

2. (2015)

The reason lazy deletion is used is because of how we search for a data within a hash table. In code the searching algorithm breaks on 2 conditions

1. The data is found.
2. An empty slot is found

If we were to make a slot empty upon deletion the searching algorithm may end prematurely, so lazy deletion is implemented to avoid this problem.

Example

Consider linear probing implementation (For simplicity) and $h_0(x) = (\text{hash}(x) + f(i)) \% \text{array size}$

Insert 1, 11, 3, 8, 9

	1	8	3	11	9	
--	---	---	---	----	---	--

Now removing 3

With lazy deletion

	1	8	DL	11	9	
--	---	---	----	----	---	--

Searching for 9

$$\begin{aligned} h_0(9) &= 9 \% 7 \\ &= 2 \end{aligned}$$

	1	8	DL	11	9	
--	---	---	----	----	---	--

Not 9 ! code continues (Moving 1 slot due to linear probing)

	1	8	DL	11	9	
--	---	---	----	----	---	--

9 Found ! code breaks as expected

without lazy deletion

	1	8		11	9	
--	---	---	--	----	---	--

	1	8		11	9	
--	---	---	--	----	---	--

Empty slot found ! code breaks prematurely.