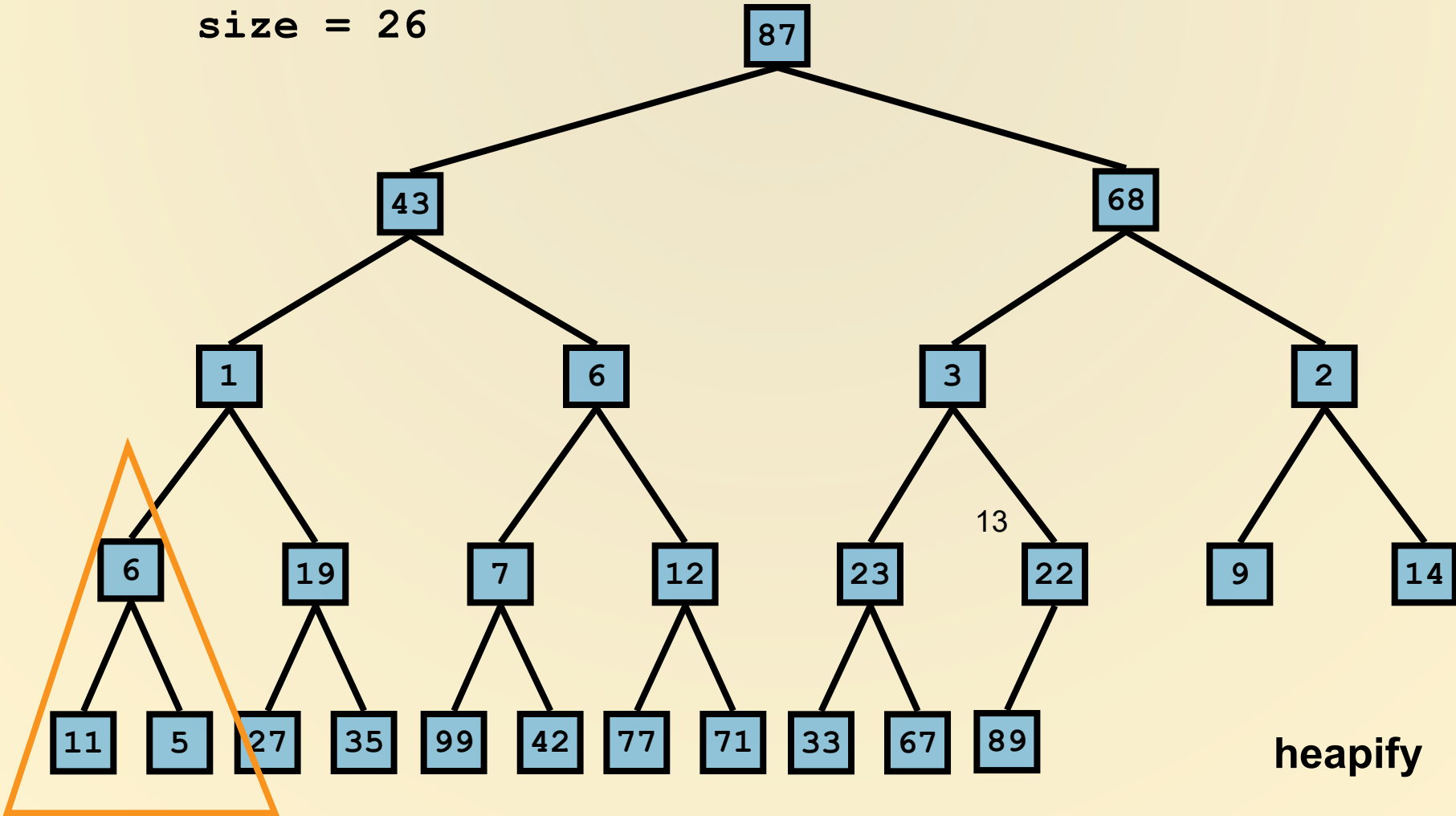
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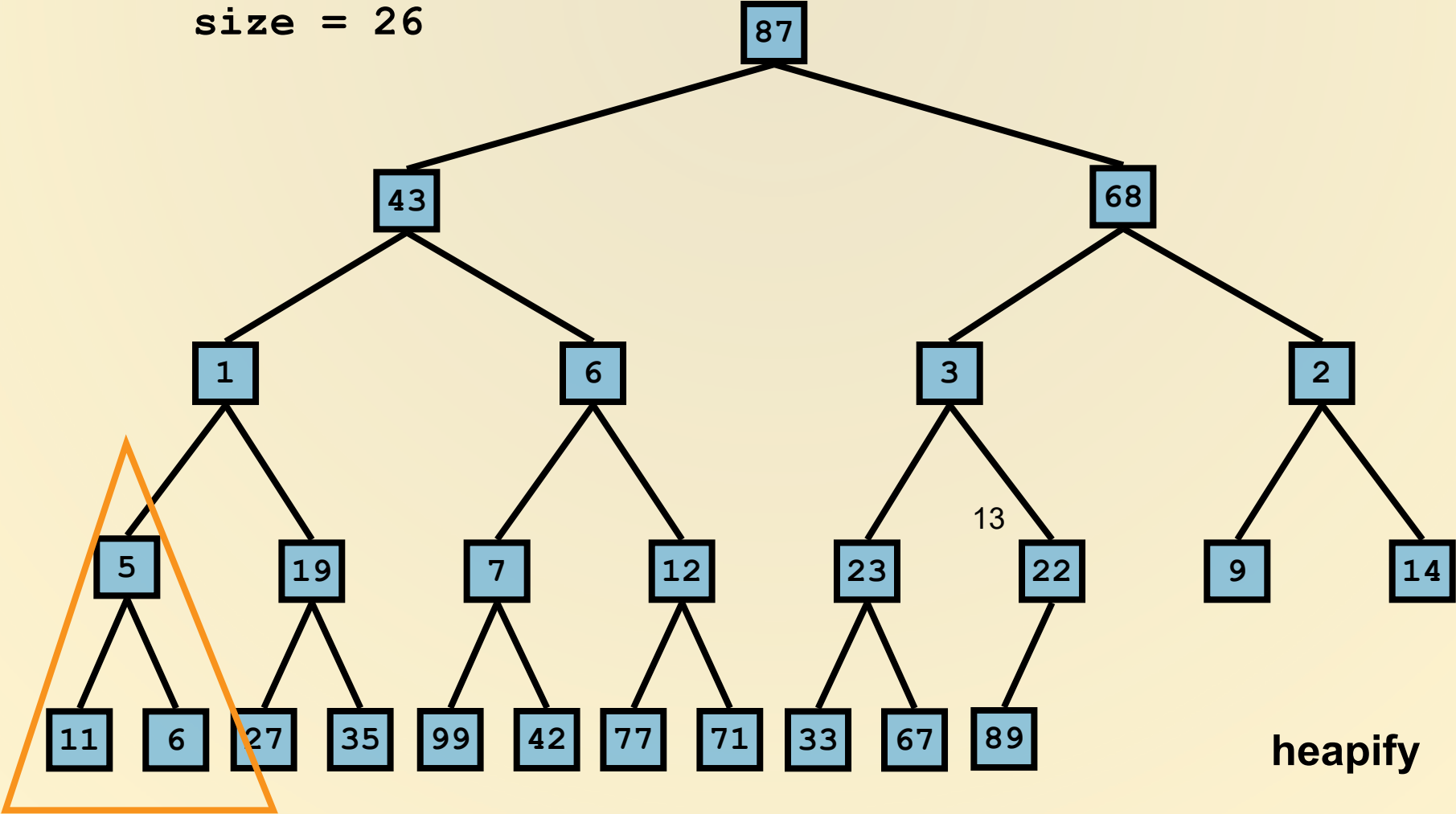
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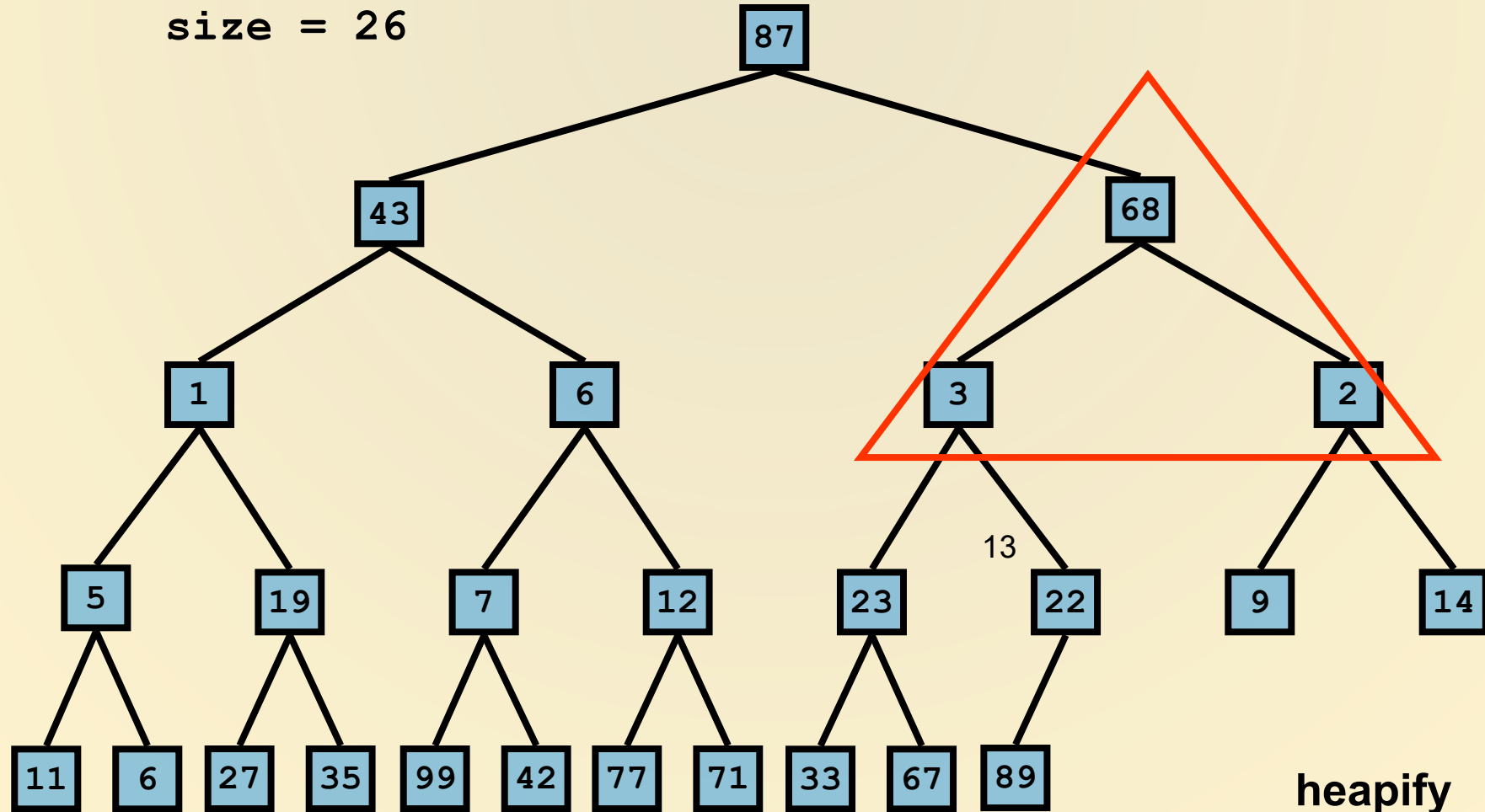
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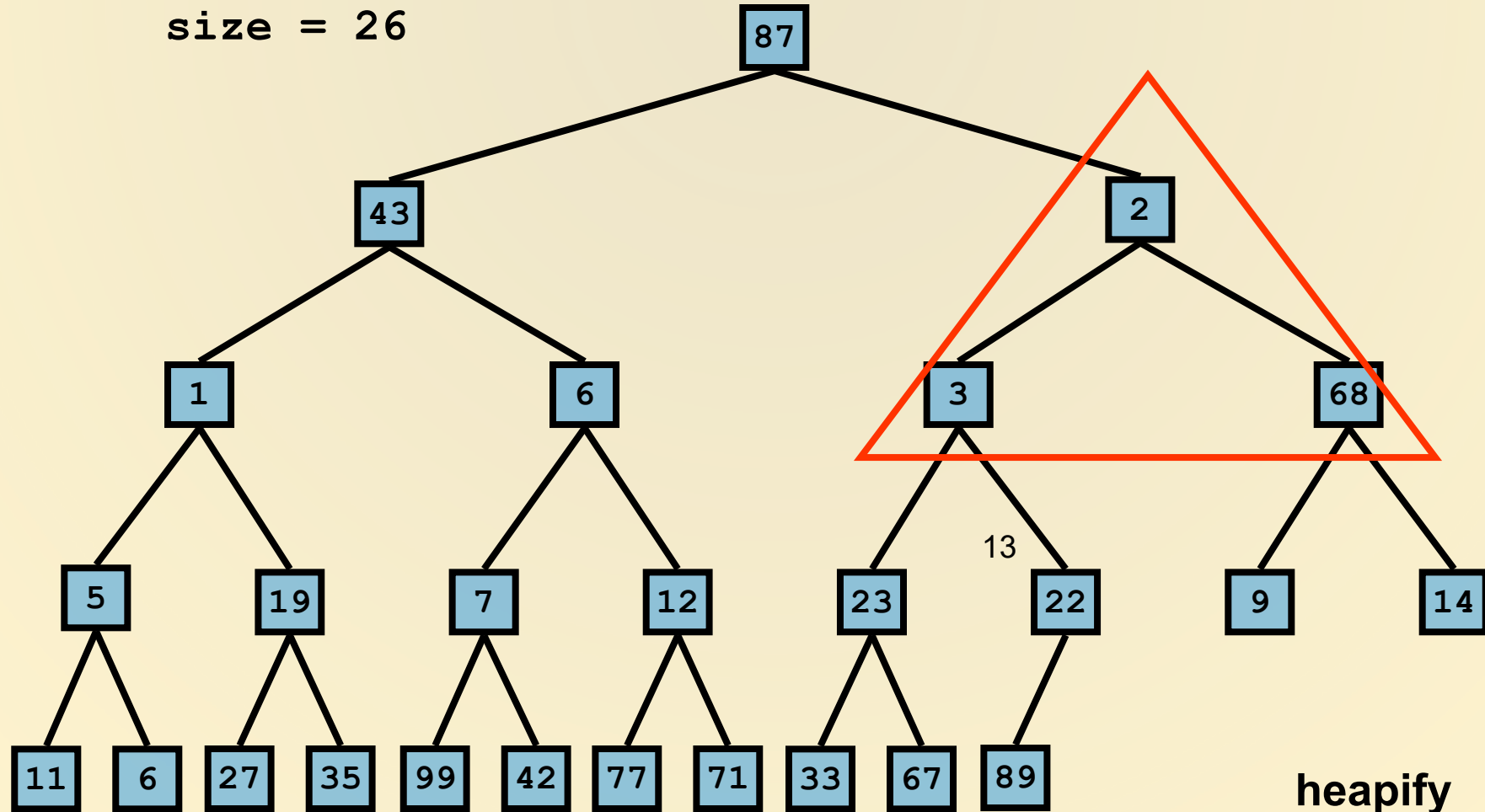
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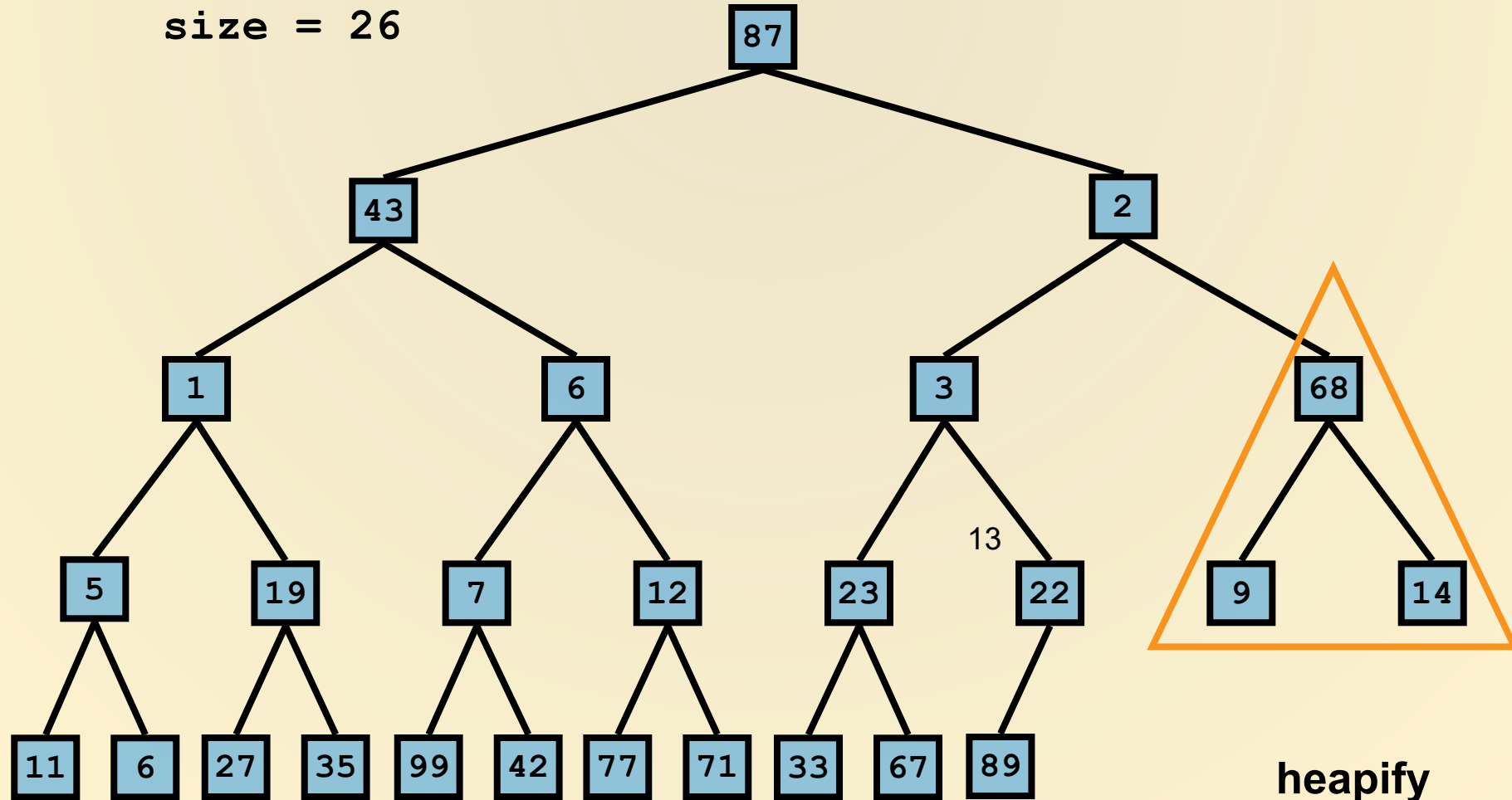
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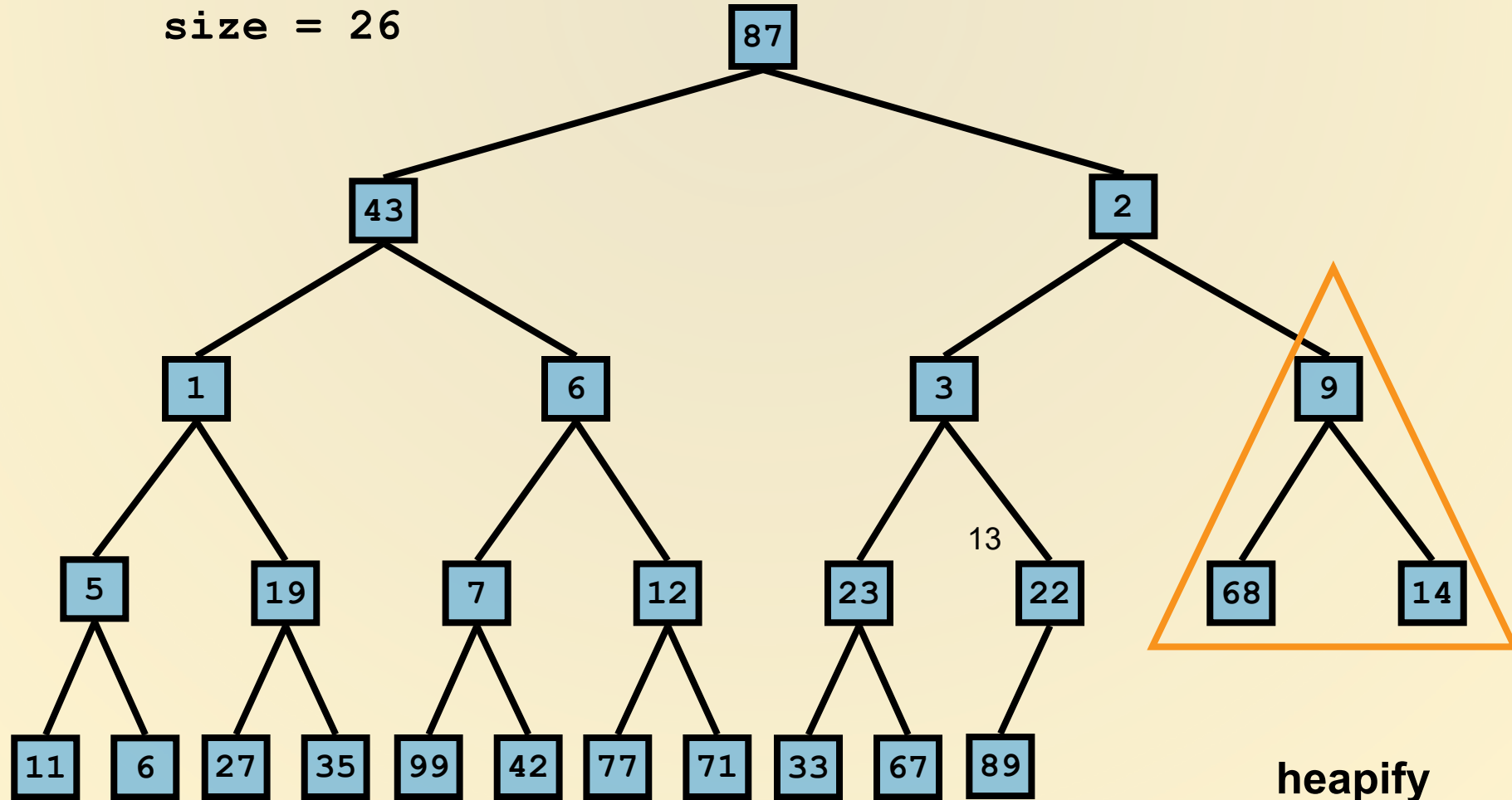
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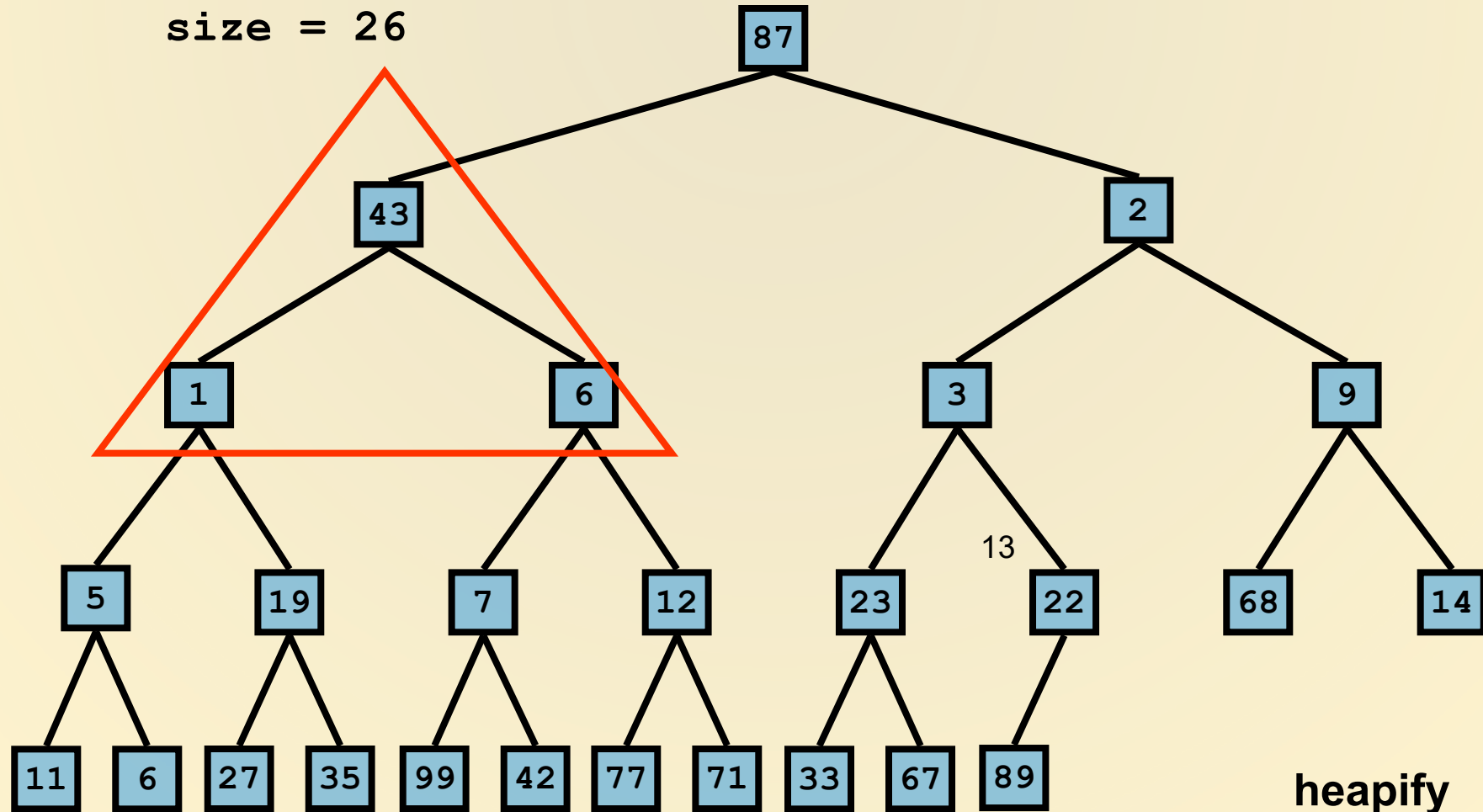


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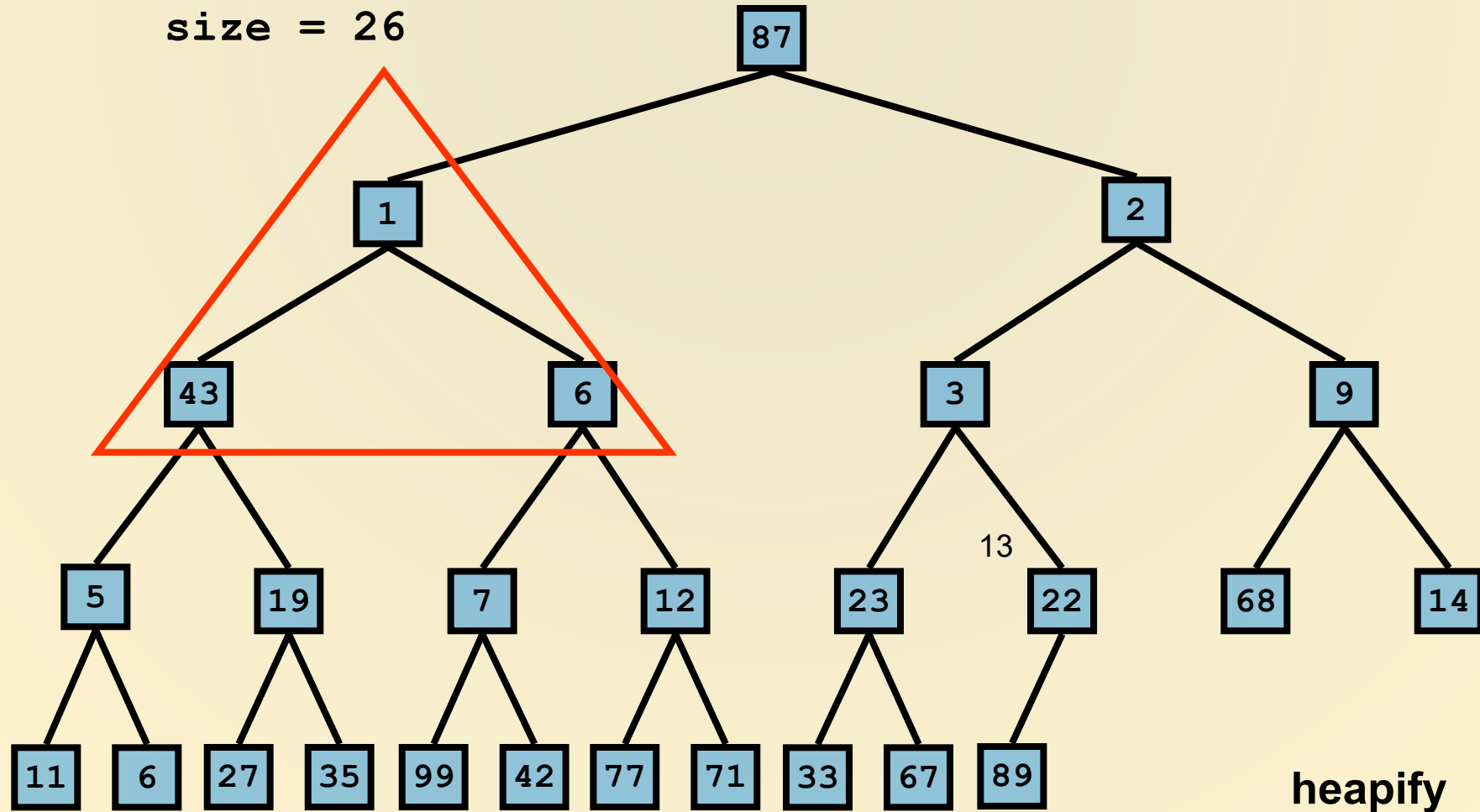
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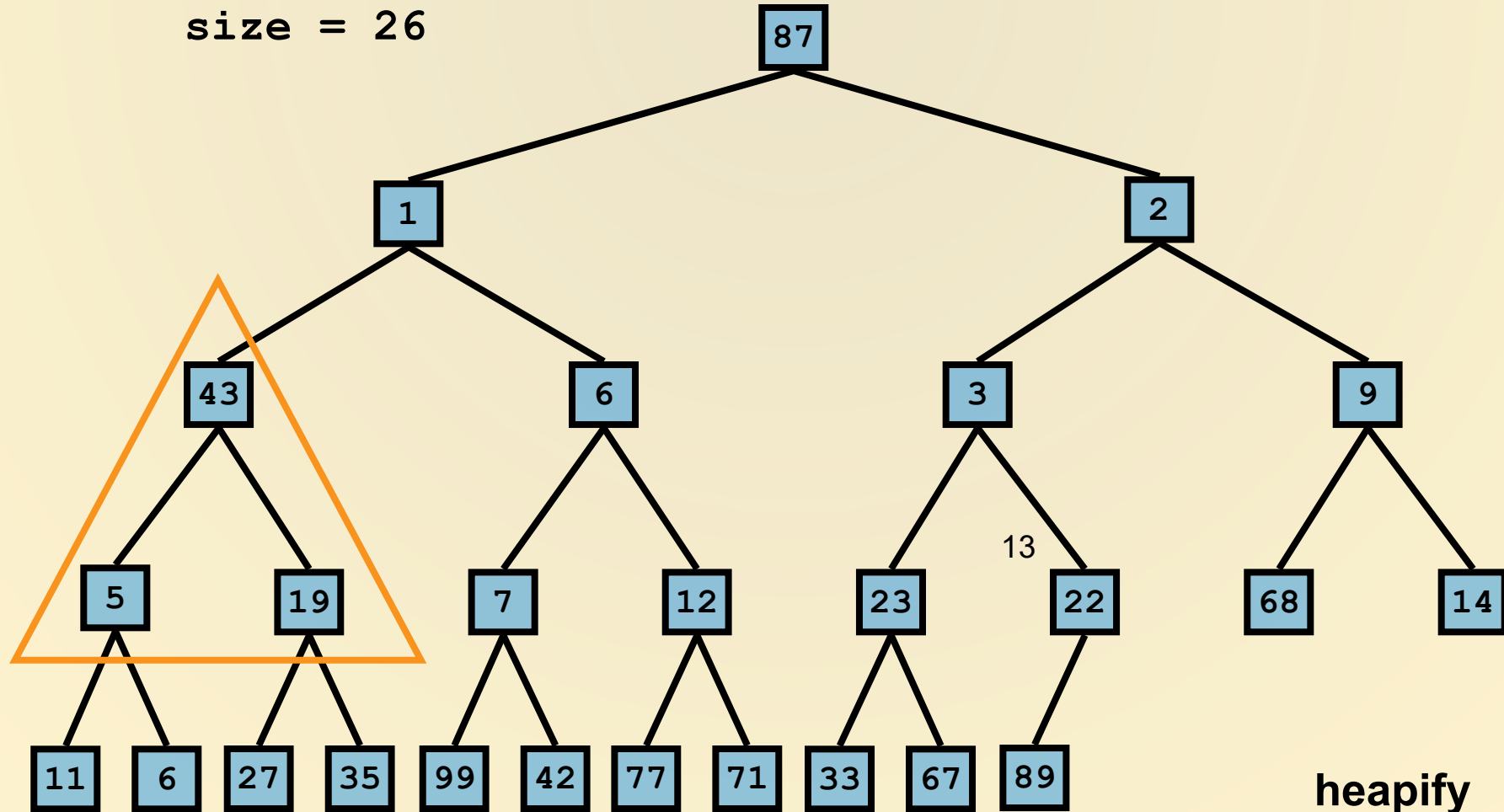


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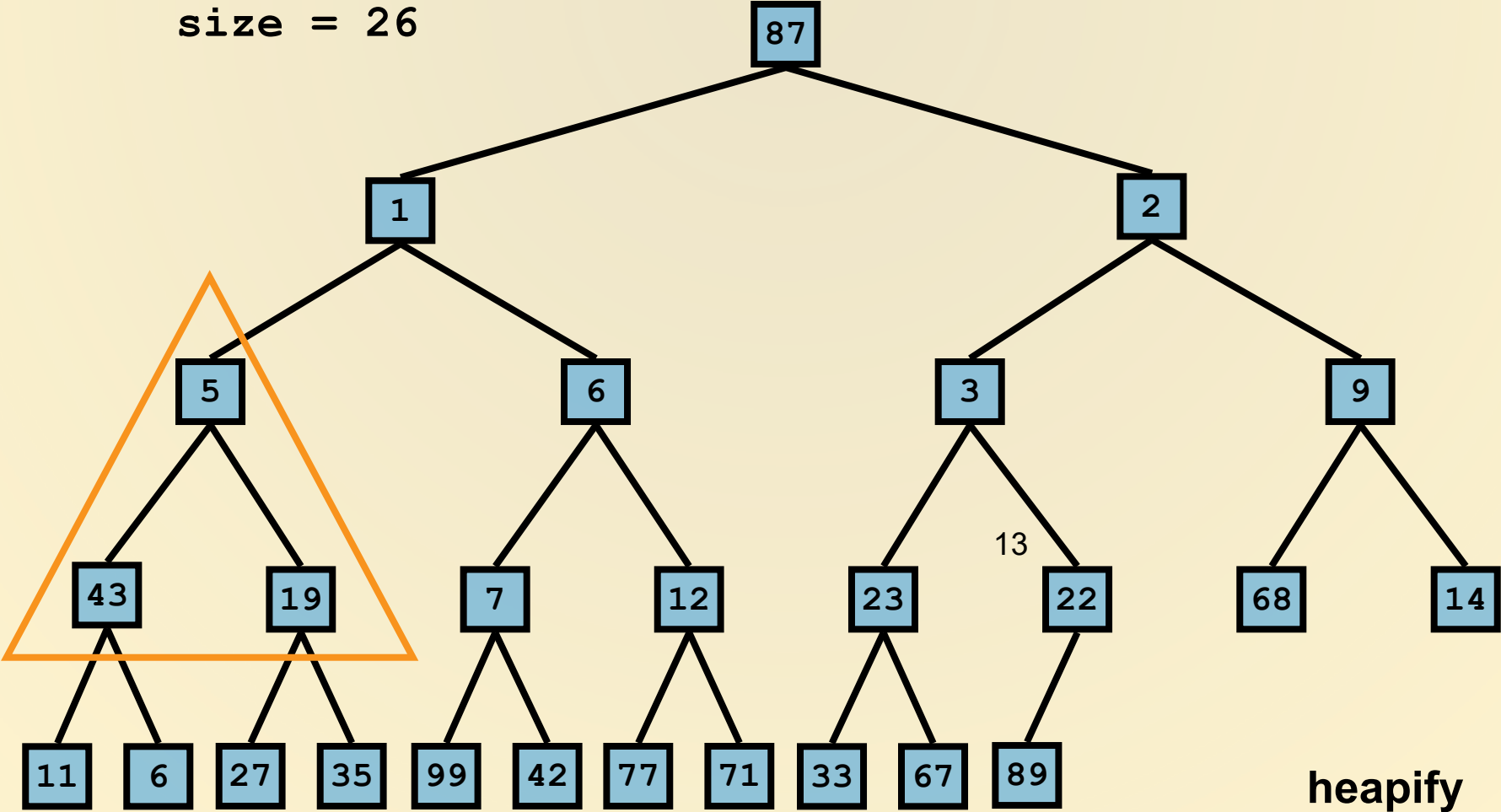
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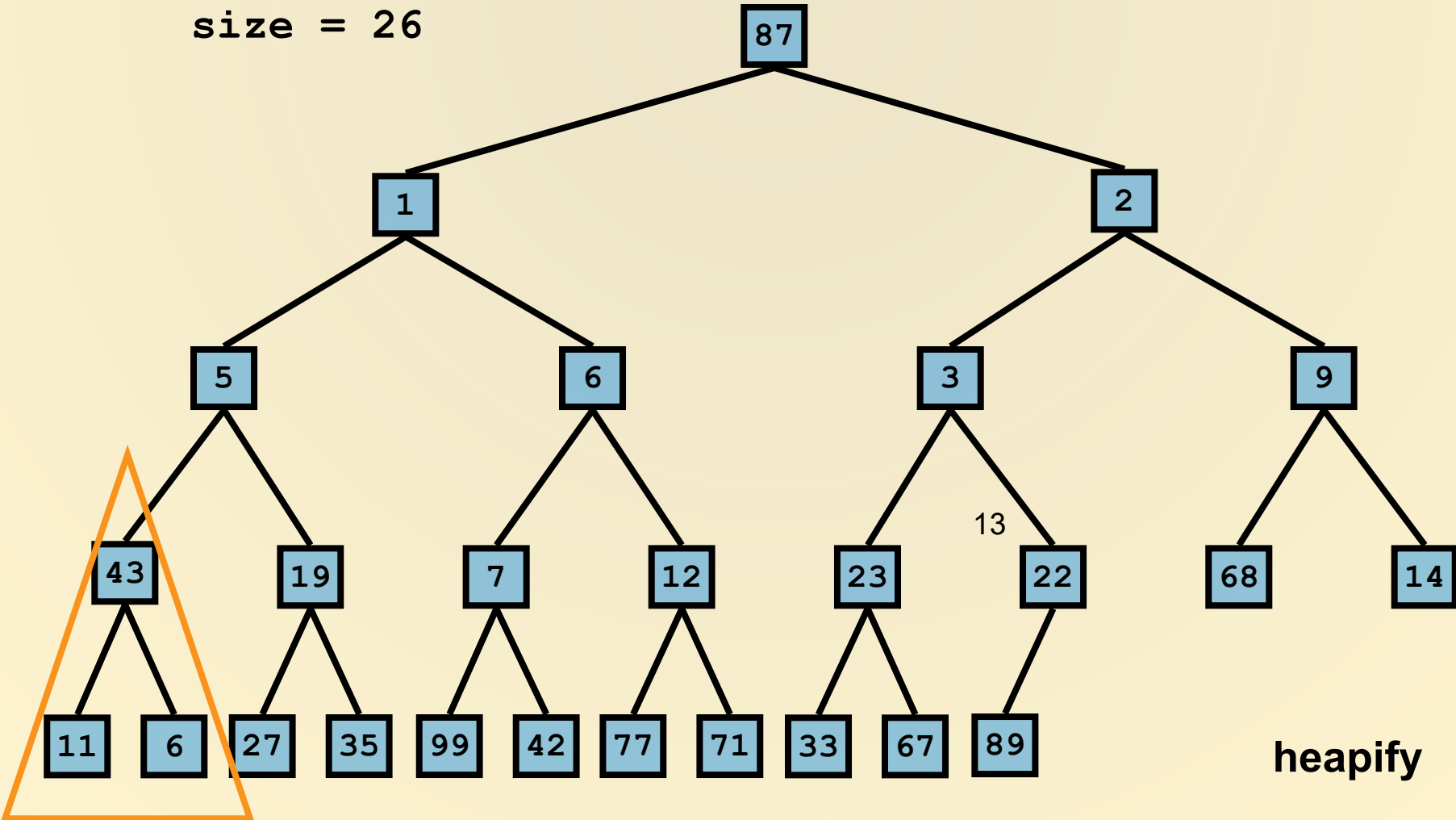
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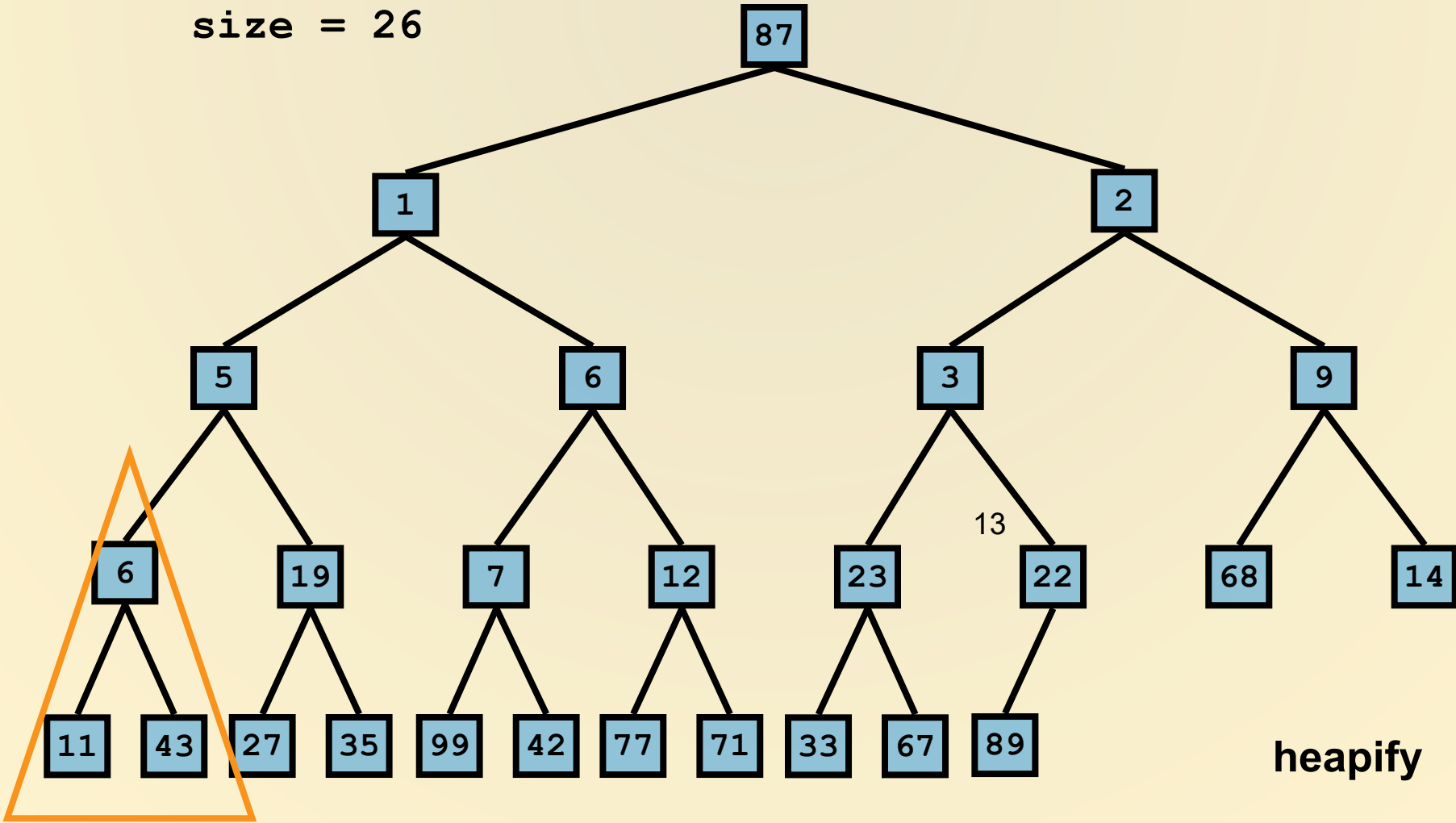
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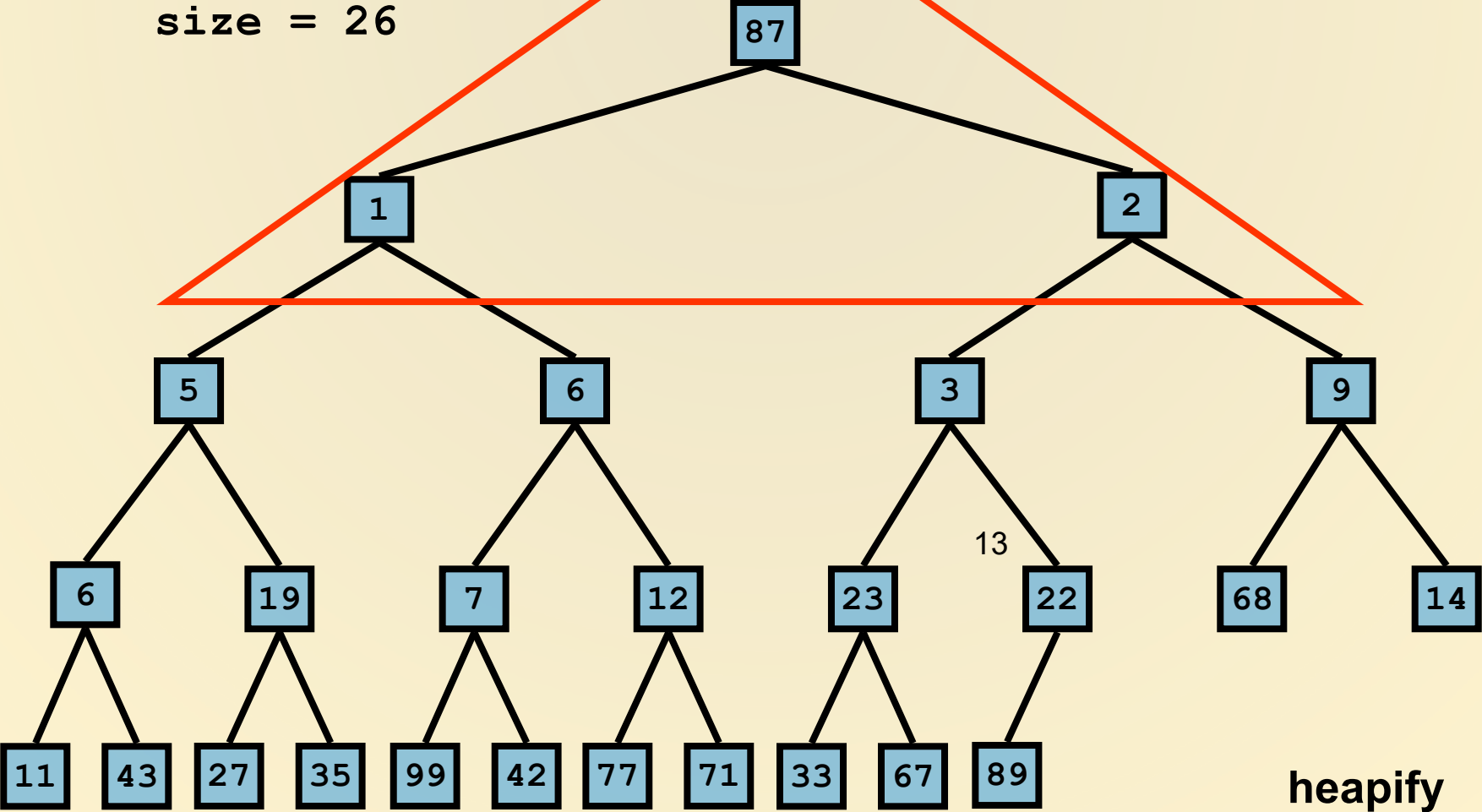
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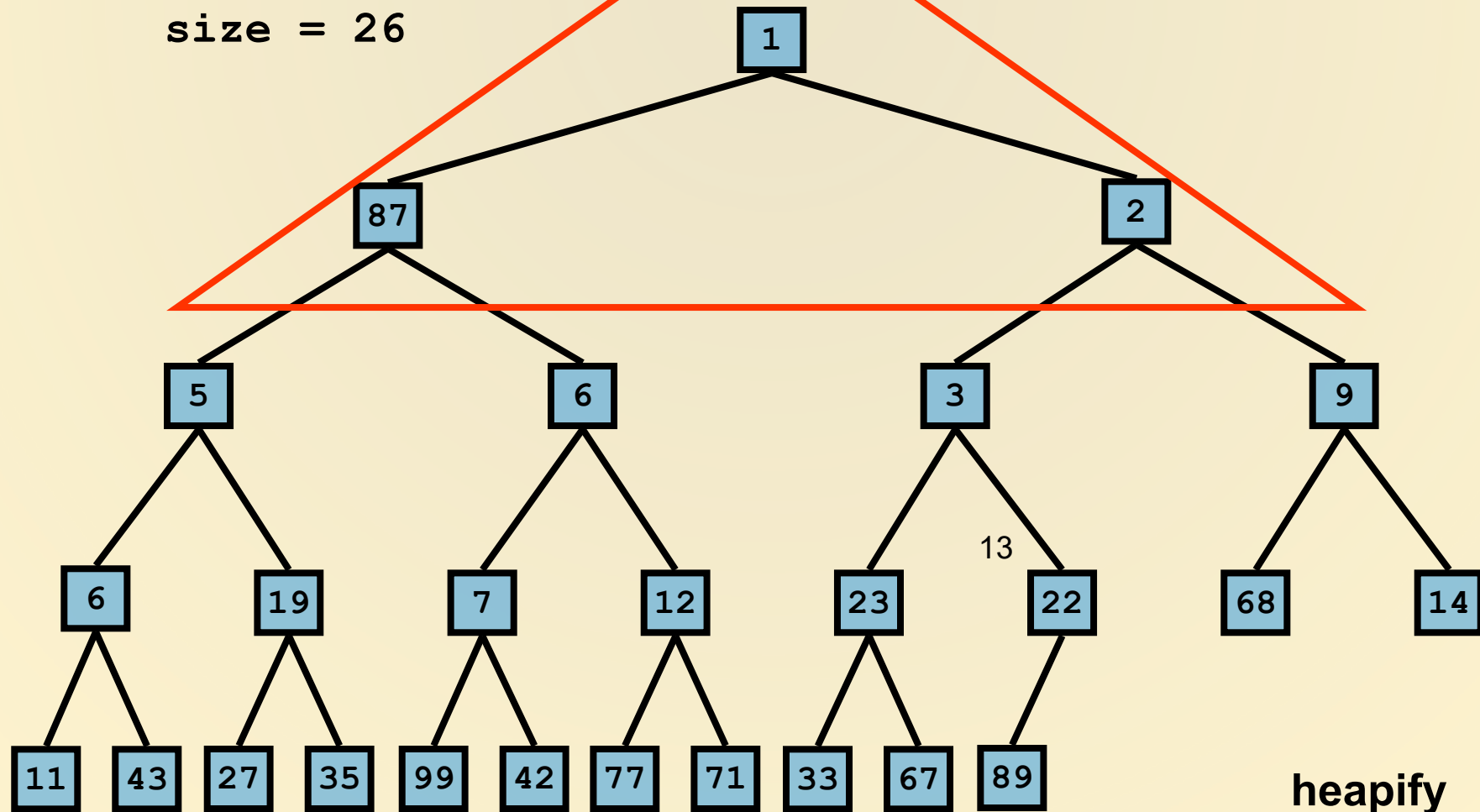
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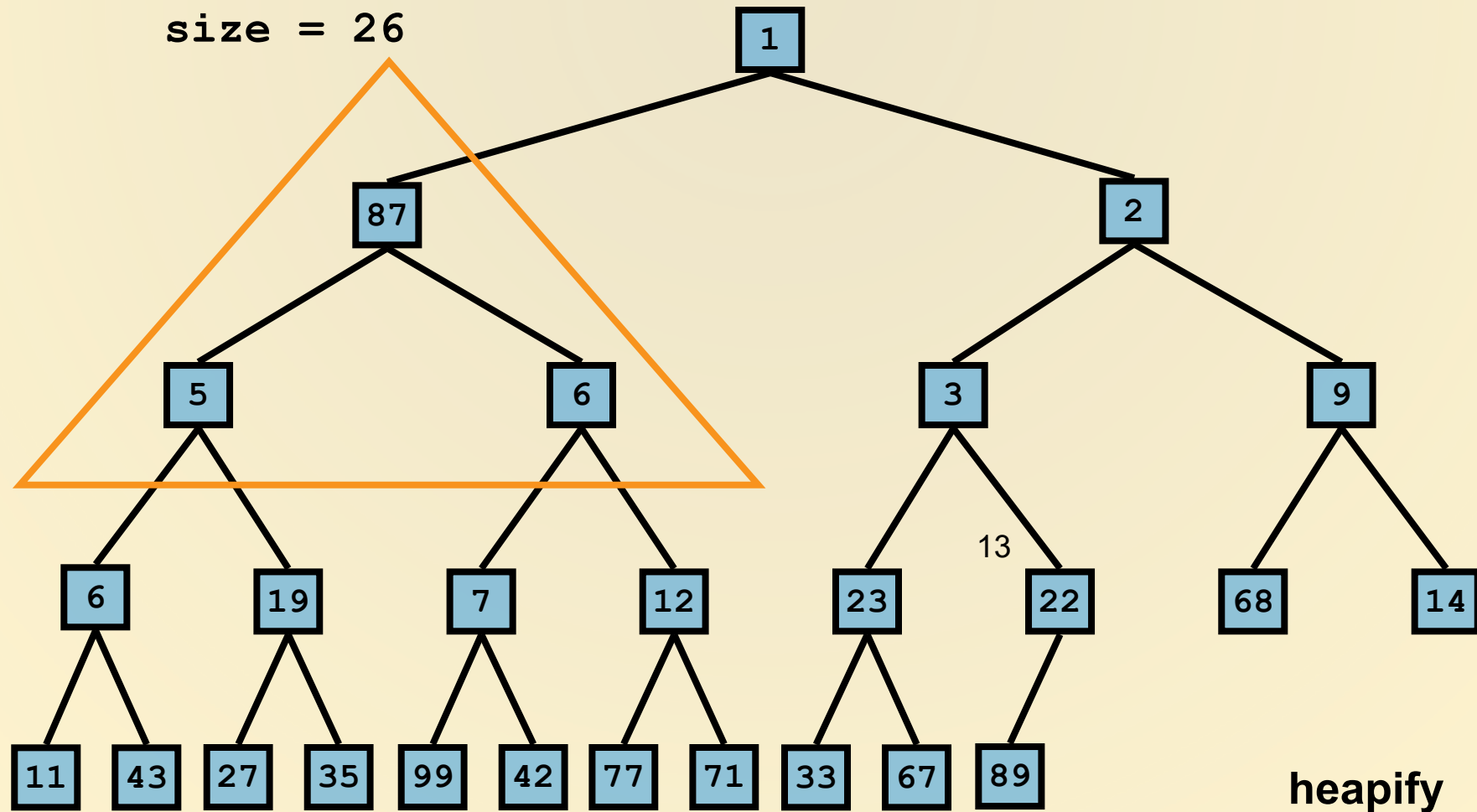


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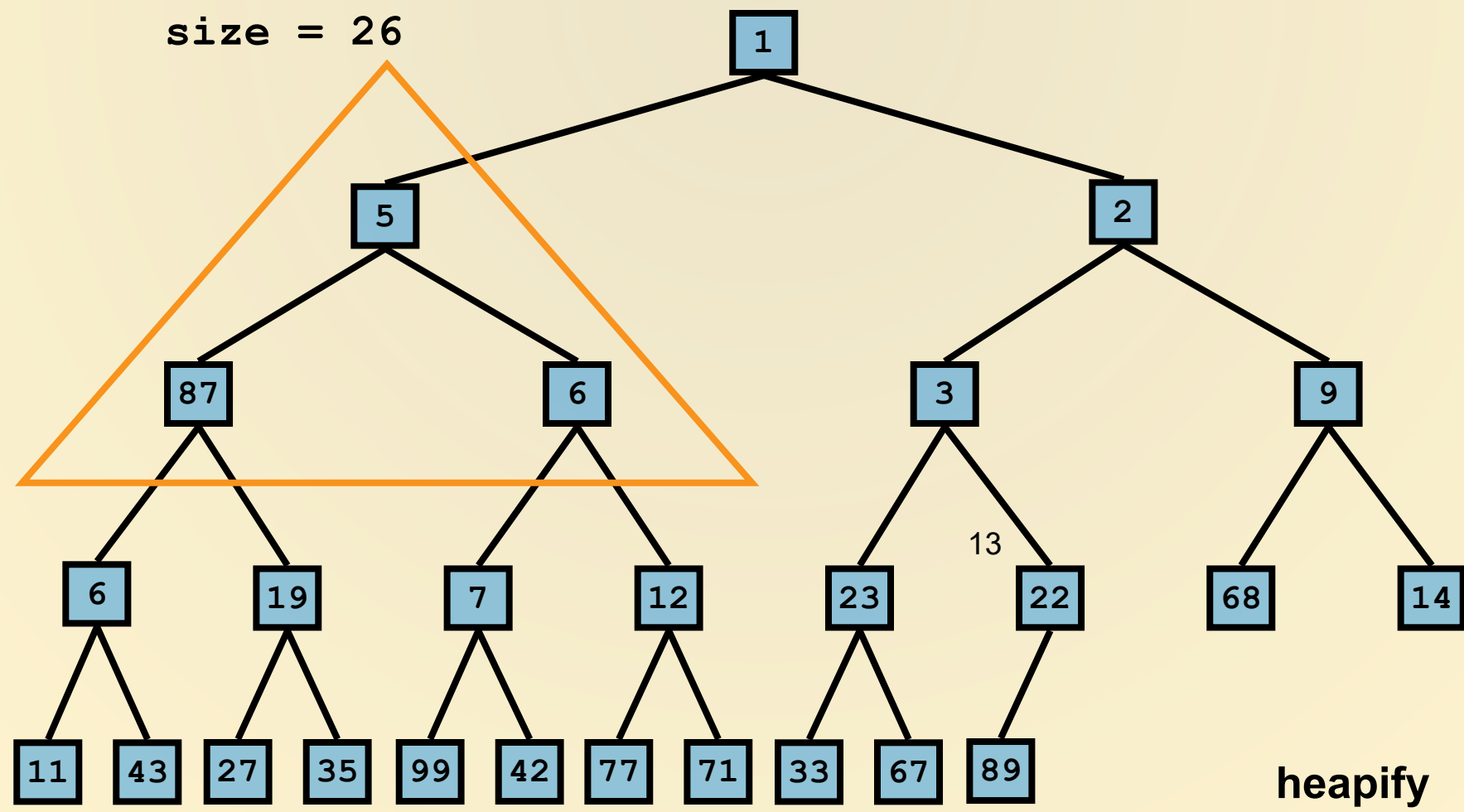
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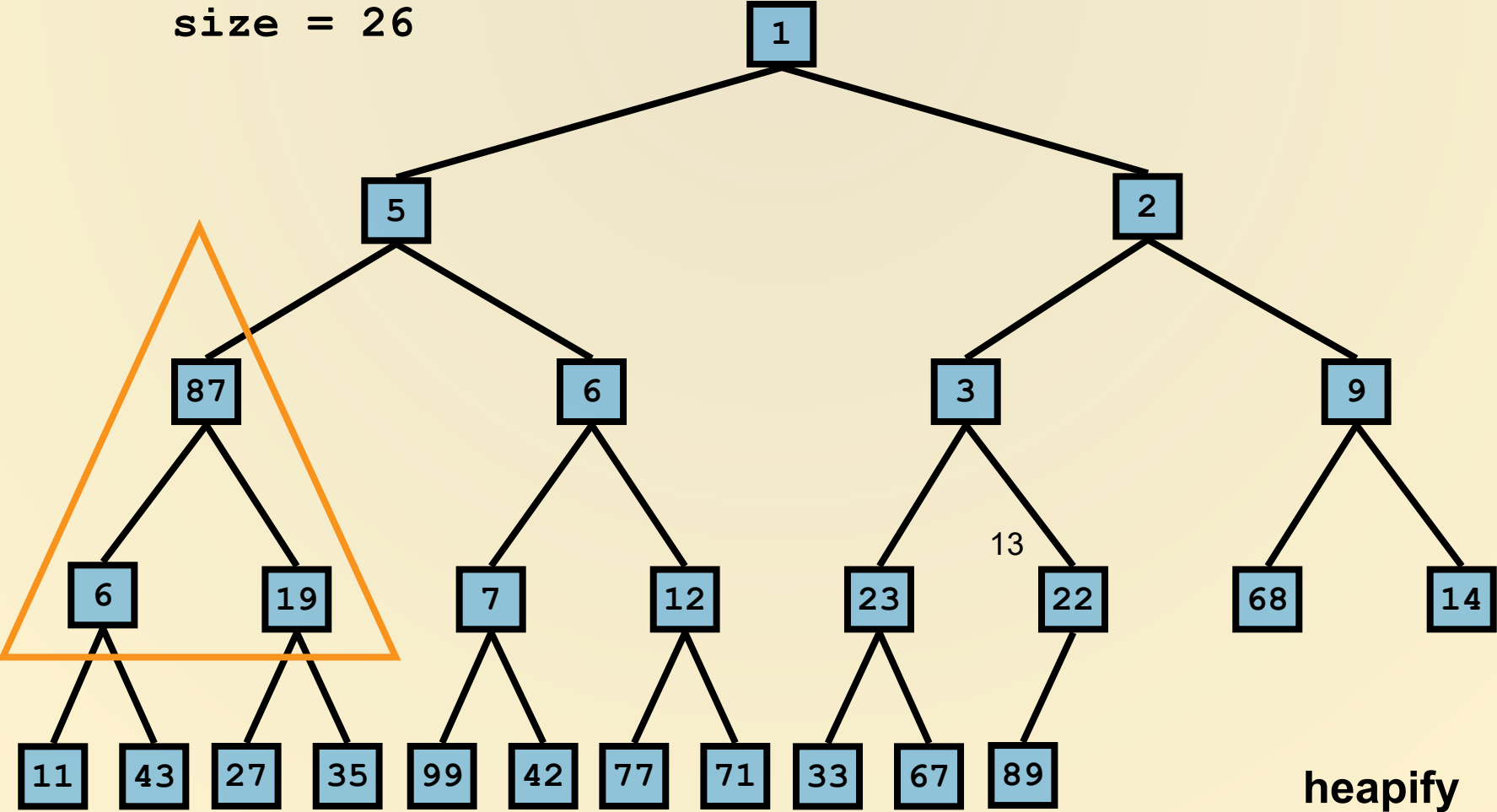


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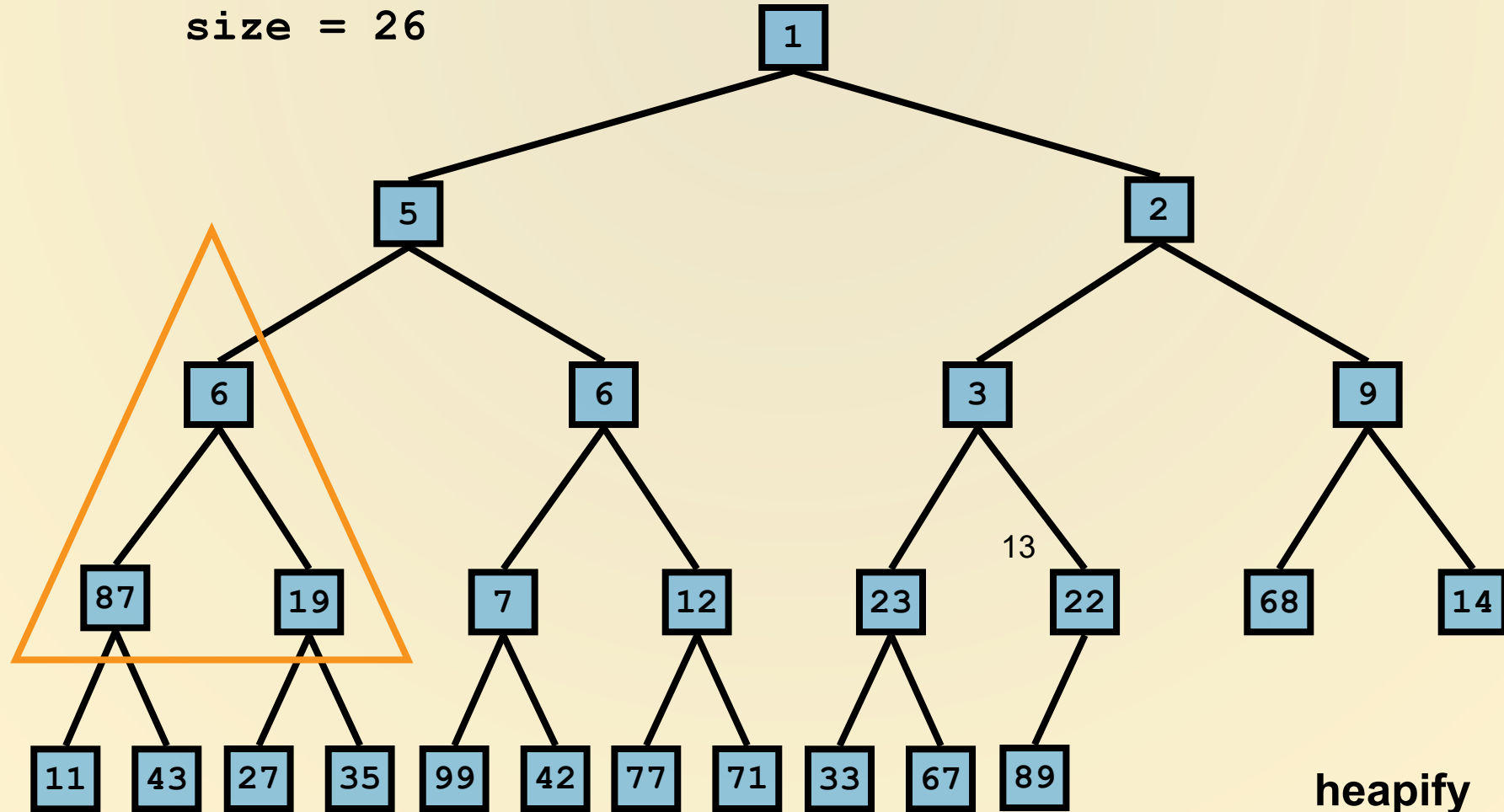
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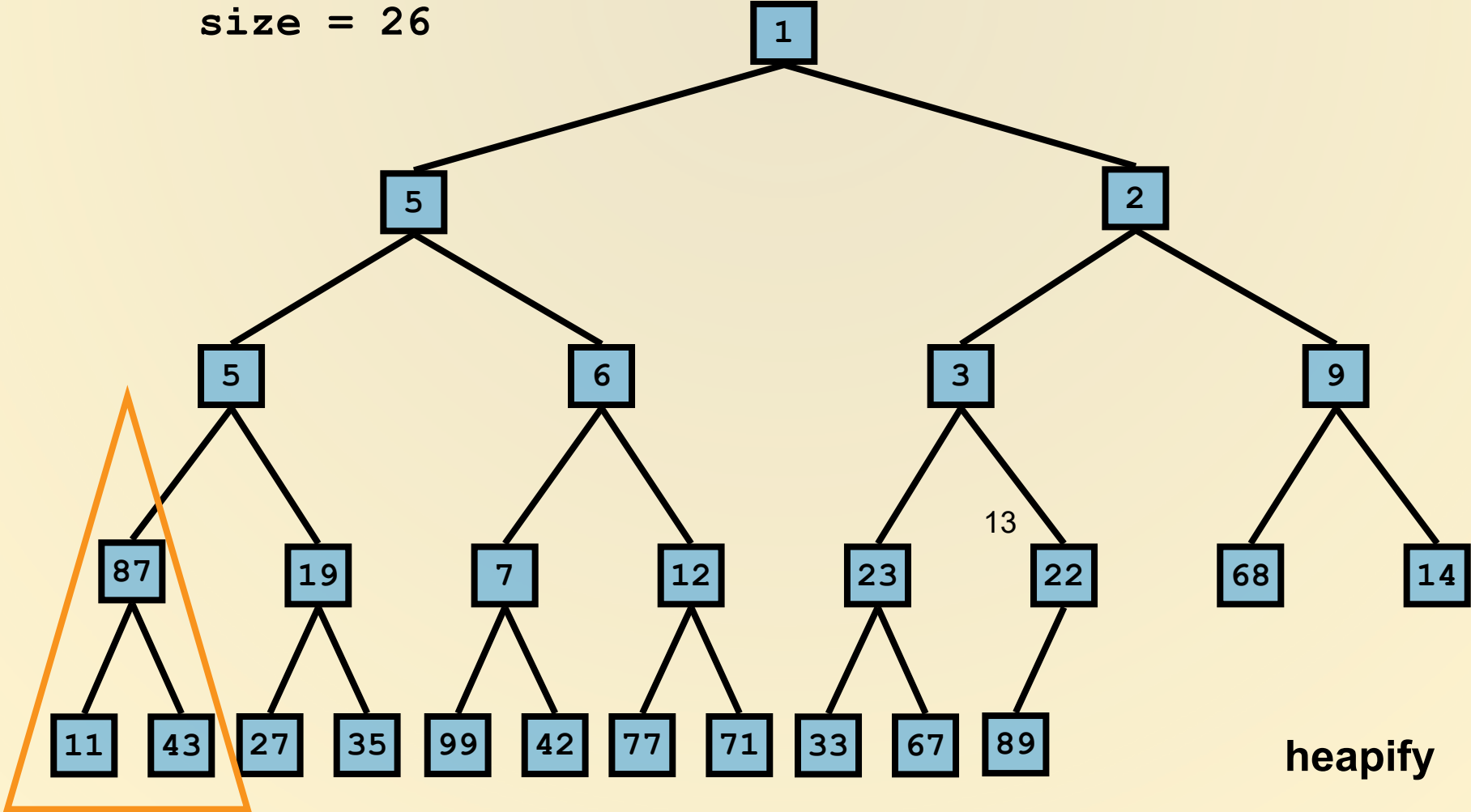
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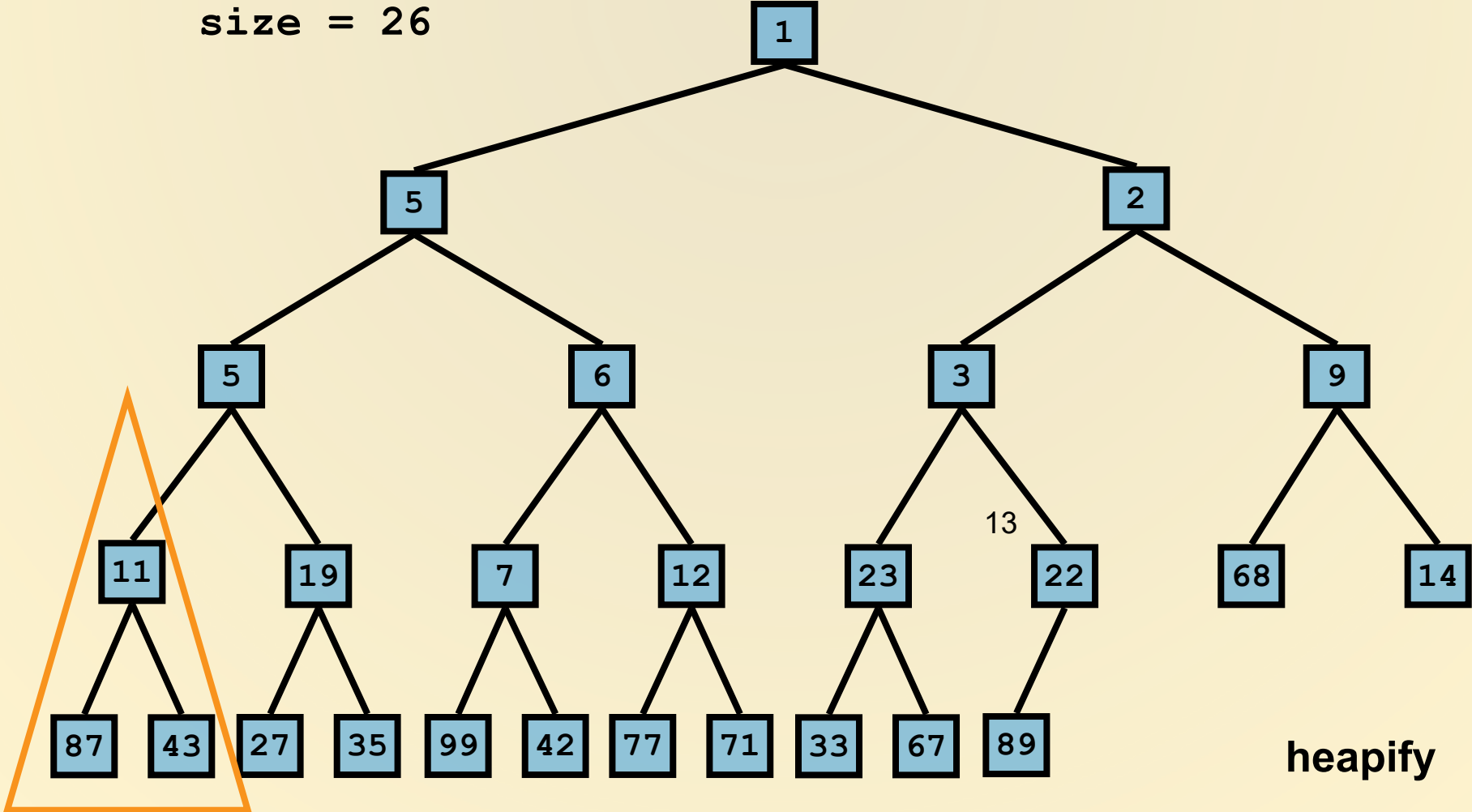
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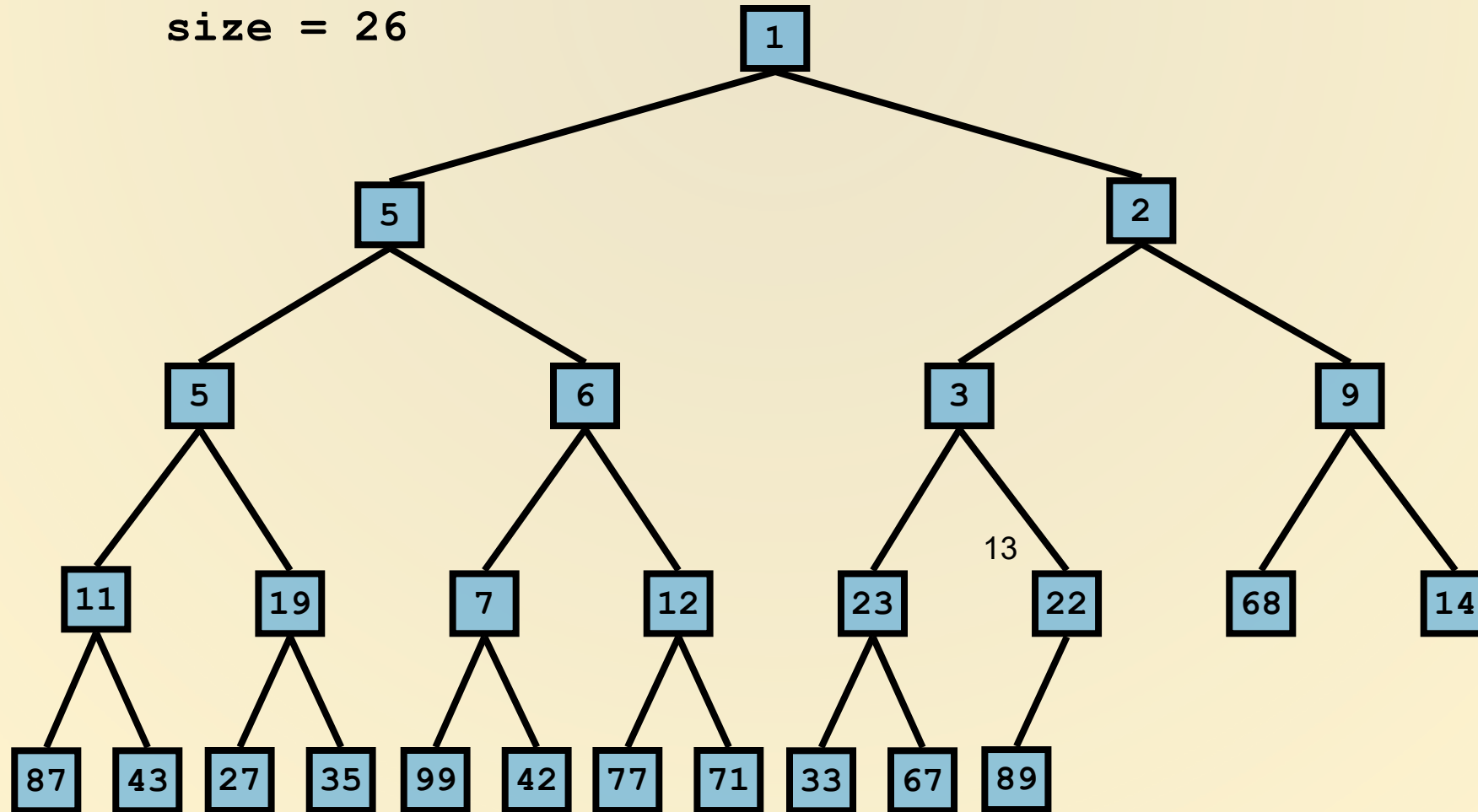
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<http://www.cs.usfca.edu/~galles/visualization/Heap.html>