ArrayStack

Open Data Structures

ArrayStack

Implementing a List using an array

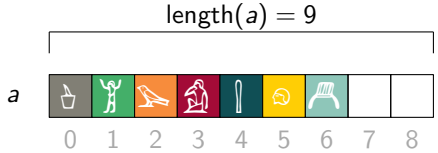
ArrayStack

Implementing a List using an array

$n = 7$

ArrayStack

Implementing a List using an array



$n = 7$

ArrayStack

Implementing a List using an array

$n = 7$

ArrayStack

Implementing a List using an array

get(3)

$n = 7$

ArrayStack

Implementing a List using an array

get(3)

$n = 7$

ArrayStack

Implementing a List using an array

get(3) ⇒ 

$n = 7$

ArrayStack

Implementing a List using an array

$n = 7$

ArrayStack

Implementing a List using an array

set(4, )

$n = 7$

ArrayStack

Implementing a List using an array

set(4, )

$n = 7$

ArrayStack

Implementing a List using an array

set(4, )

$n = 7$

ArrayStack

Implementing a List using an array

$n = 7$

ArrayStack

Implementing a List using an array

add(3, )

$n = 7$

ArrayStack

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add(3, )

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ArrayStack

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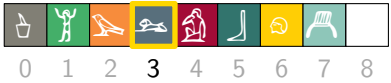
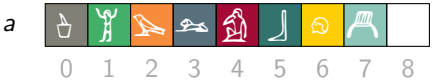


$n = 7$

ArrayStack

Implementing a List using an array

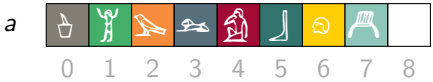
add(3, )



$n = 8$

ArrayStack

Implementing a List using an array



$n = 8$

ArrayStack

Implementing a List using an array

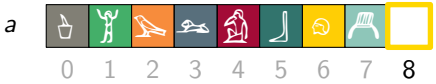
add(8, )

$n = 8$

ArrayStack

Implementing a List using an array

add(8, )

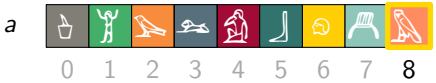


$n = 8$

ArrayStack

Implementing a List using an array

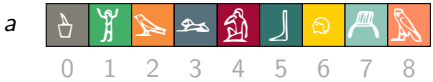
add(8, )



$n = 8$

ArrayStack

Implementing a List using an array



$n = 8$

ArrayStack

Implementing a List using an array

$n = 9$

ArrayStack

Implementing a List using an array

add(6, )

a 

0 1 2 3 4 5 6 7 8

$n = 9$

ArrayStack

Implementing a List using an array

add(6, )

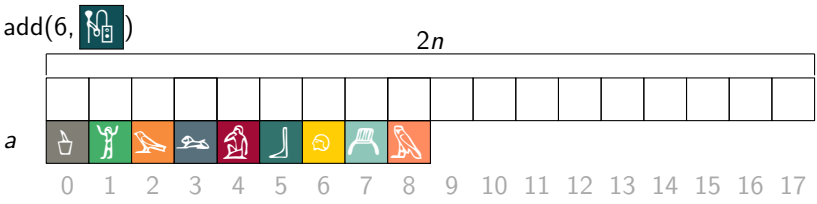
a 

0 1 2 3 4 5 6 7 8

$n = 9 = \text{length}(a) \Rightarrow \text{resize}()$

ArrayStack

Implementing a List using an array



$n = 9$

ArrayStack

Implementing a List using an array

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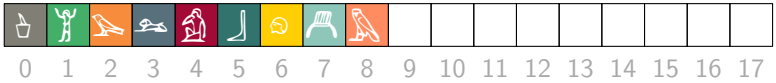
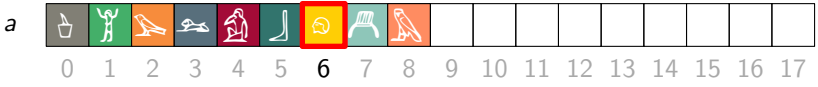


$n = 9$

ArrayStack

Implementing a List using an array

add(6, )



$n = 9$

ArrayStack

Implementing a List using an array

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$n = 9$

ArrayStack

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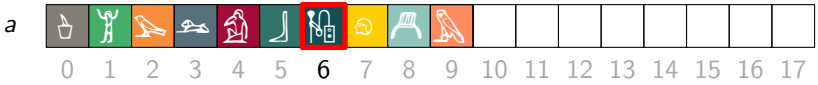
add(6, )



$n = 9$

ArrayStack

Implementing a List using an array

$n = 10$

ArrayStack

Implementing a List using an array

remove(5)

$n = 10$

ArrayStack

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remove(5)

$n = 10$

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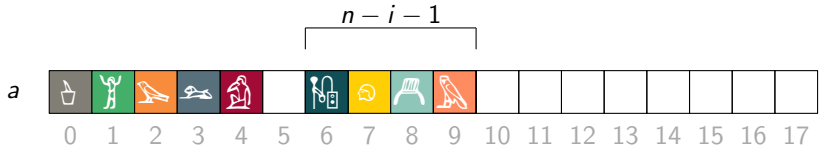
remove(5)



$n = 10$

ArrayStack

Implementing a List using an array

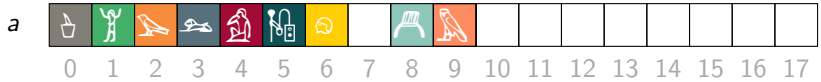
remove(5)

$n = 10$

ArrayStack

Implementing a List using an array

remove(5)



$n = 10$

ArrayStack

Implementing a List using an array

remove(5)

$n = 10$

ArrayStack

Implementing a List using an array

remove(5)

$n = 10$

ArrayStack

Implementing a List using an array

remove(5)

$n = 9$

ArrayStack

Implementing a List using an array

$n = 9$

ArrayStack

Implementing a List using an array

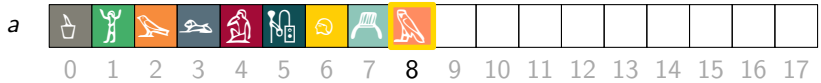
remove(8)

$n = 9$

ArrayStack

Implementing a List using an array

remove(8)



$n = 9$

ArrayStack

Implementing a List using an array

remove(8)

$n = 9$

ArrayStack

Implementing a List using an array

remove(8)

$n = 8$

ArrayStack

Implementing a List using an array

$n = 8$

ArrayStack

Implementing a List using an array

remove(7) ... remove(6) ... remove(5)

$n = 8$

ArrayStack

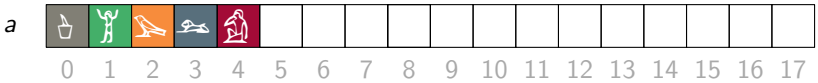
Implementing a List using an array

remove(7) ... remove(6) ... remove(5)

$n = 8$

ArrayStack

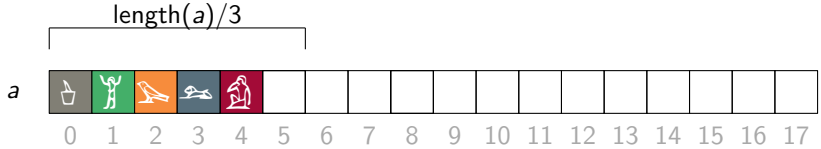
Implementing a List using an array



$n = 5$

ArrayStack

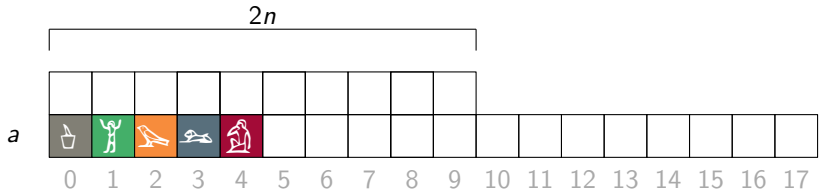
Implementing a List using an array



$n = 5 < \text{length}(a)/3 \Rightarrow \text{resize}()$

ArrayStack

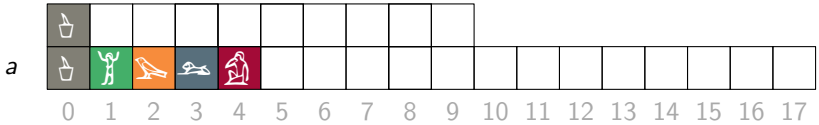
Implementing a List using an array



$n = 5$

ArrayStack

Implementing a List using an array



$n = 5$

ArrayStack

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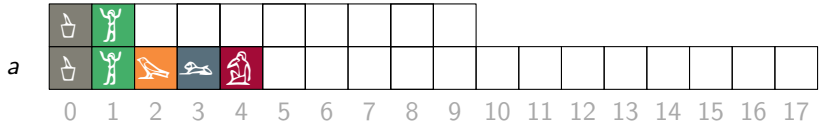

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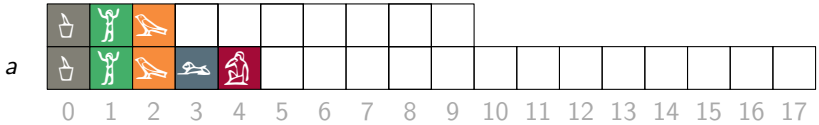

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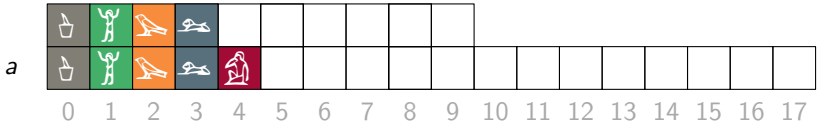

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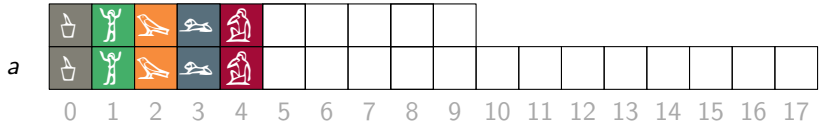

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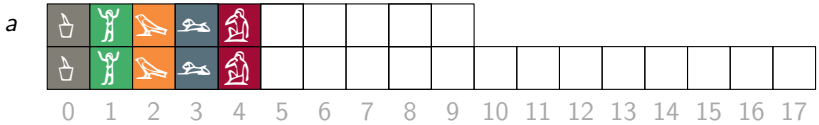

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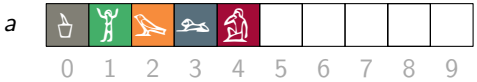
ArrayStack

Implementing a List using an array



$n = 5$

ArrayStack

Implementing a List using an array

Theorem

An ArrayStack implements the List interface.

ArrayStack

Implementing a List using an array

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Ignoring the time spent in calls to resize(),

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Ignoring the time spent in calls to resize(),

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- set(i, x) runs in $O(1)$ time;

ArrayStack

Implementing a List using an array

Theorem

An ArrayStack implements the List interface.

Ignoring the time spent in calls to resize(),

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ArrayStack

Implementing a List using an array

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ArrayStack

Implementing a List using an array

Theorem

An ArrayStack implements the List interface.

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Question

What about the calls to resize()?

End of Lesson