# CSC148 Worksheet 11 Solution

Hyungmo Gu

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## Question 1

a. Here, the constant time means the running time of accessing and assigning element by index doesn't depend on the length of the list.

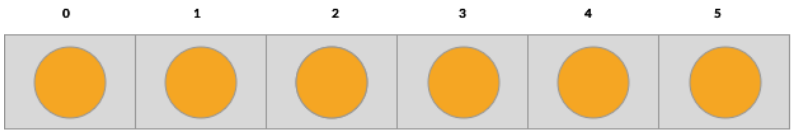
b.

$$n - i$$

many elements need to be shifted to right.

**Notes:**

- The following example tells us

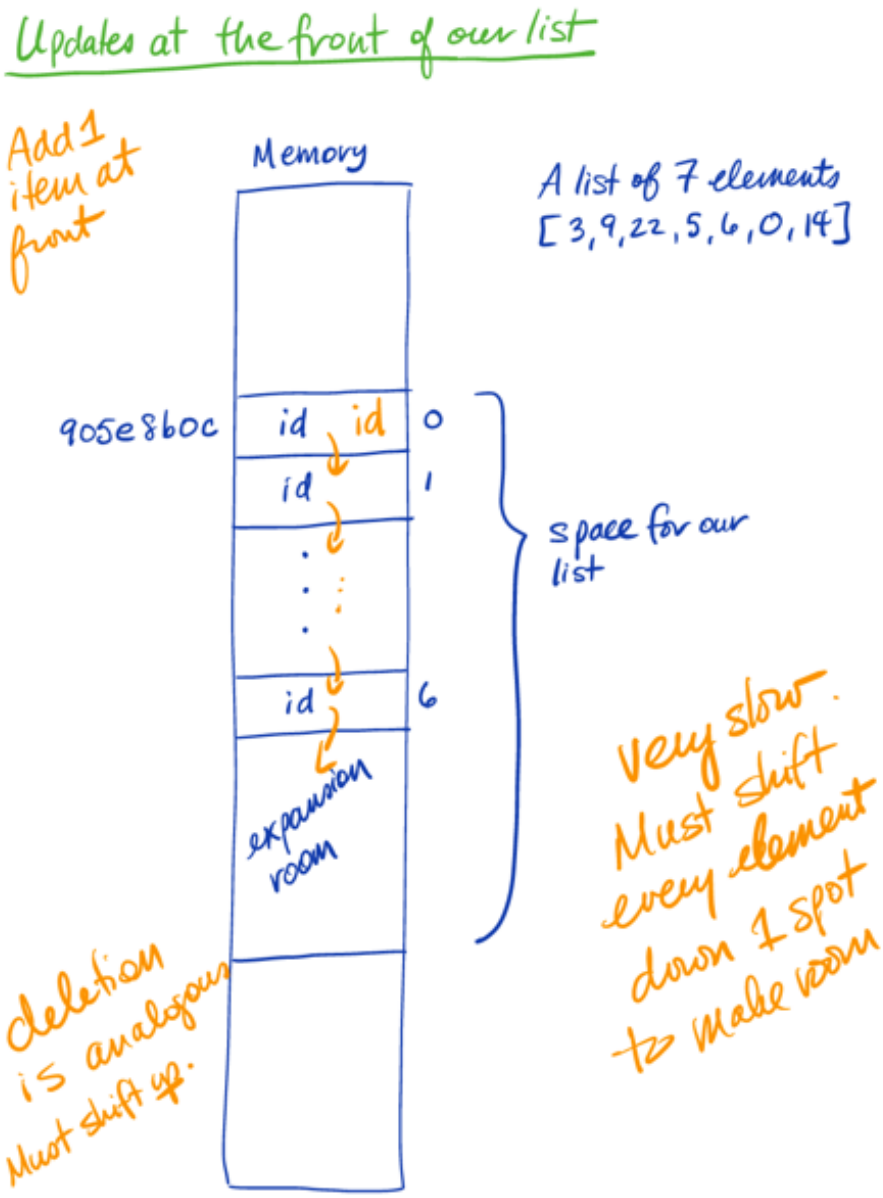




  to position an element at index $i = 3$ of the list, $n - i = 6 - 3 = 3$ elements must be moved over.

  Using this fact, we can generalize that to position an element at index $i$ of the list, $n - i$ many elements must be shifted.

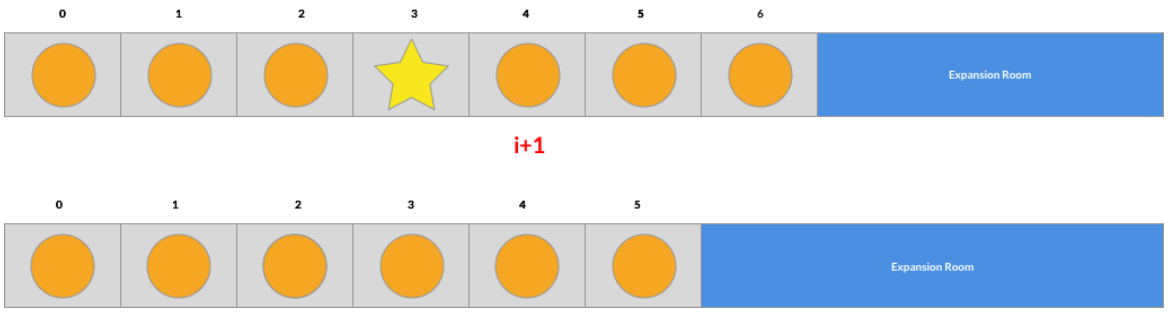
- Learned that when items shifts, it shifts into the expansion room.




c. Because we know the list size stays as is when an element is removed, we can conclude 0 many list elements must be moved.

**Correct Solution:**

The following example tells us




when an element at index $i = 3$ is removed from the list $n - (i + 1) = 7 - (3 - 1) = 3$ many elements must be moved.

Using this fact, we can generalize that when an element is removed, $n-(i+1) = n-i-1$ many elements must be shifted to left.

d. i. A solution is *LIST.remove(...)*.

The answer to question 1.d tells us when an element is removed, $n - i$ must be shifted to left.

Using this fact, we can write a list of smaller size needs to shift elements less.

Then, it follows from this fact that $n = 100$ works faster than $n = 1,000,000$.

# Question 2