WHO TAKES OUT YOUR TRASH?

@sannekalkman

Magic is just (computer) science you don’t understand yet


TASSO

Allocate memory

Allocate memory

Find the garbage

Allocate memory

Find the garbage

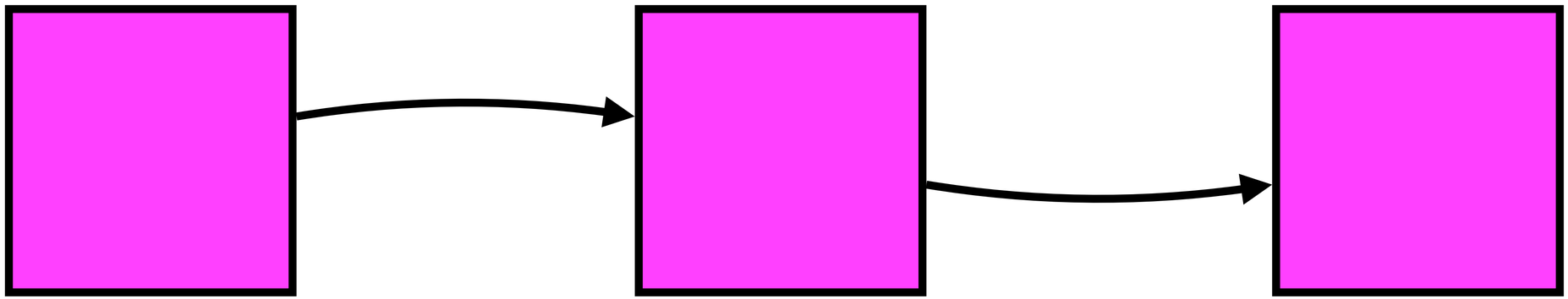
Free up memory

Running out of memory

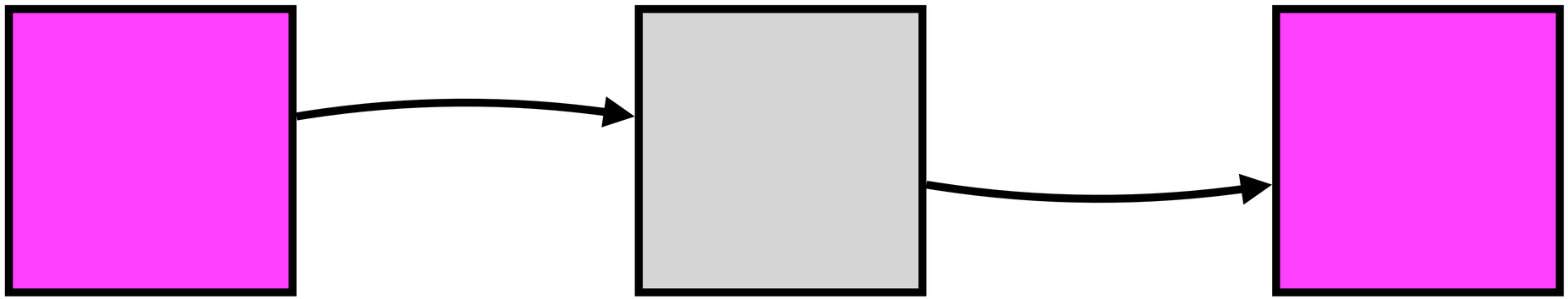
Running out of memory

Breaking things

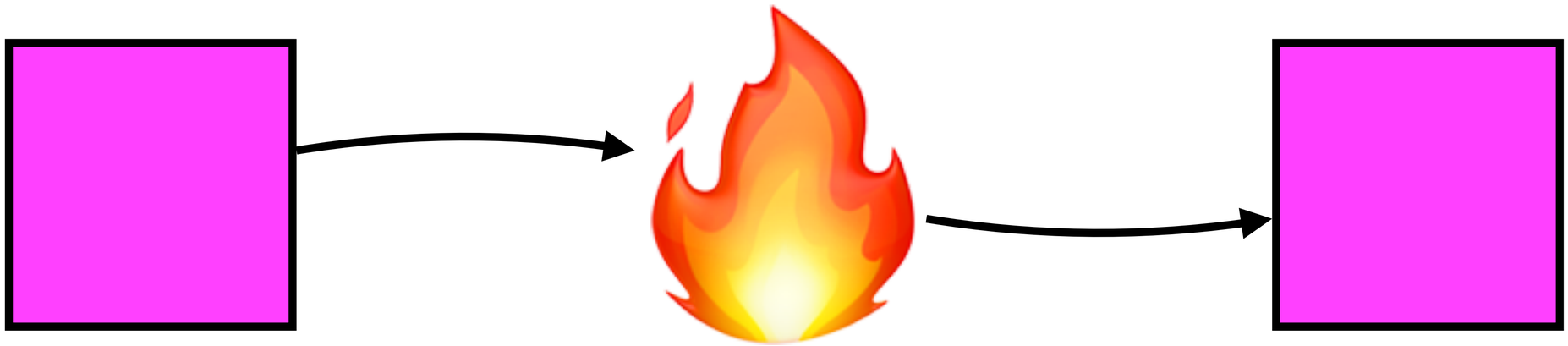
DANGLING POINTERS



DANGLING POINTERS



DANGLING POINTERS



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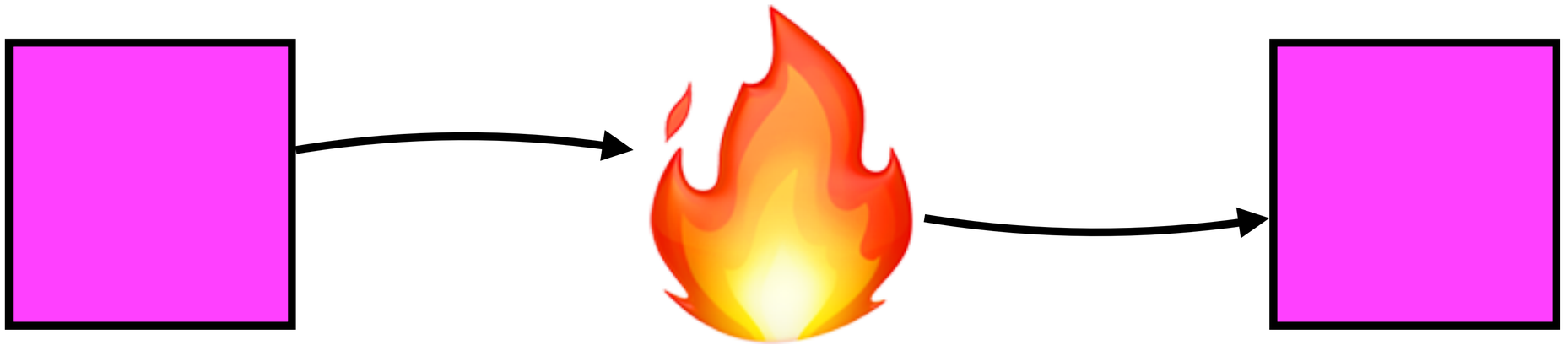


Memory Leak

MEMORY

Where do you put things?

Stack

Stack

Heap

REFERENCE COUNTING

If nothing points to it, nothing’s using it

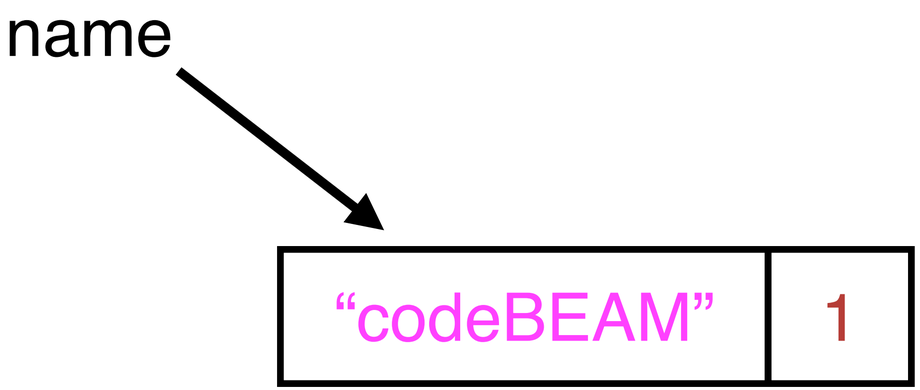
REFERENCE COUNTING

REFERENCE COUNTING

name = “codeBEAM”

REFERENCE COUNTING

name = “codeBEAM”



REFERENCE COUNTING

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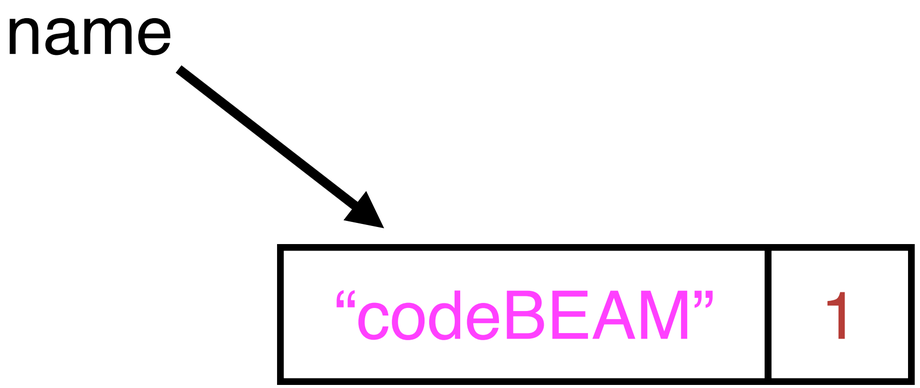

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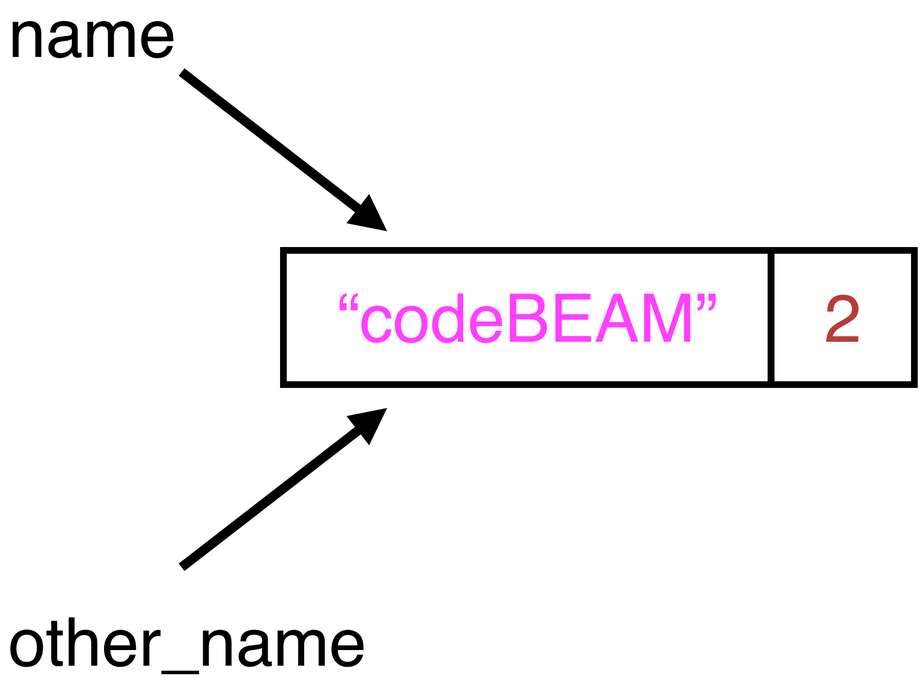

REFERENCE COUNTING

name = “codeBEAM”
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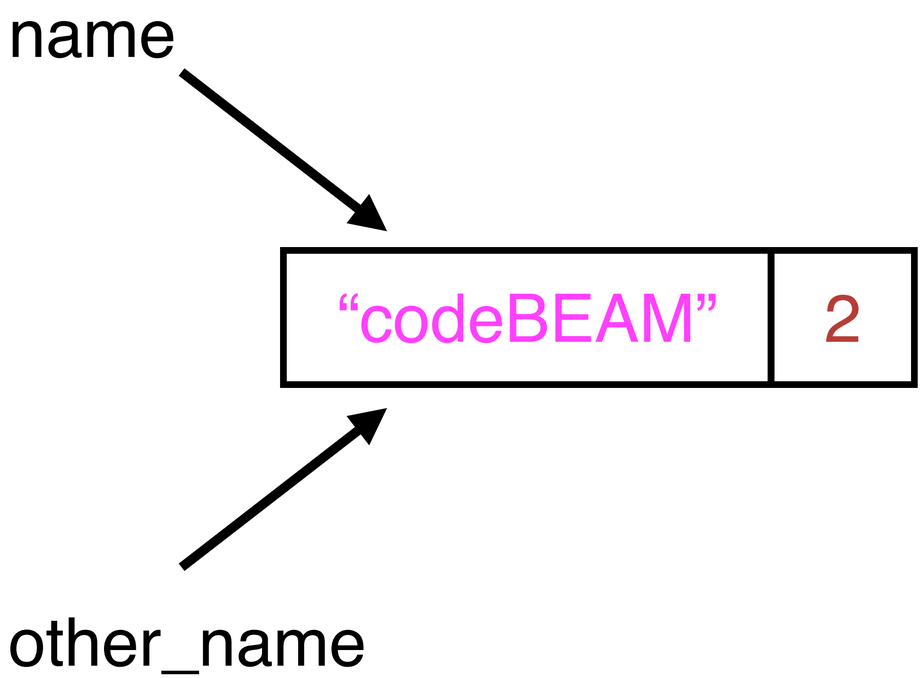
name = nil



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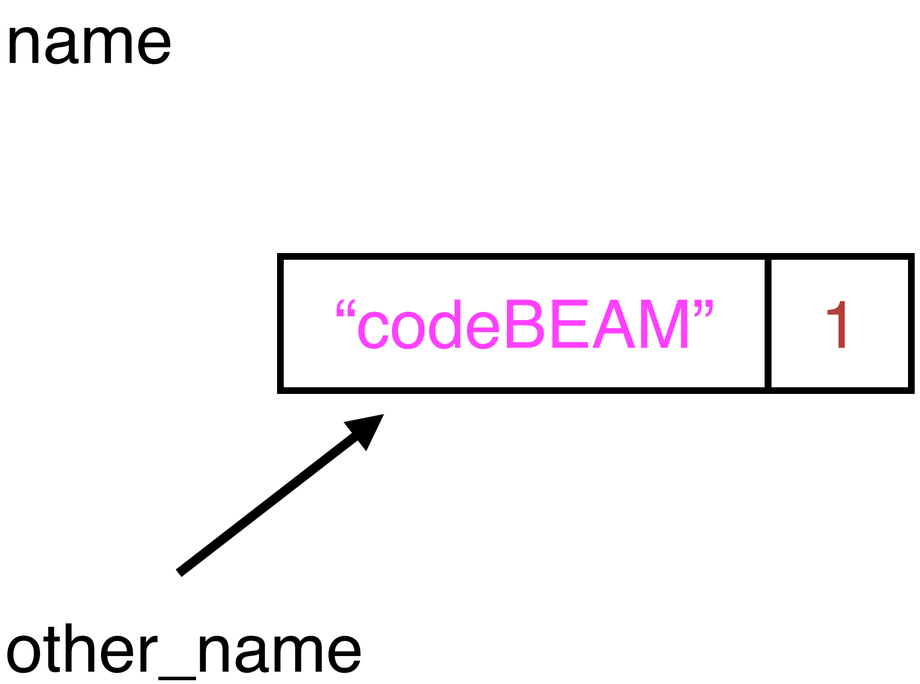

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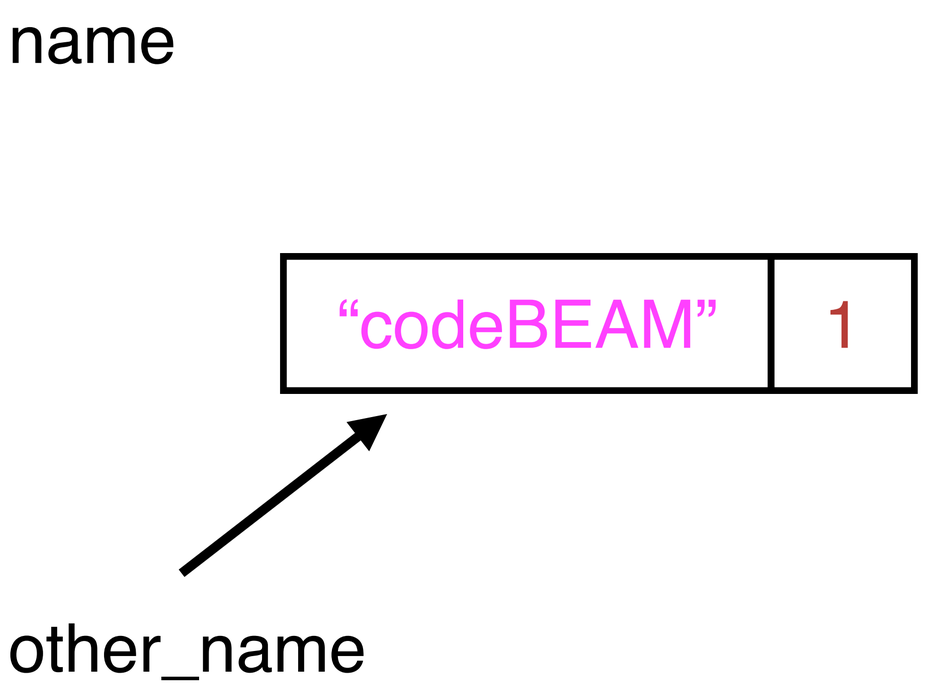

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CYCLES

CYCLES

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a = {
  other: nil
}
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CYCLES

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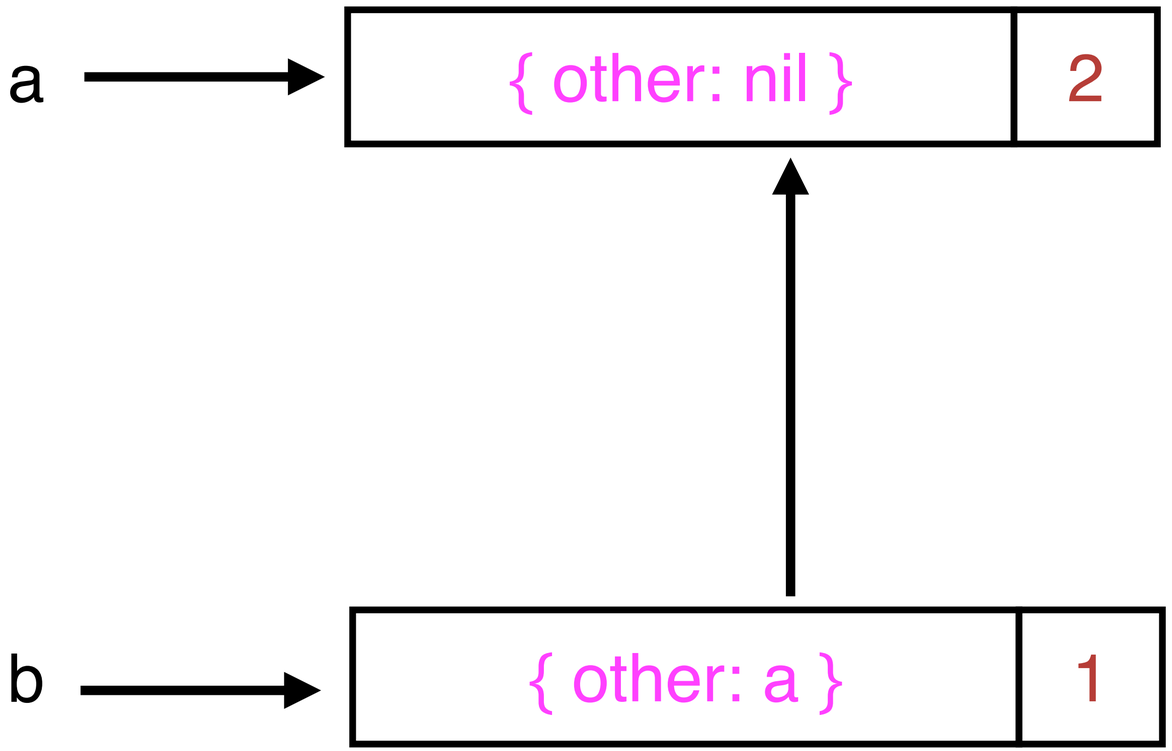

CYCLES

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a = {
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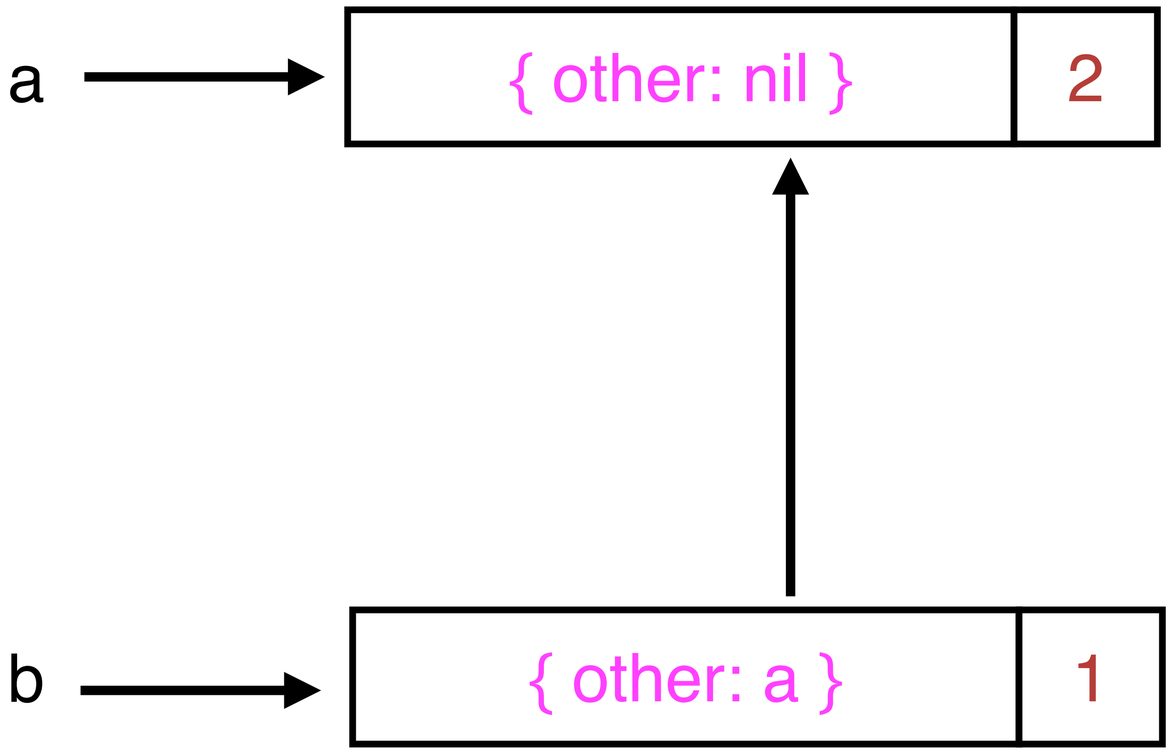

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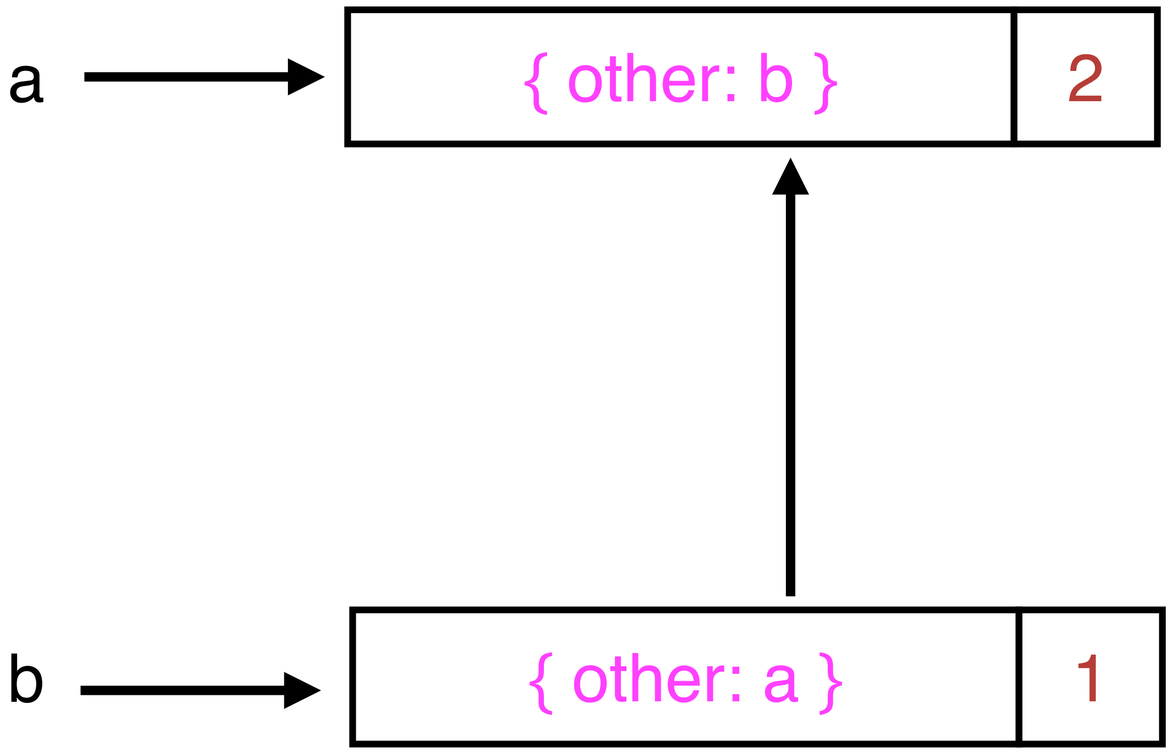

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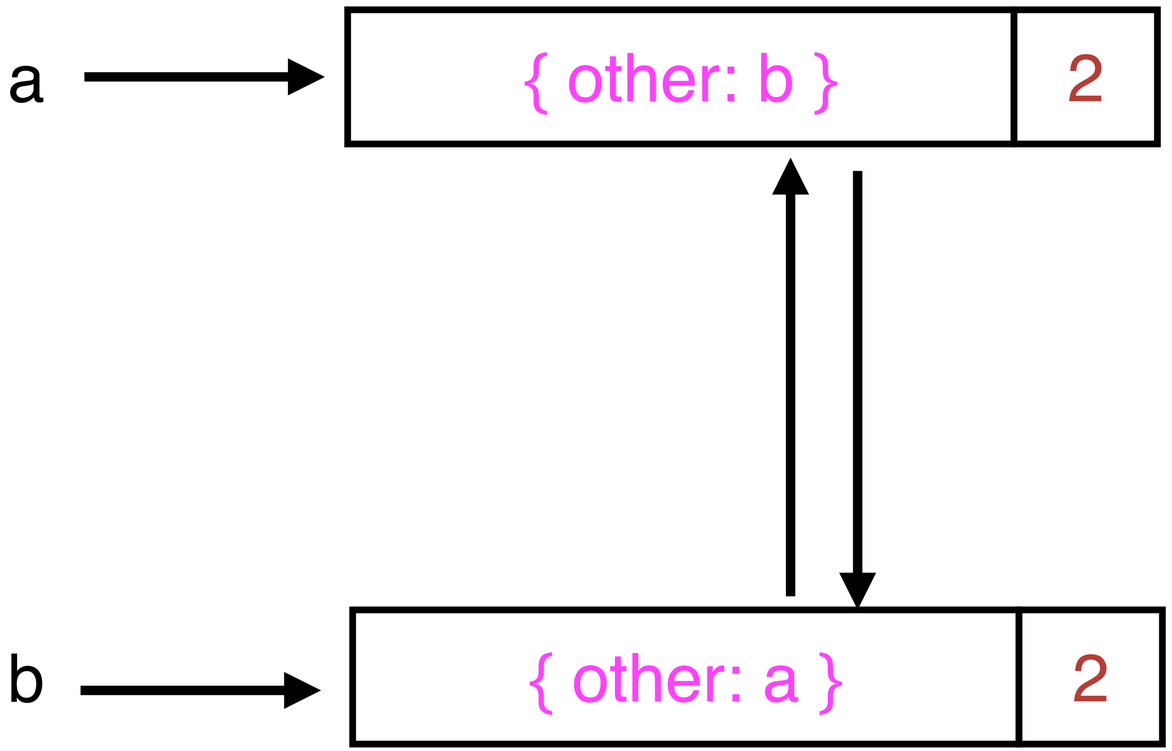

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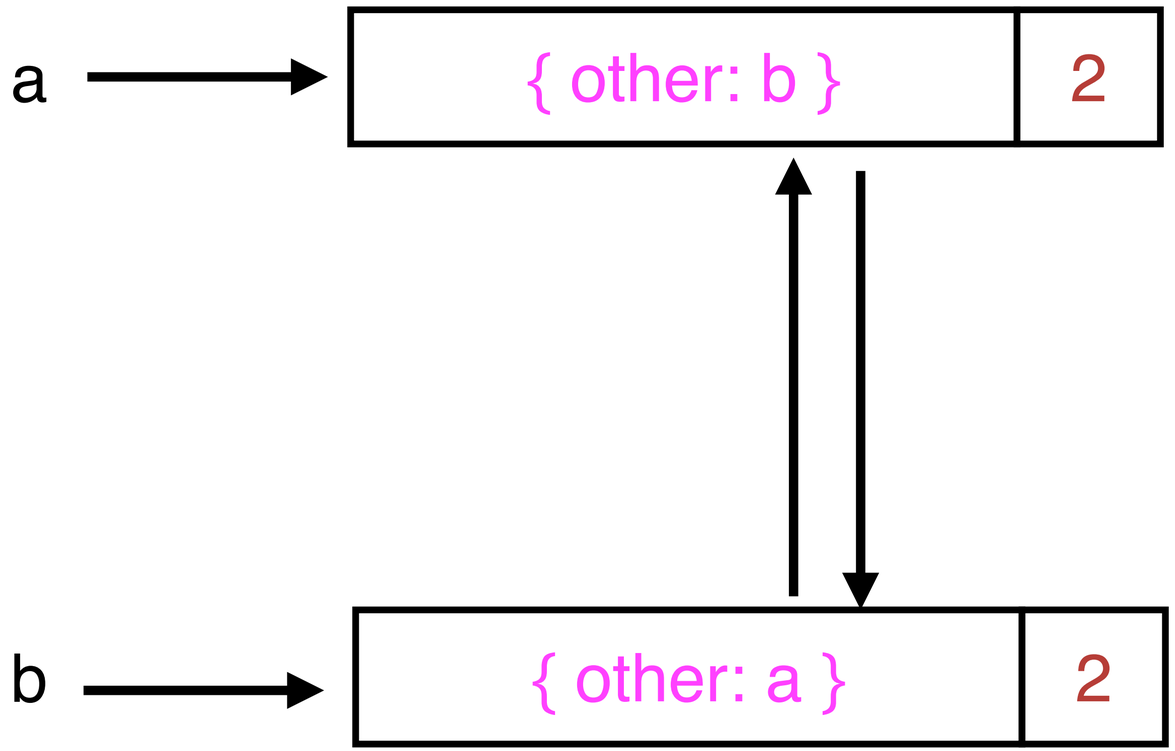

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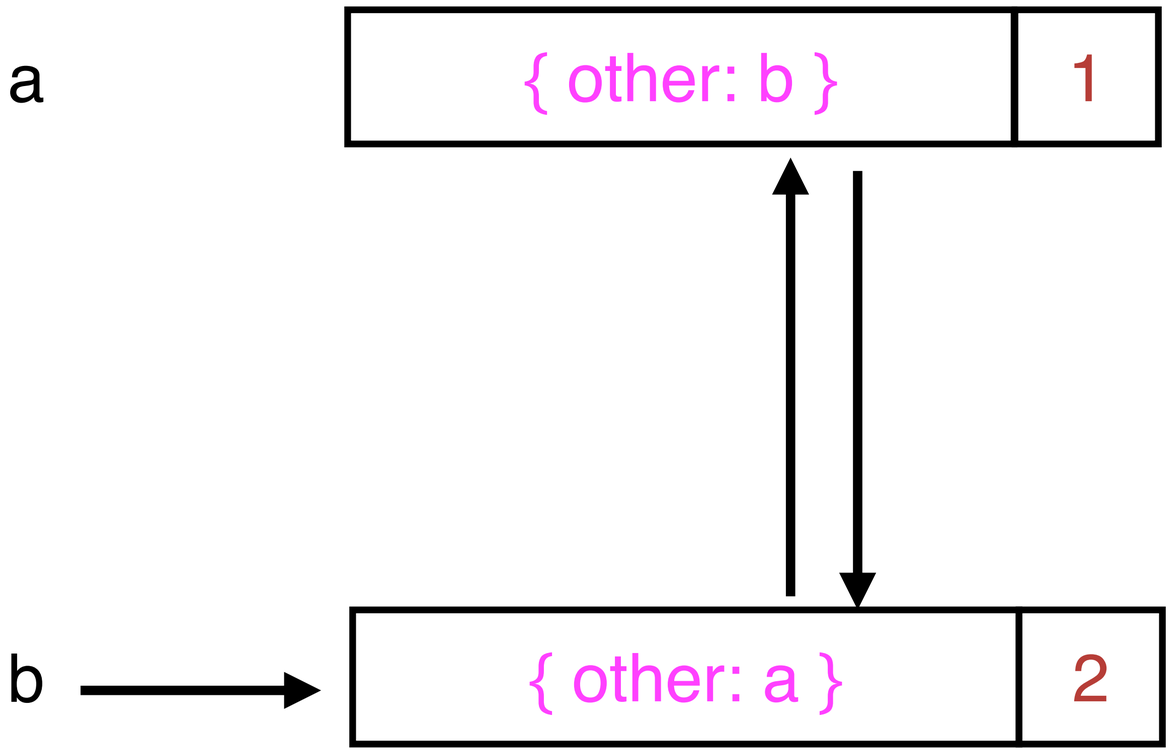

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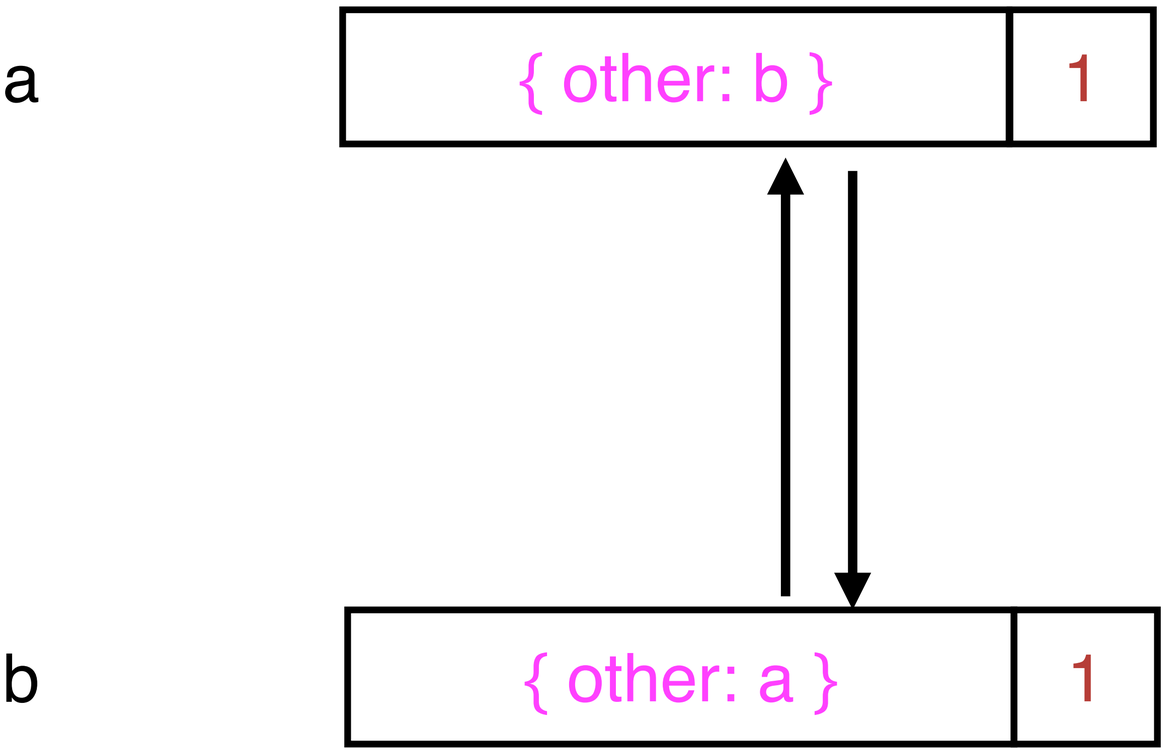
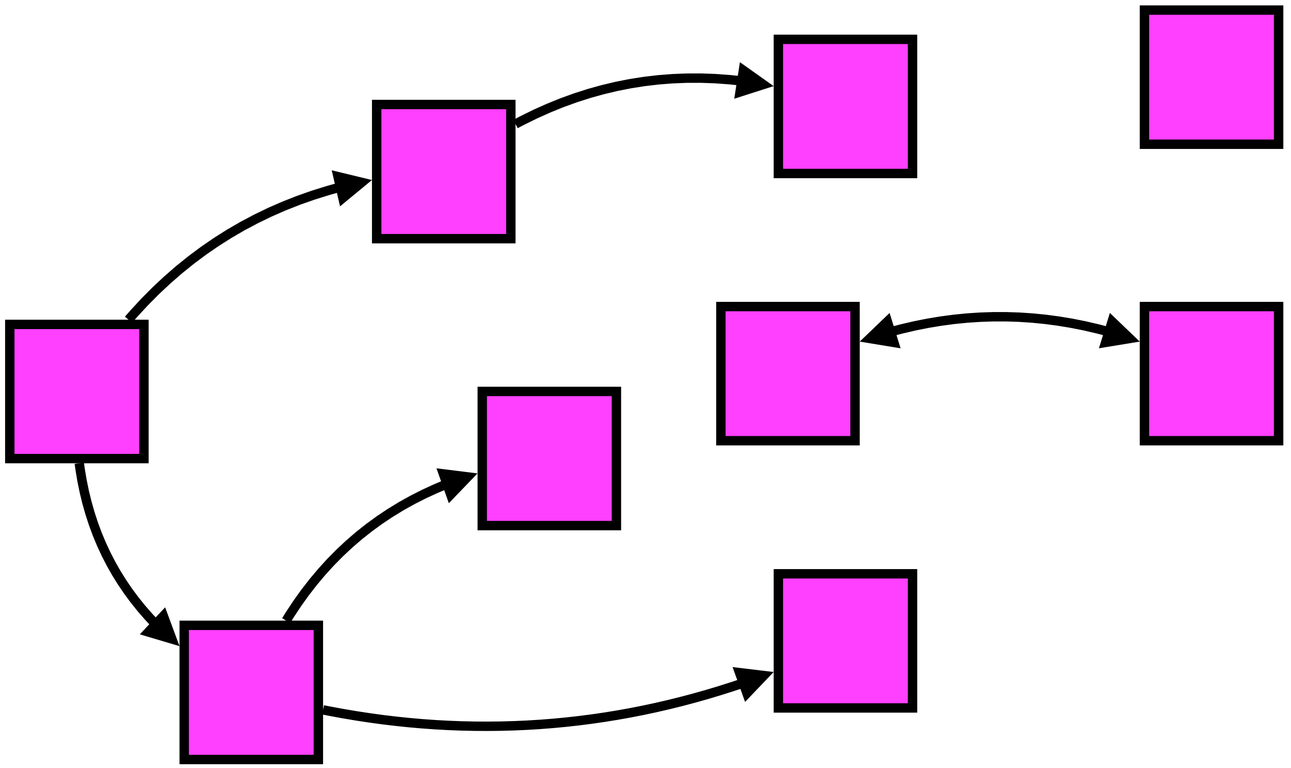


MARK & SWEEP

If you can’t get to it, you can’t be using it


PRS - Q
SONN - STA
STE - SU
WAN - WED
WEE - WHA
SW - SZ

MARK & SWEEP



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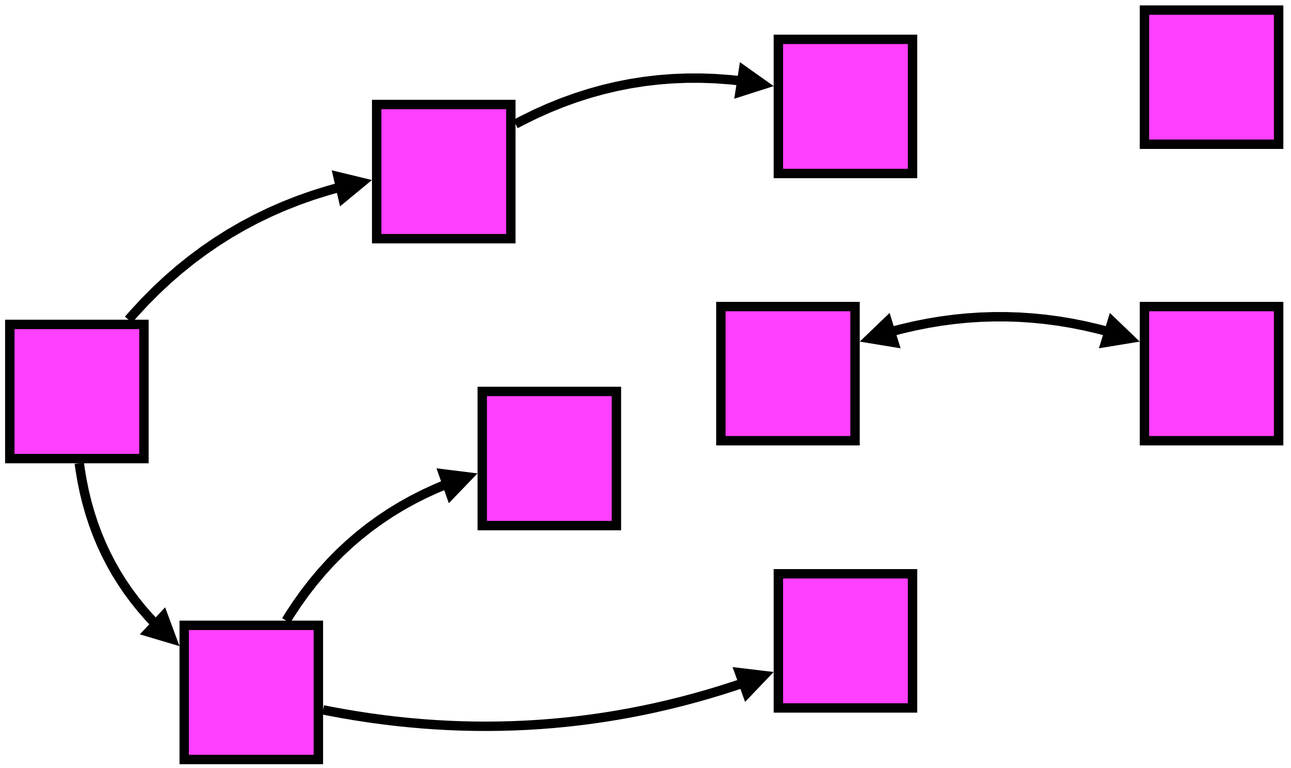

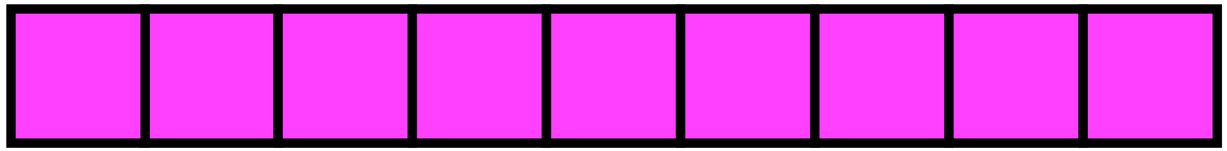

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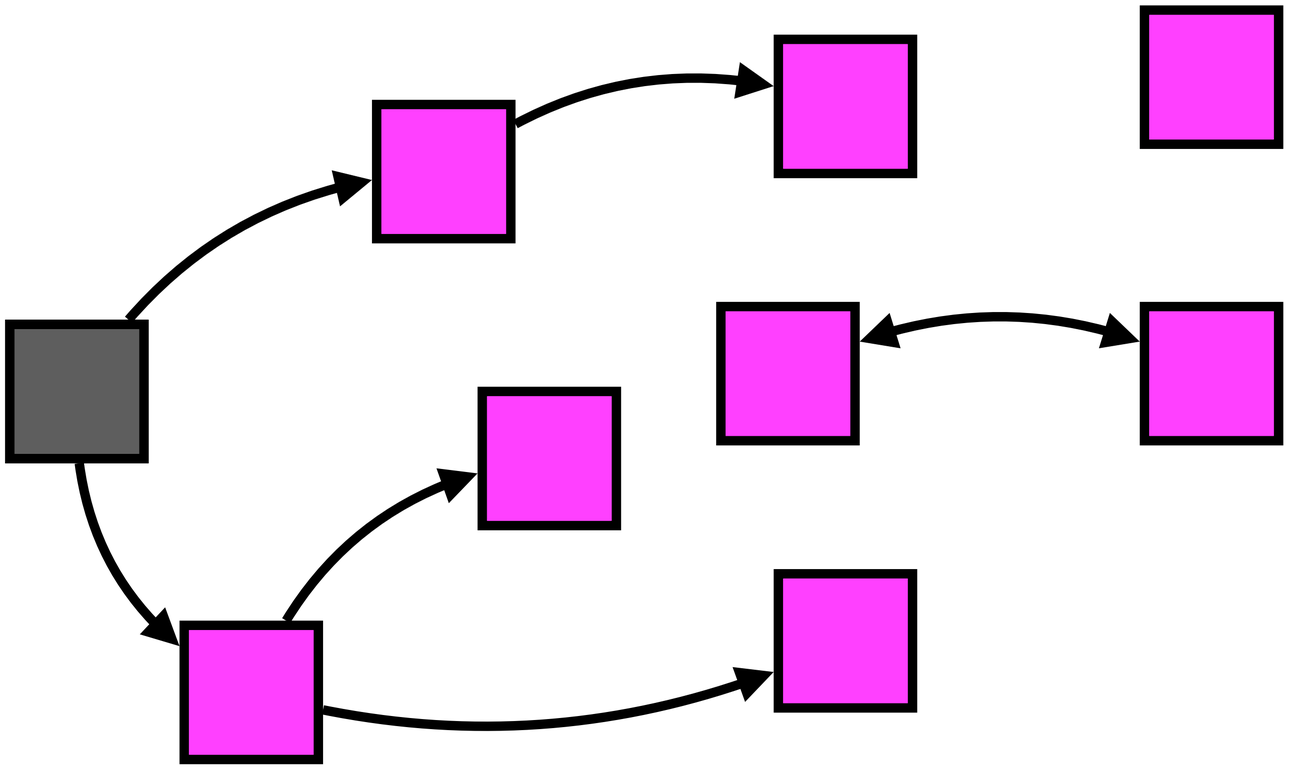

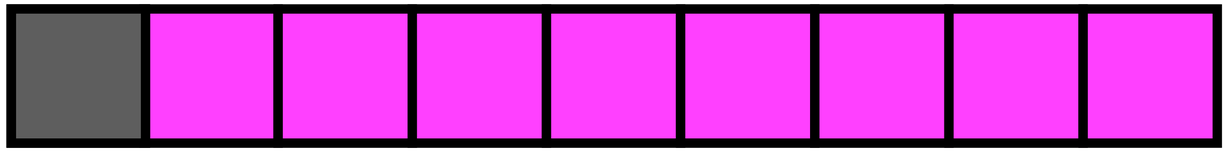

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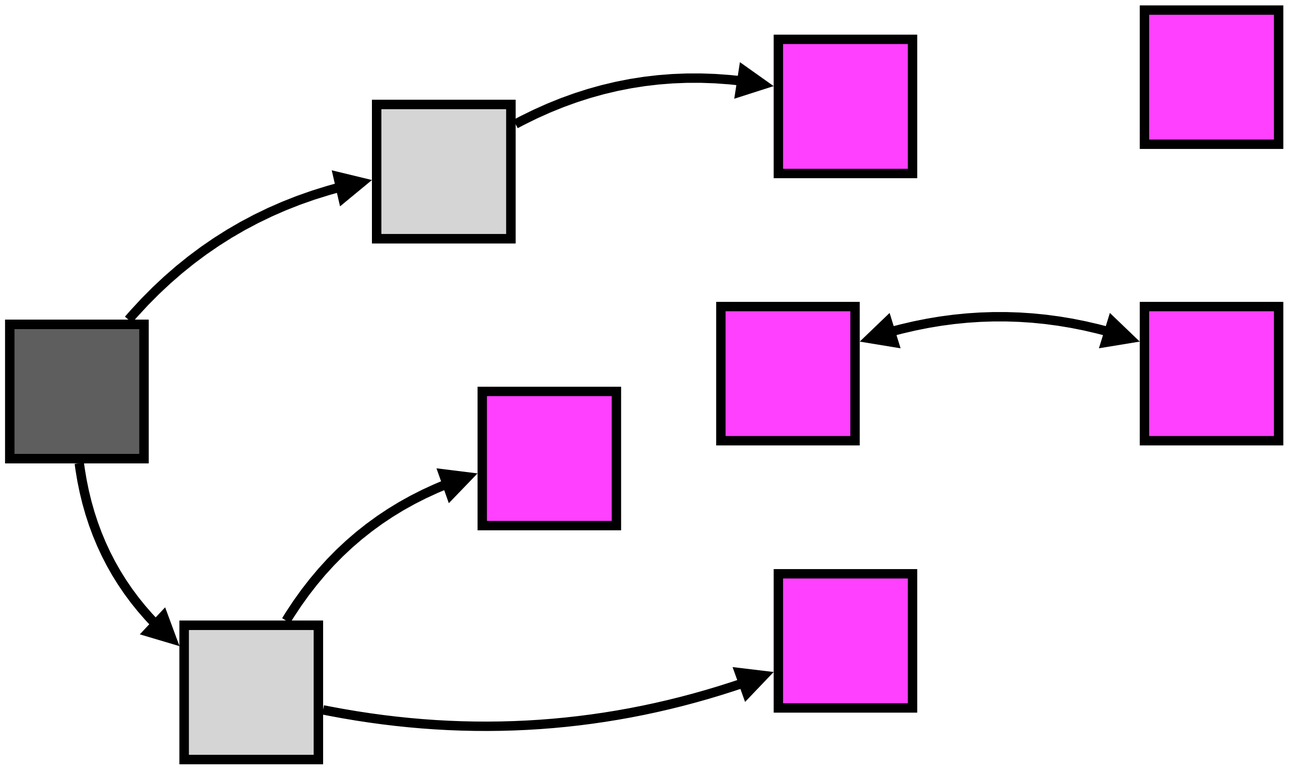

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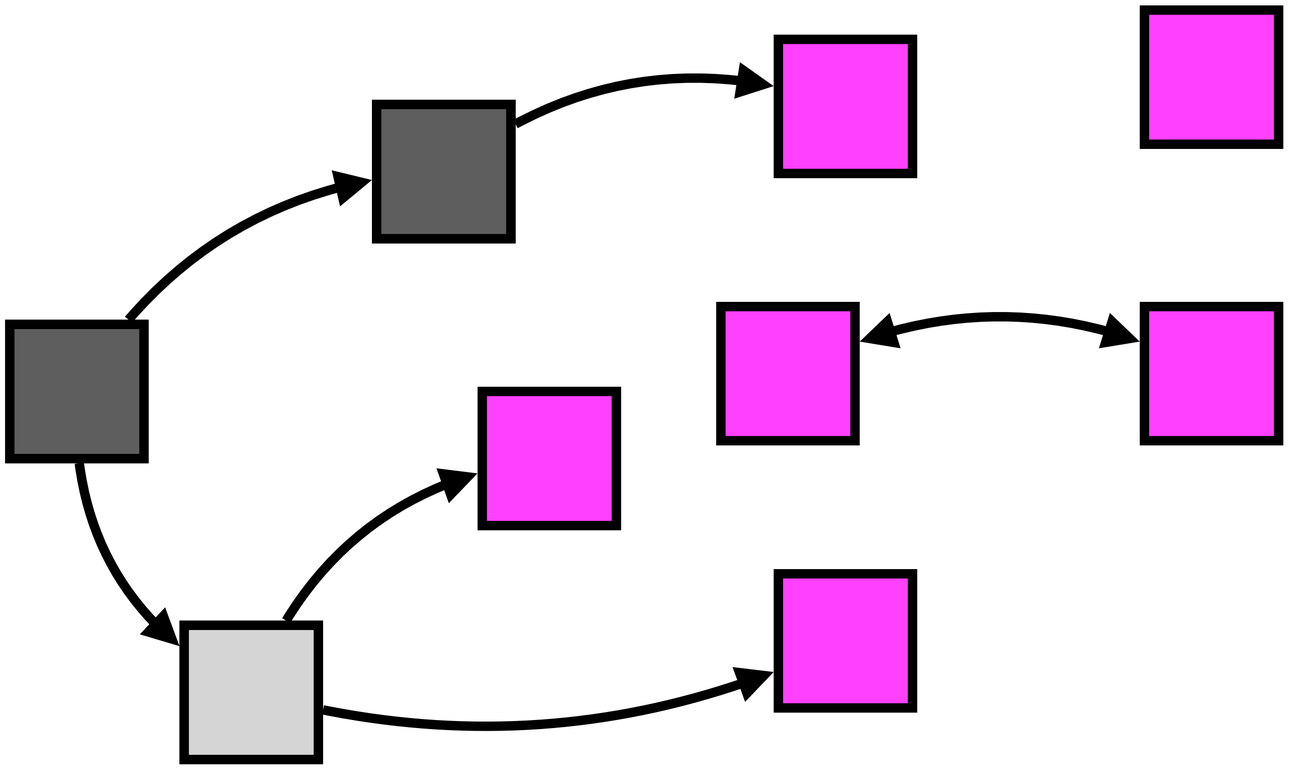

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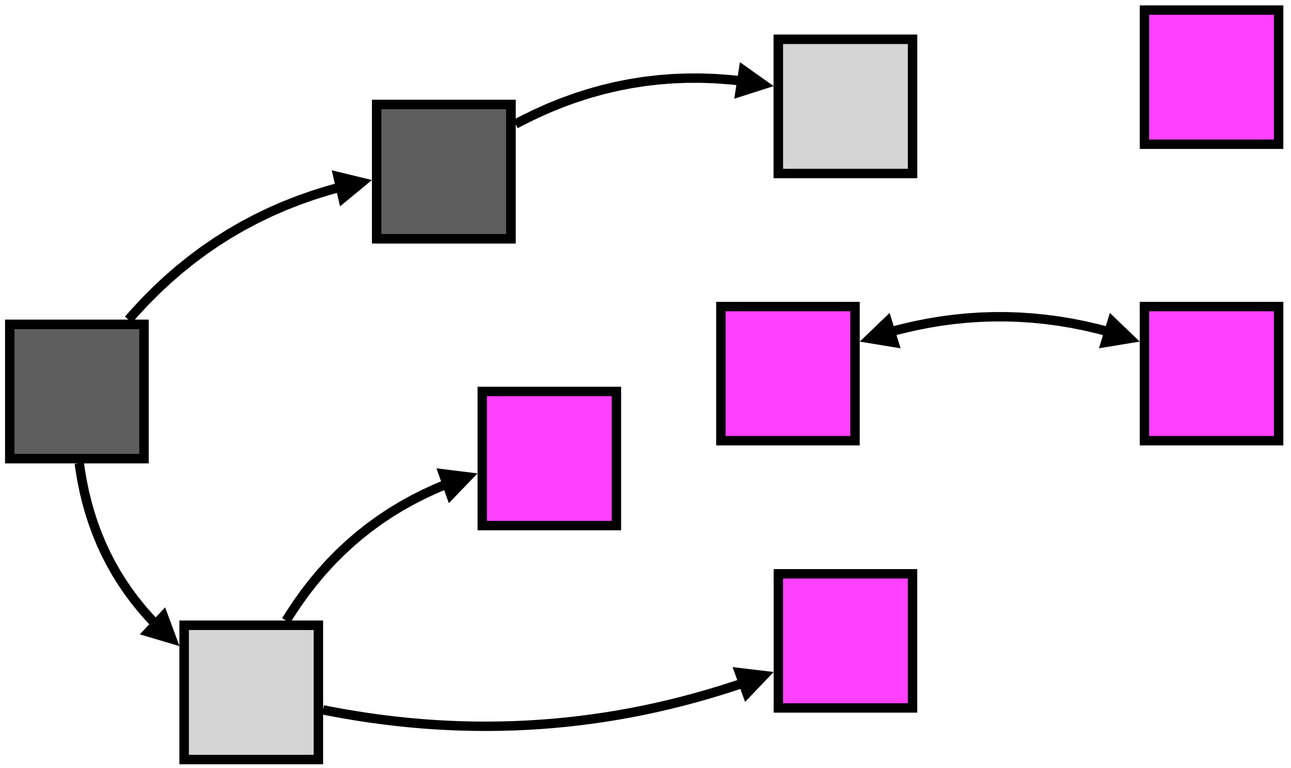

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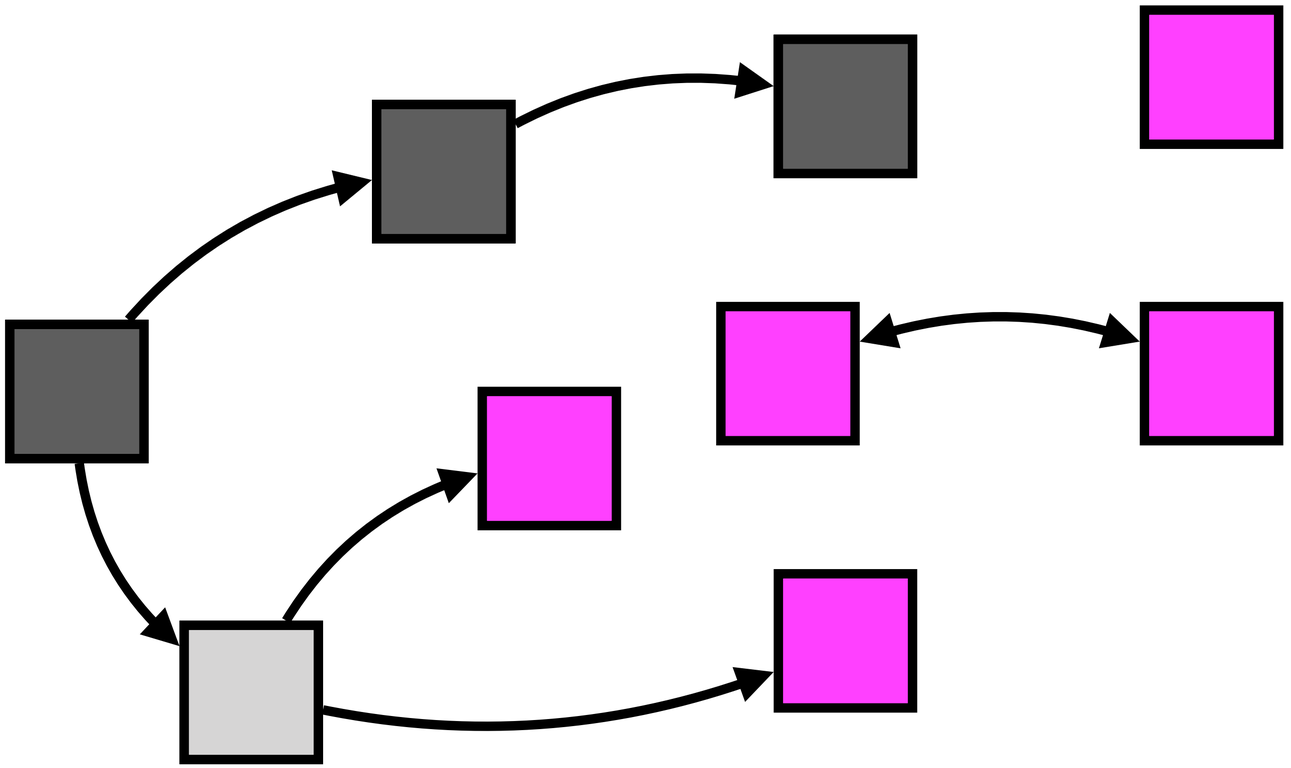

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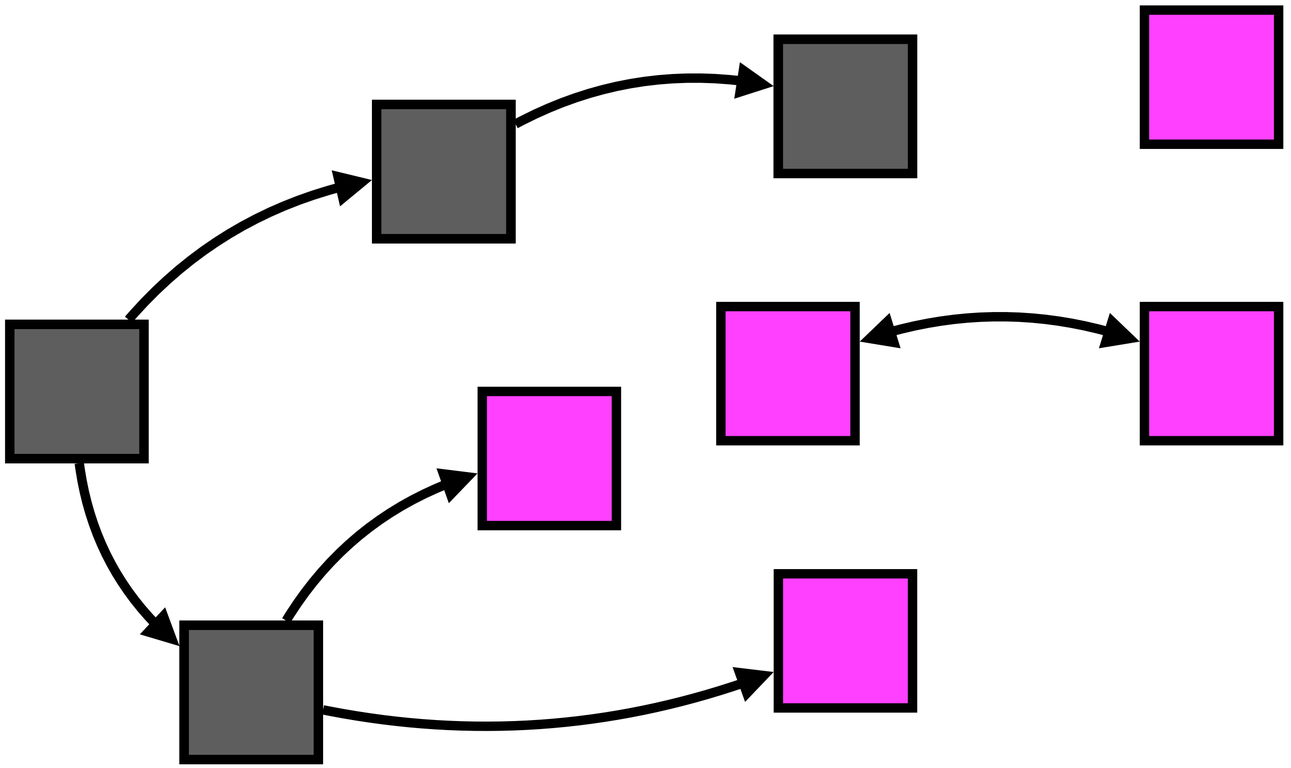

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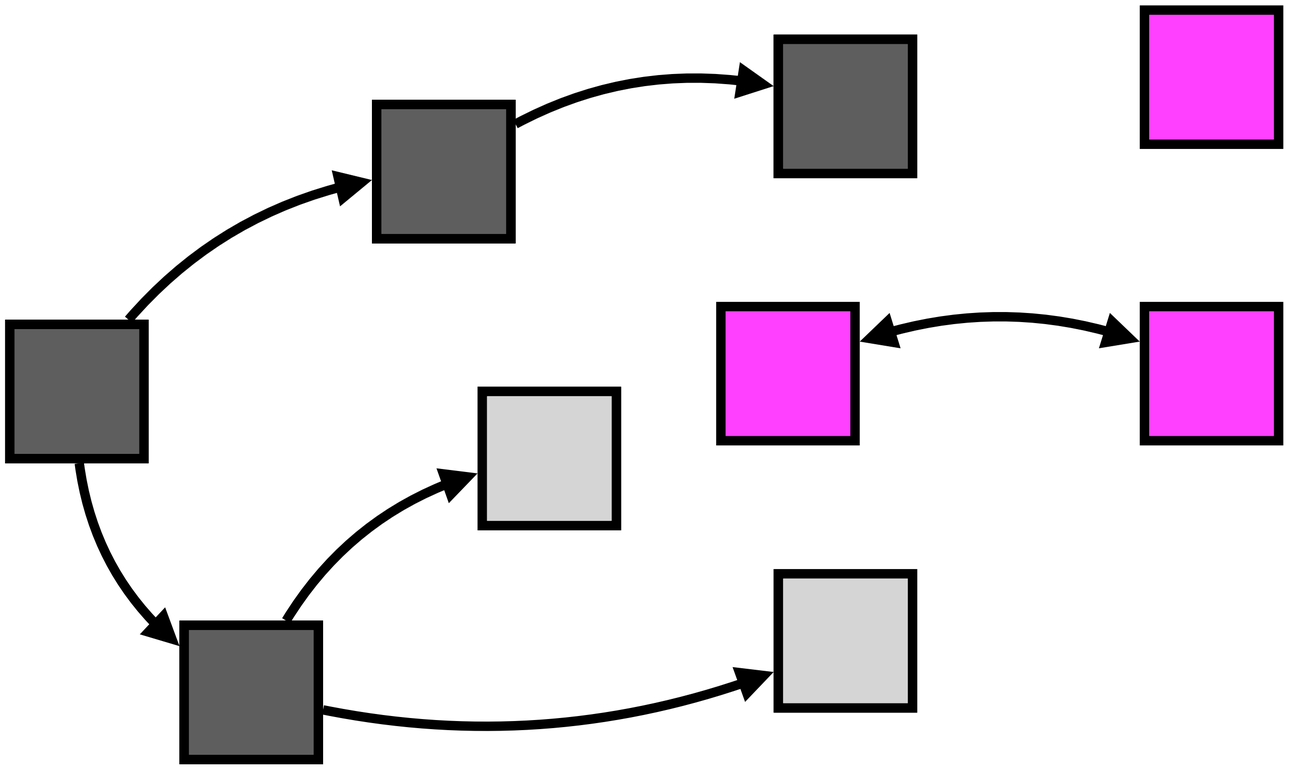

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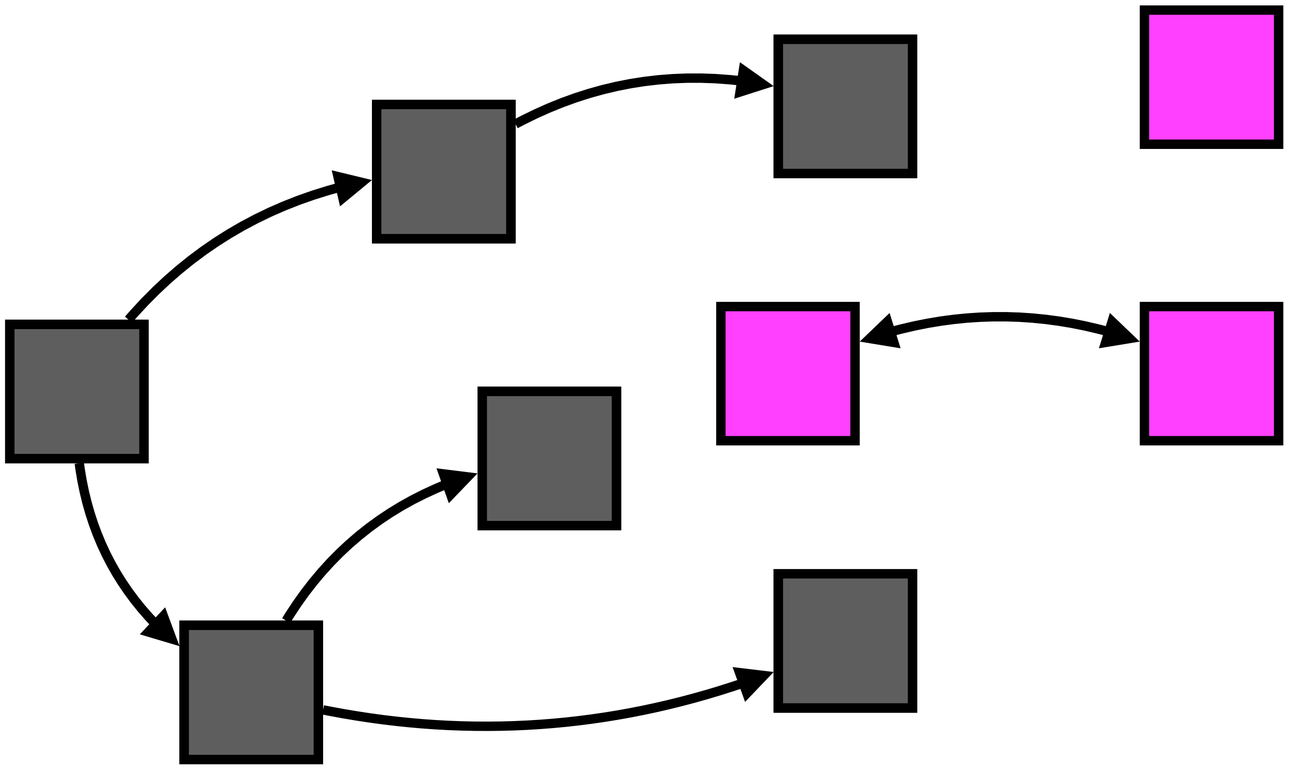

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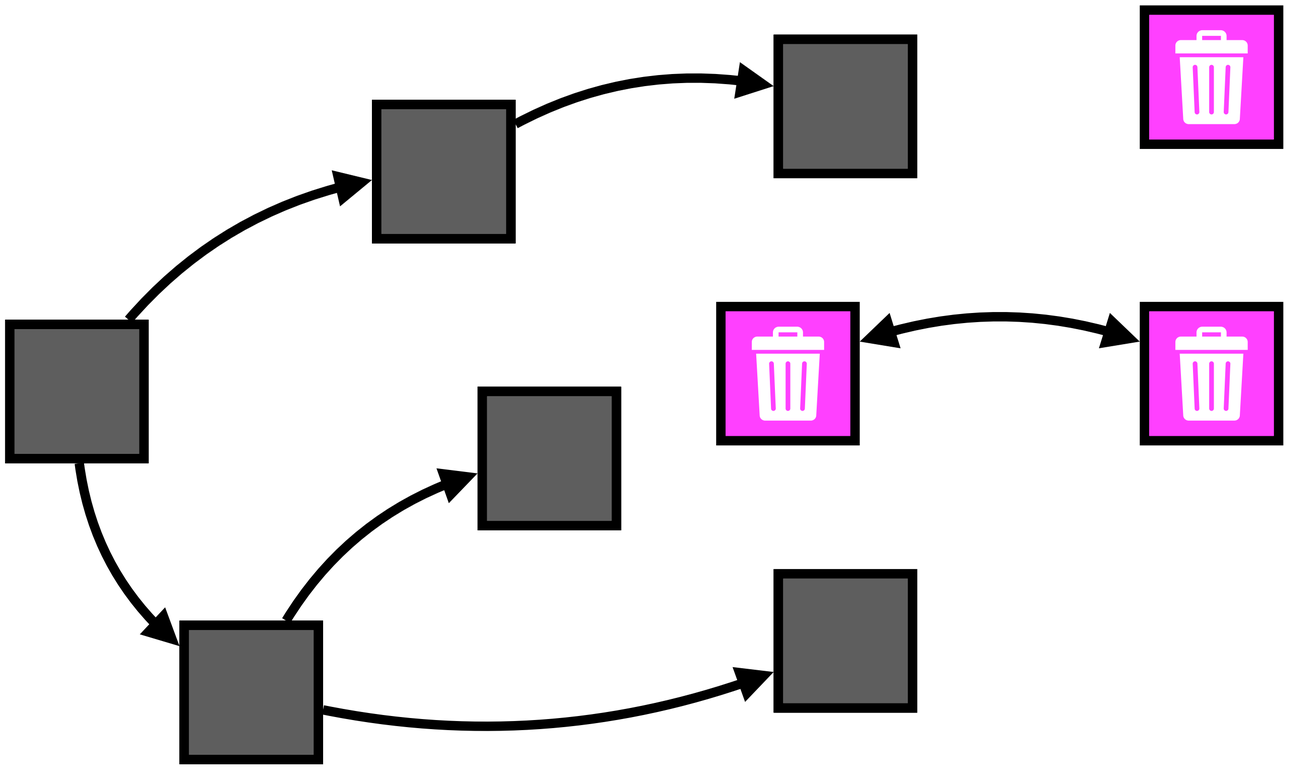

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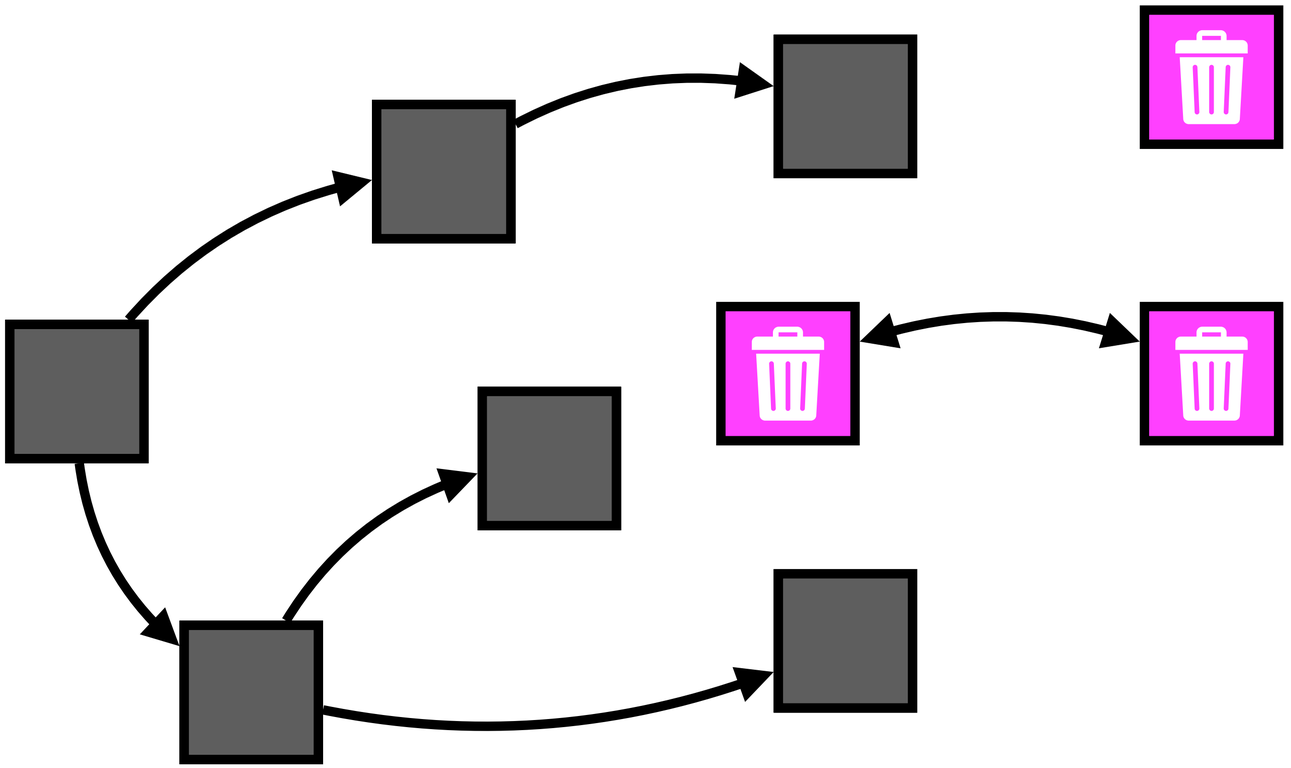
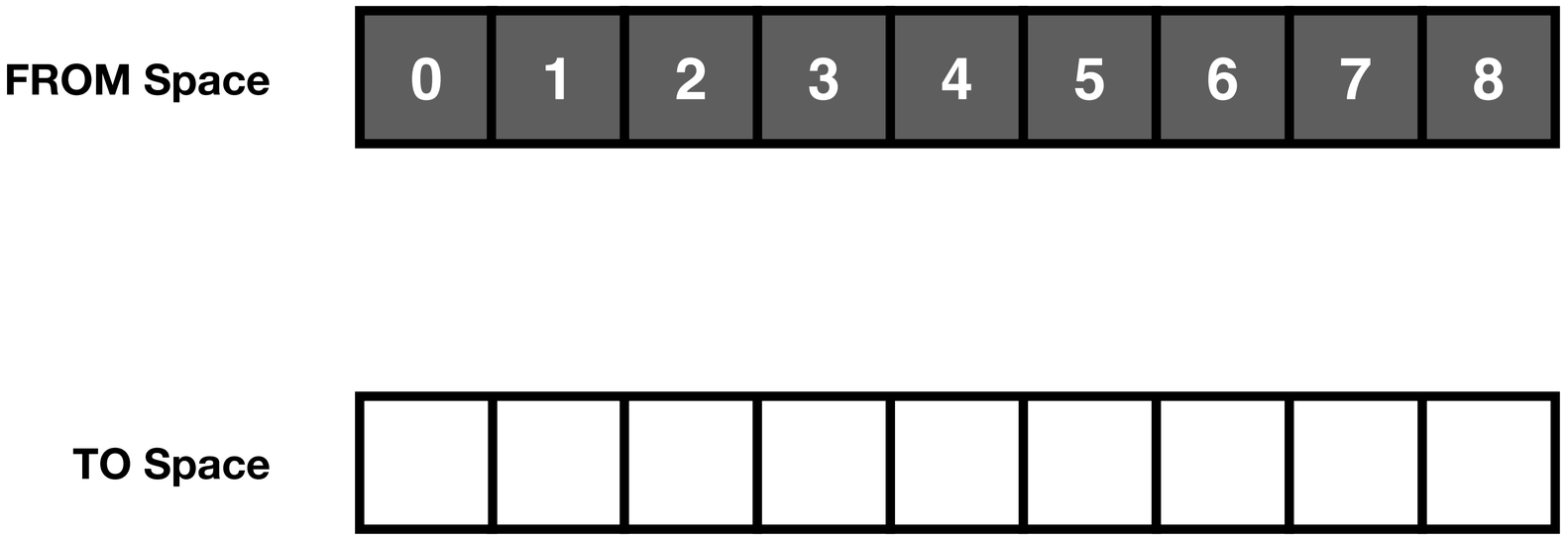


COPYING COLLECTION

Keep your stuff together

COPYING COLLECTION



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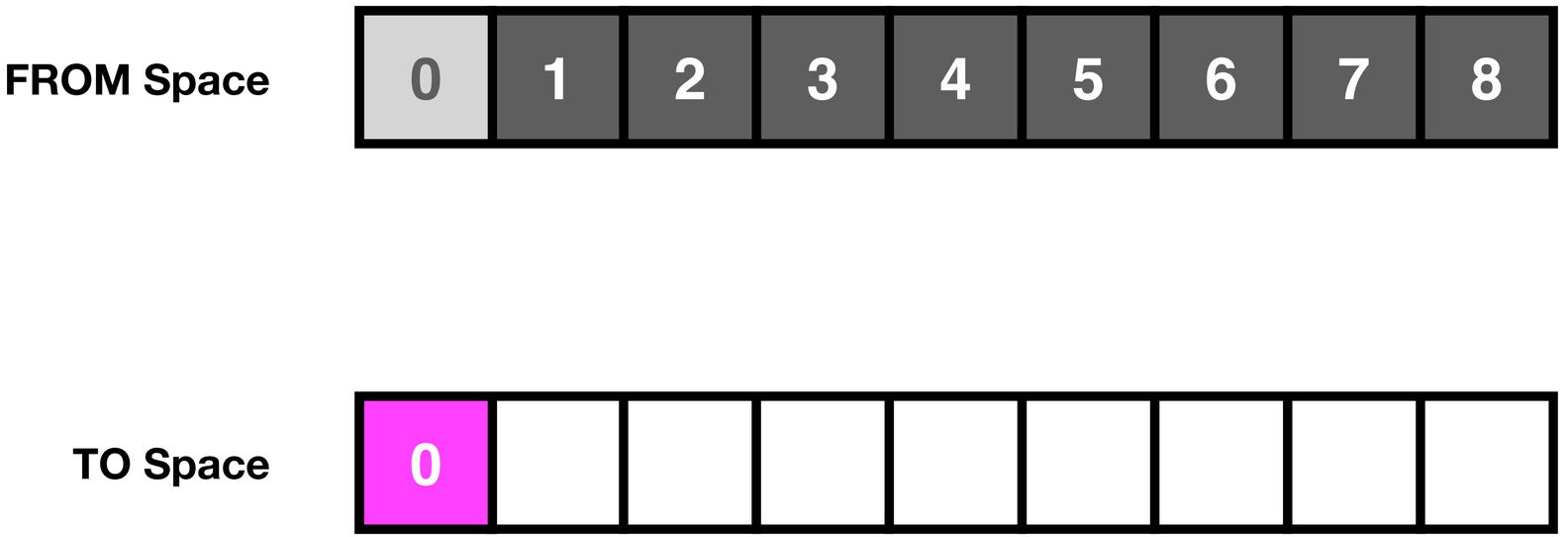

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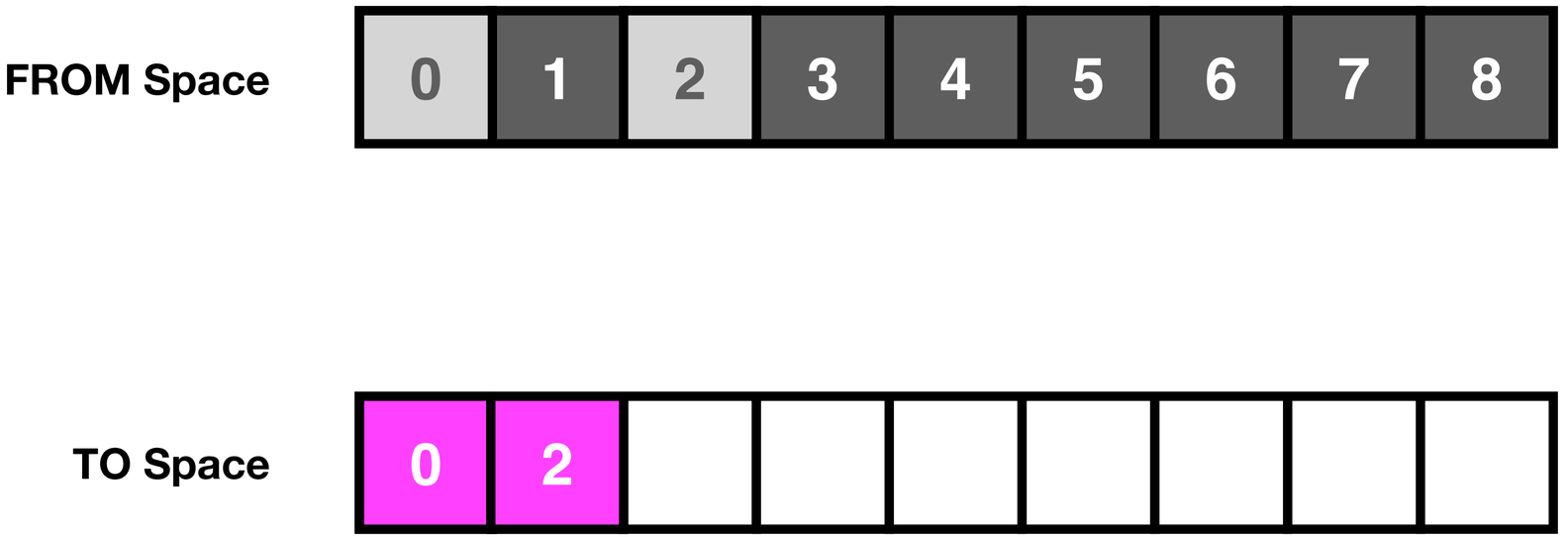

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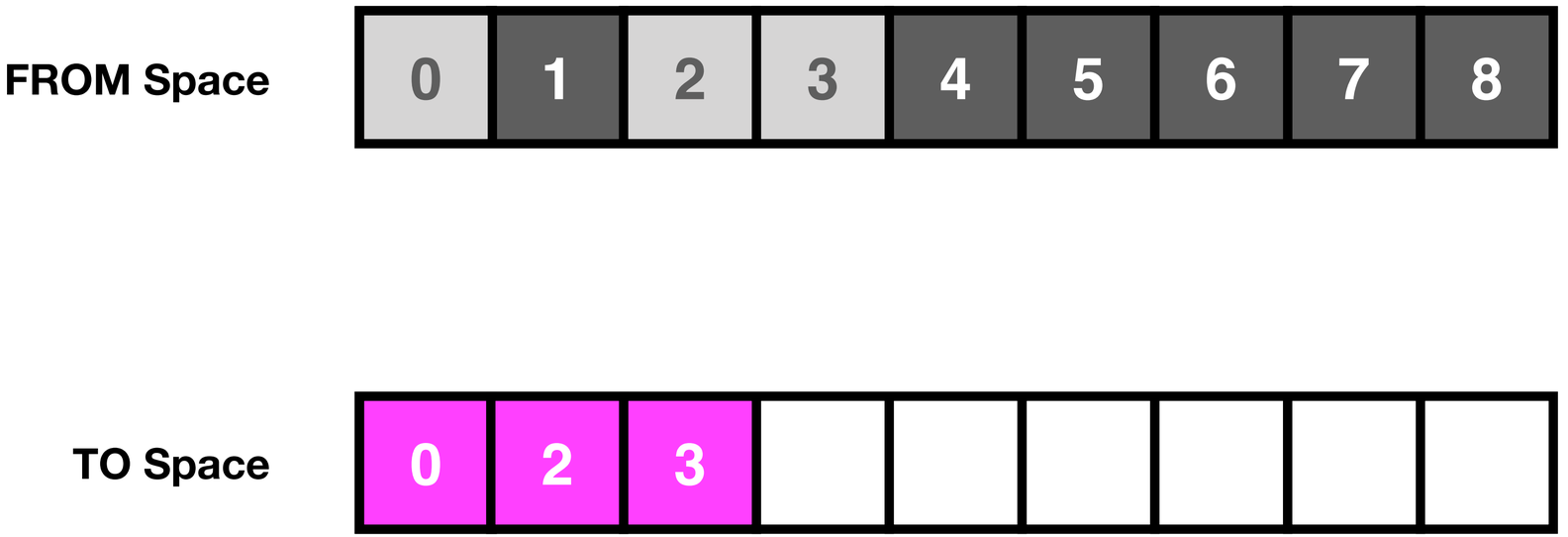

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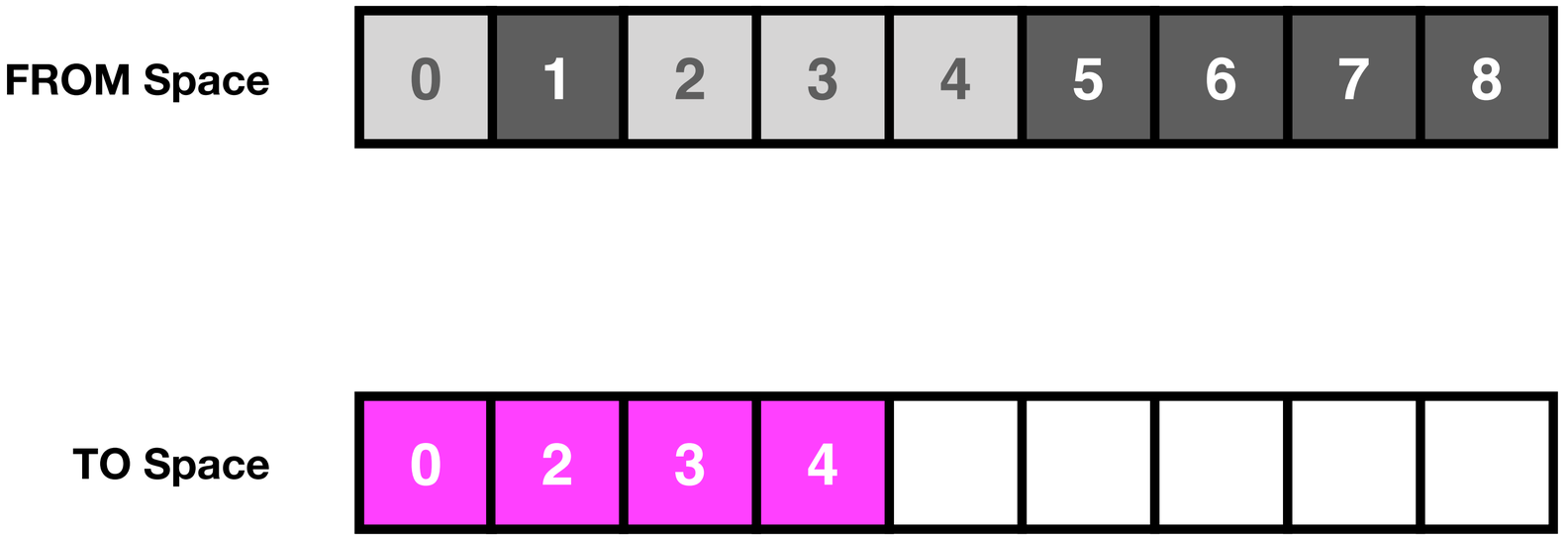

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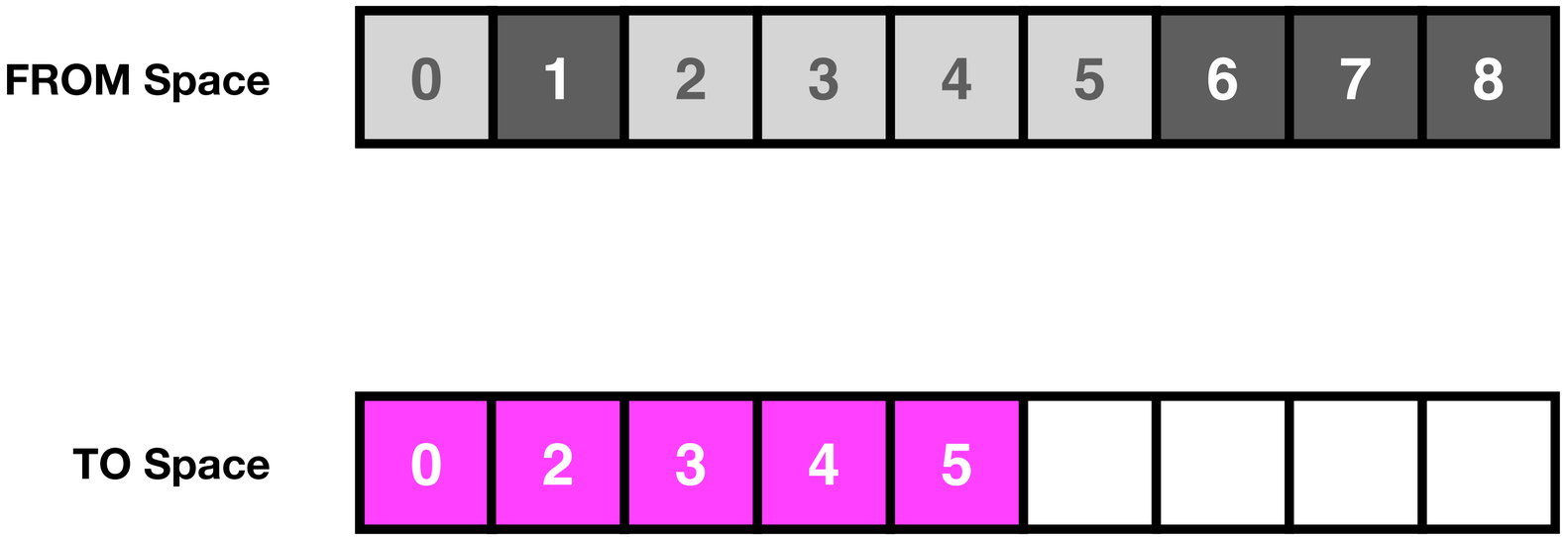

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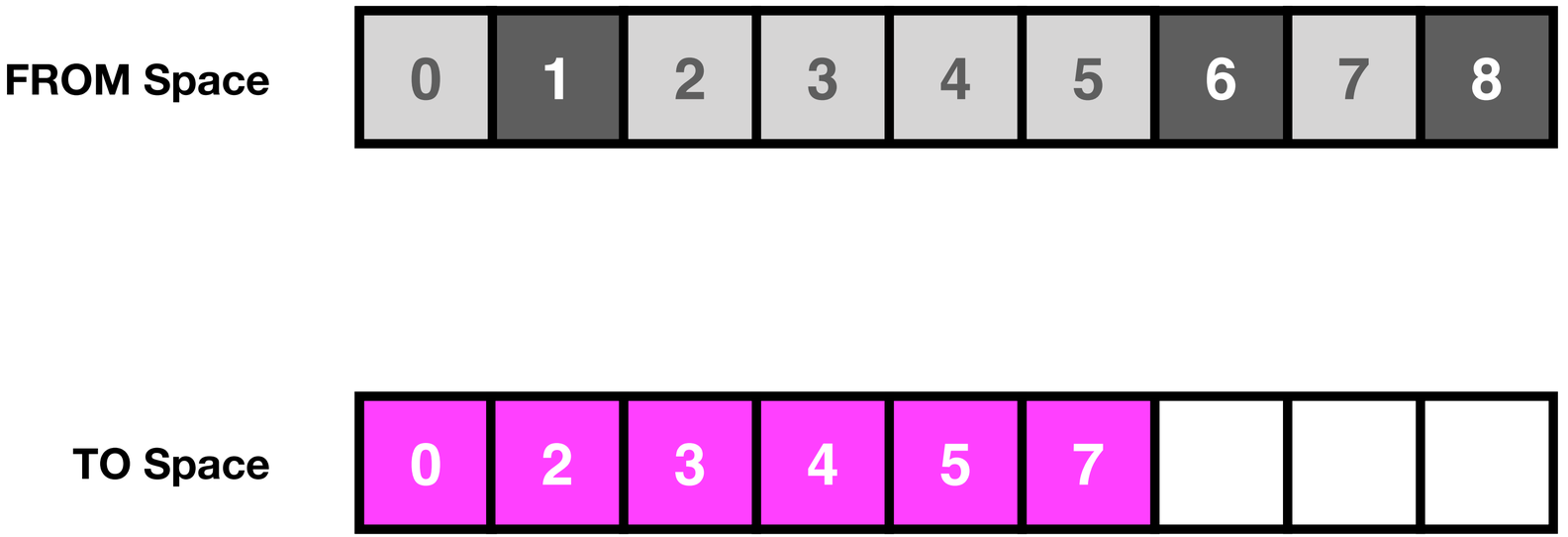

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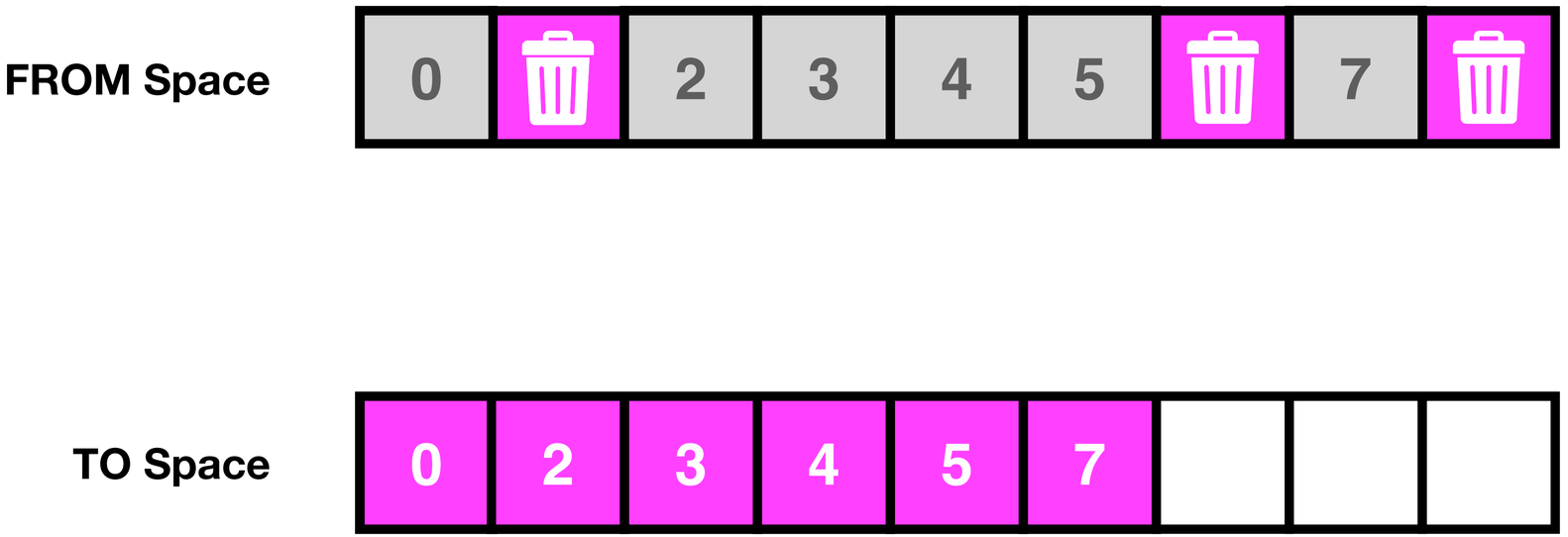

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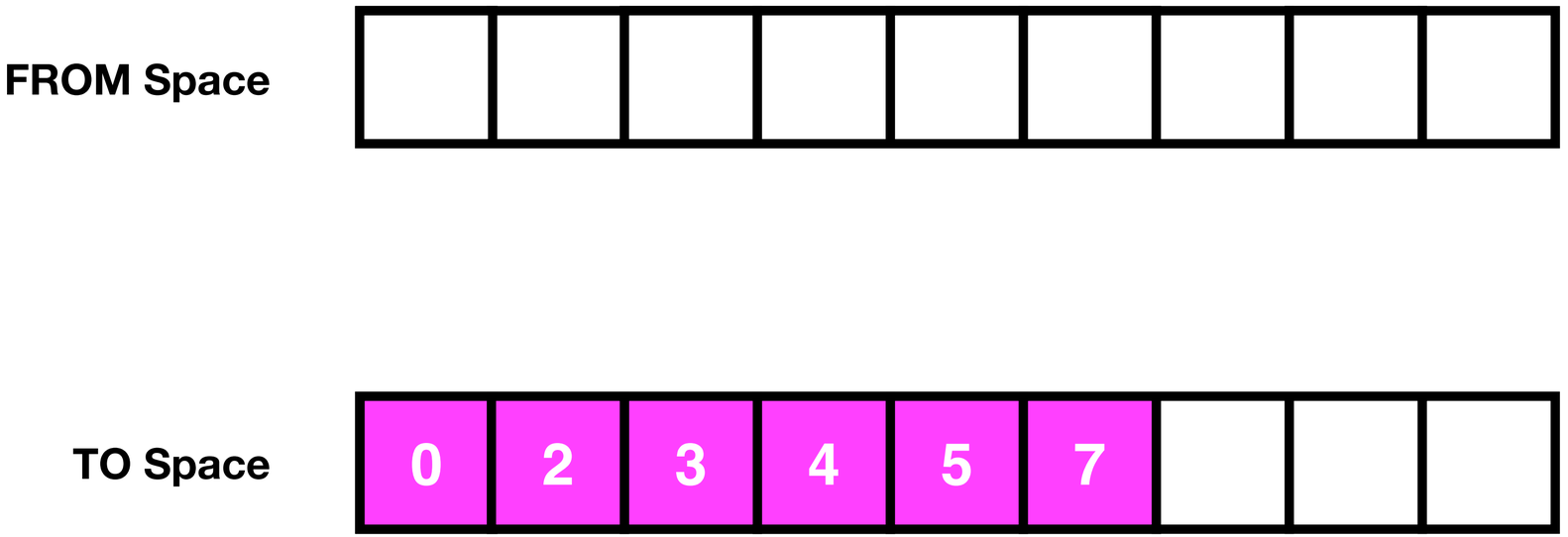
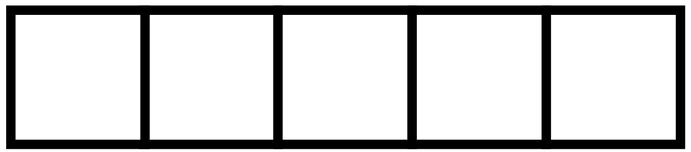


GENERATIONAL COLLECTION

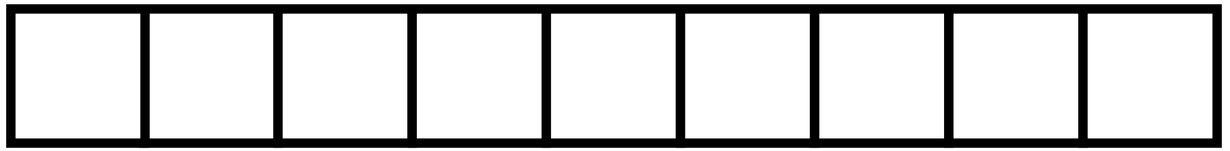
If you’ve been using it for a while, it’s probably important

GENERATIONAL COLLECTION

New objects

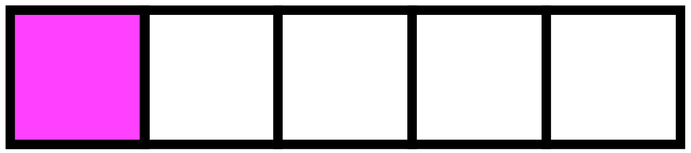


Old objects



GENERATIONAL COLLECTION

New objects



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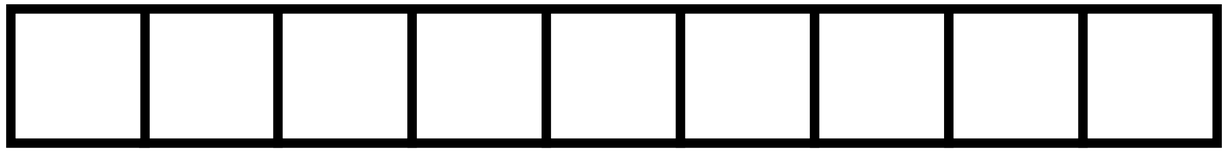

GENERATIONAL COLLECTION

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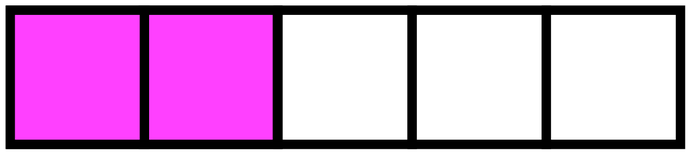

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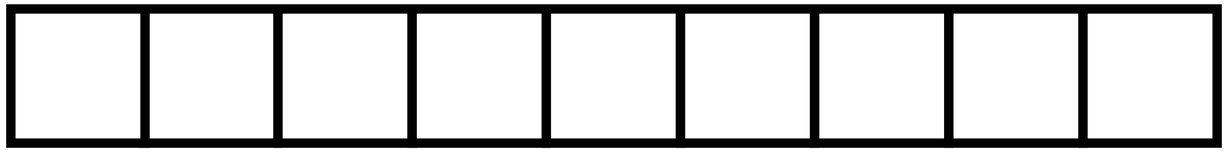

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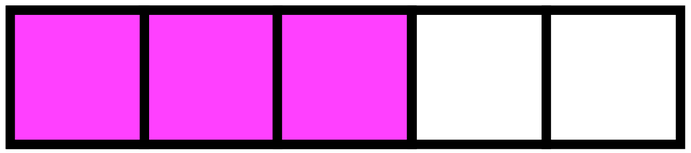

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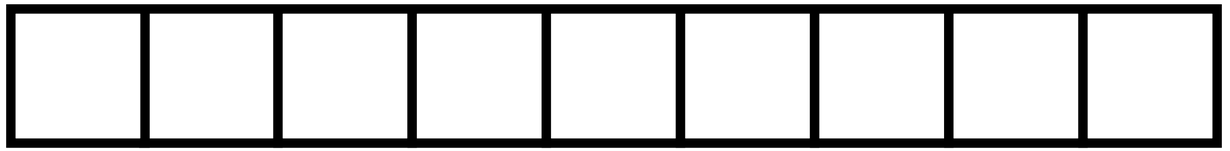

GENERATIONAL COLLECTION

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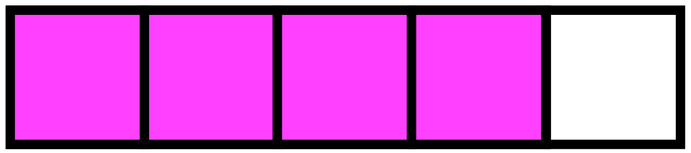

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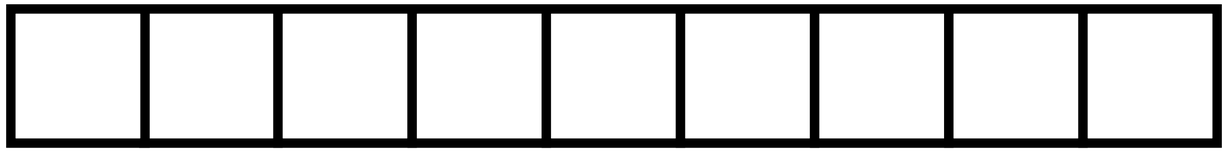

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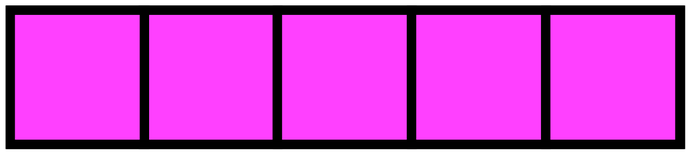

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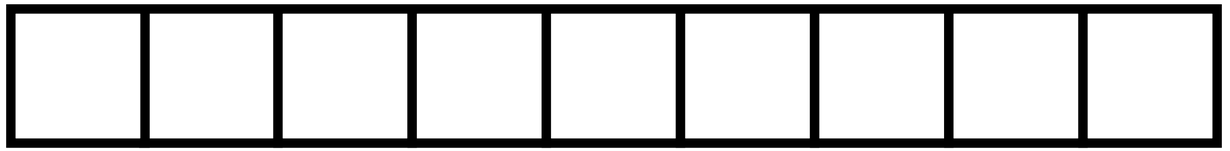
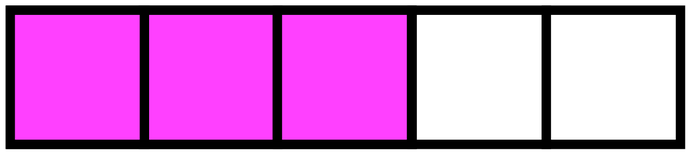


GENERATIONAL COLLECTION

New objects



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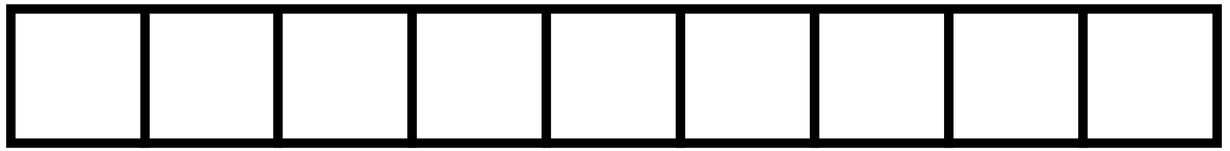
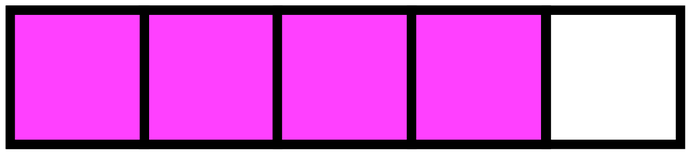


GENERATIONAL COLLECTION

New objects



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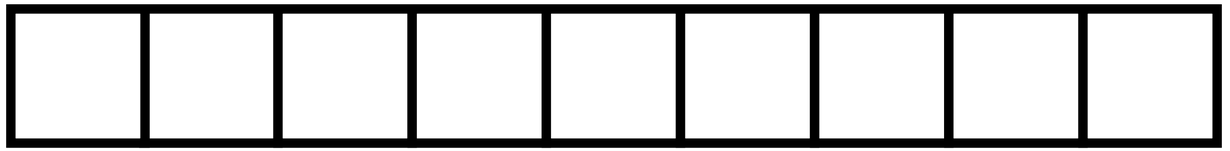

GENERATIONAL COLLECTION

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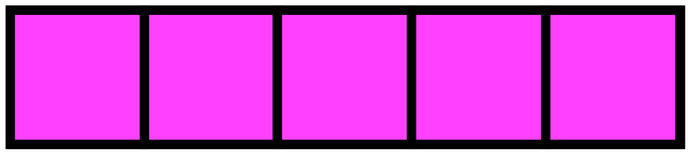

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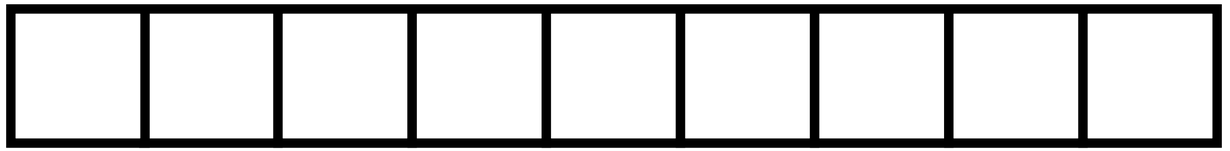

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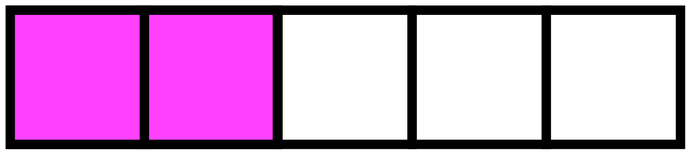

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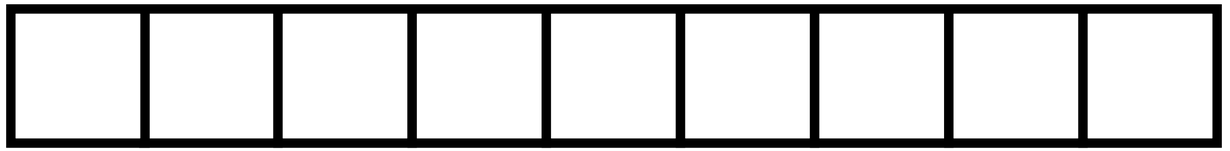

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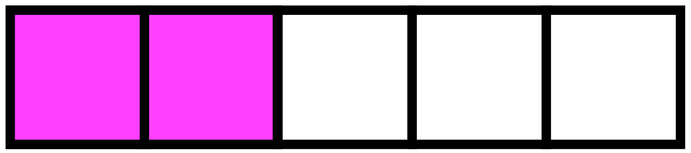

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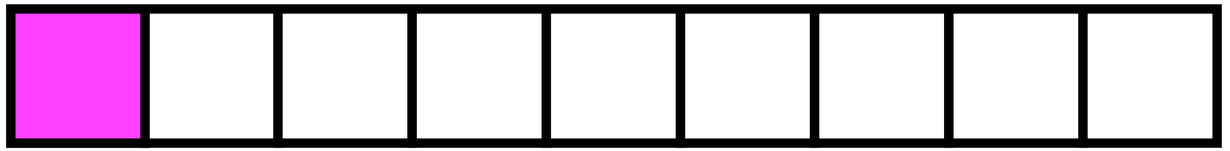

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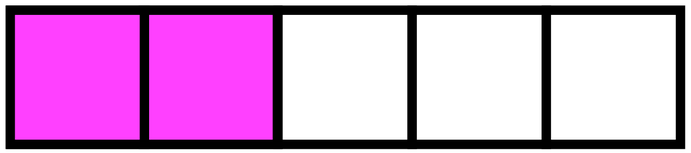

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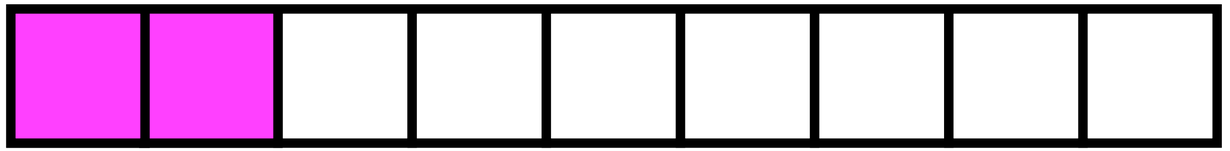

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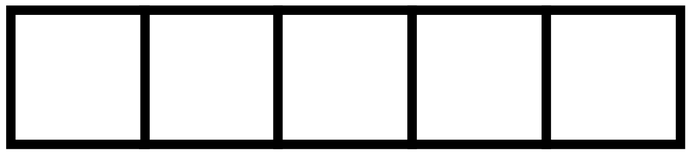

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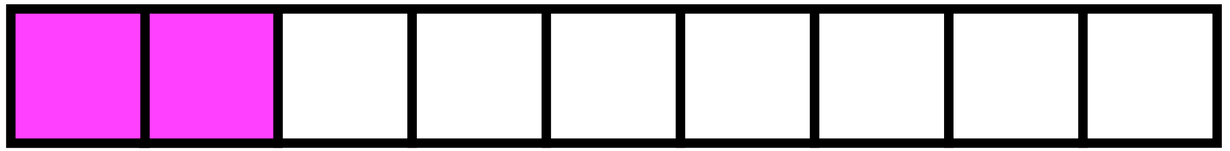


WHAT ABOUT THE BEAM?

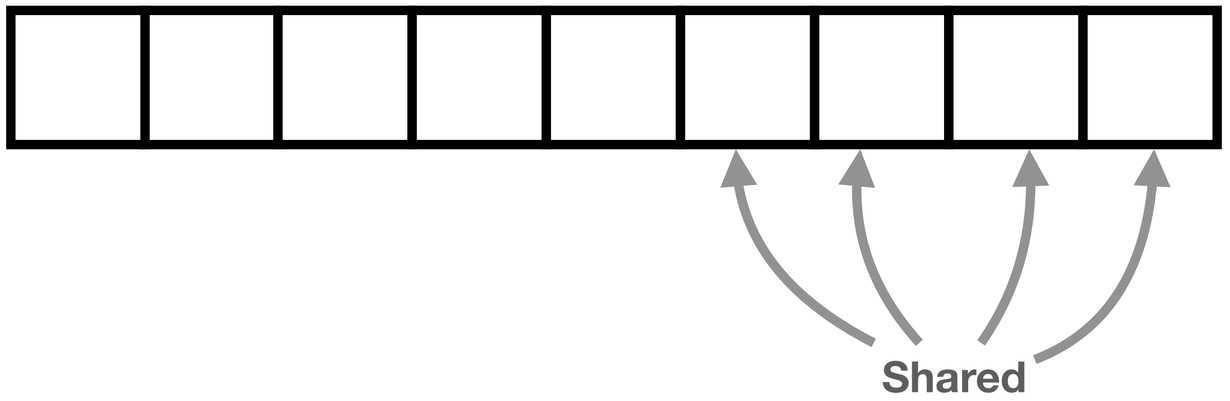
Erlang & Elixir garbage collection

Processes

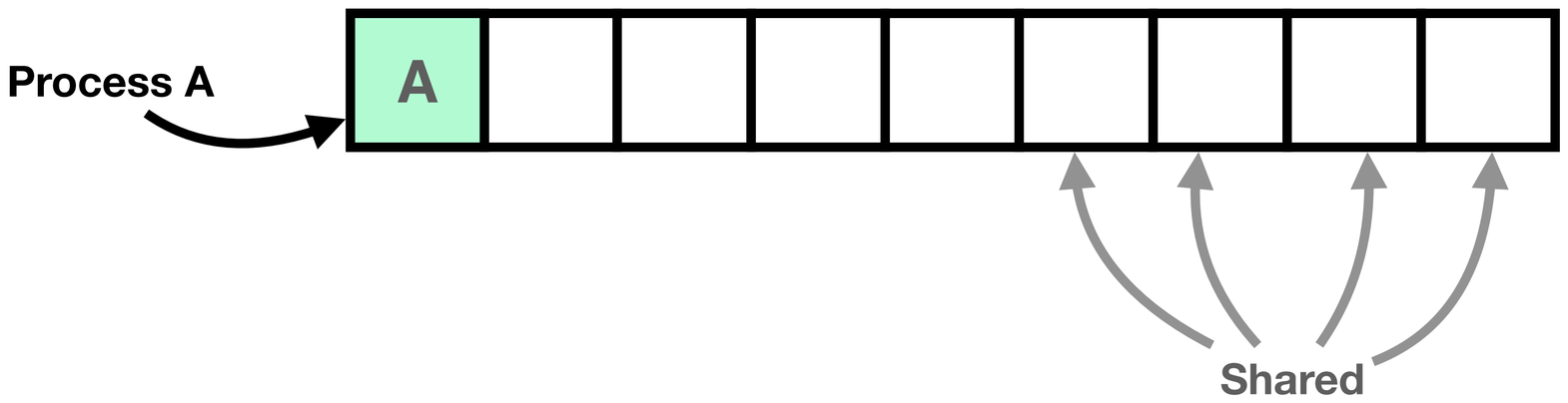
Processes

Immutability

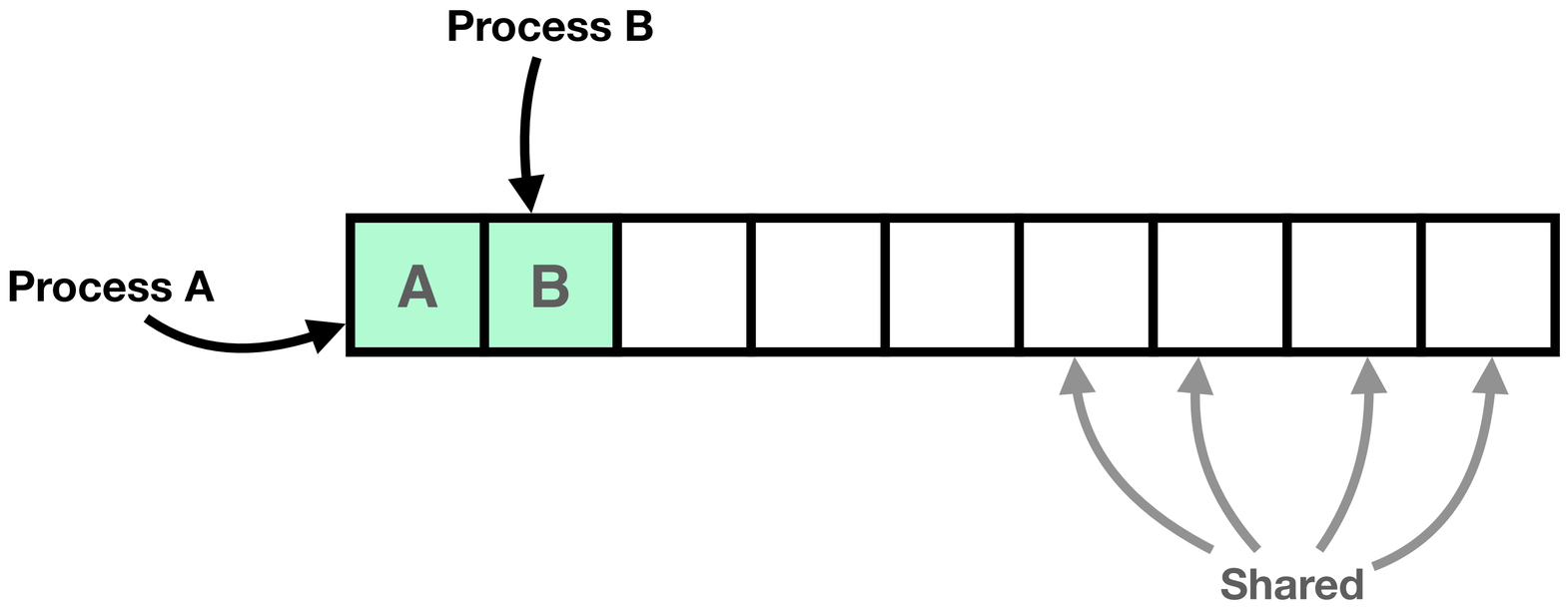
MEMORY LAYOUT



MEMORY LAYOUT



MEMORY LAYOUT



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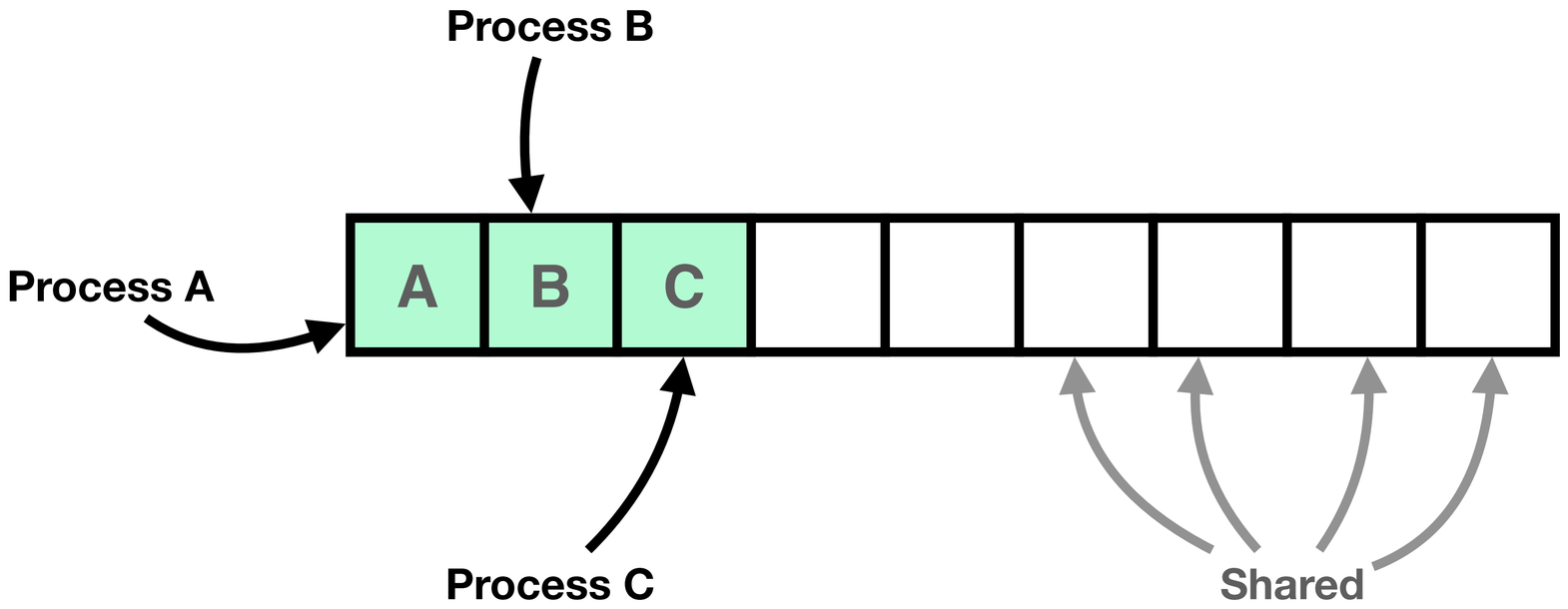

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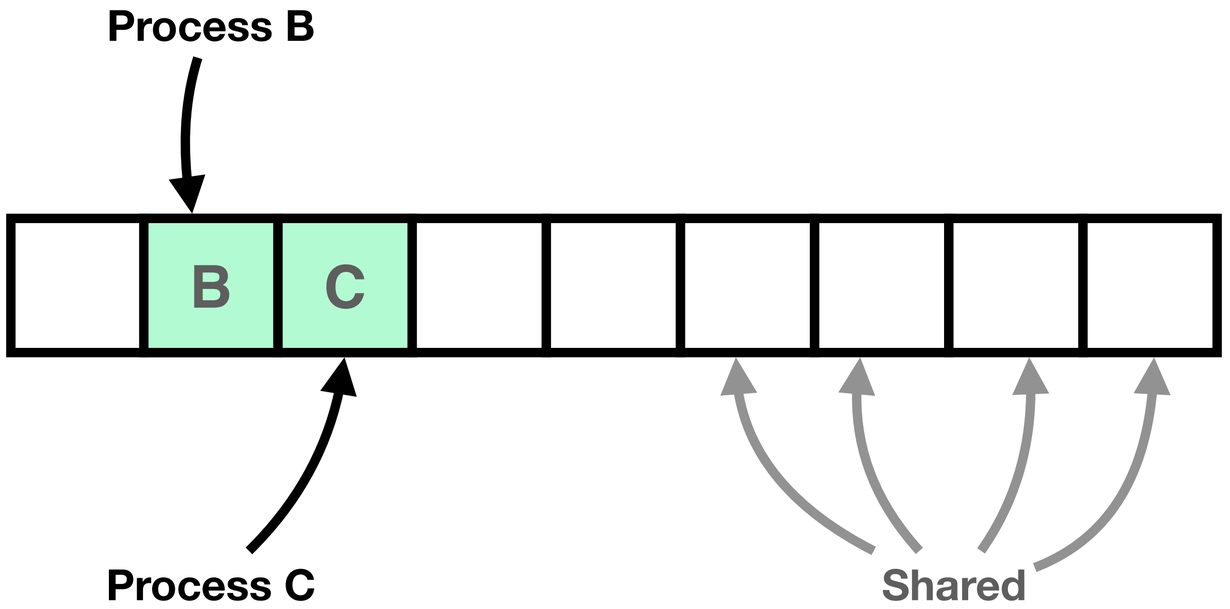

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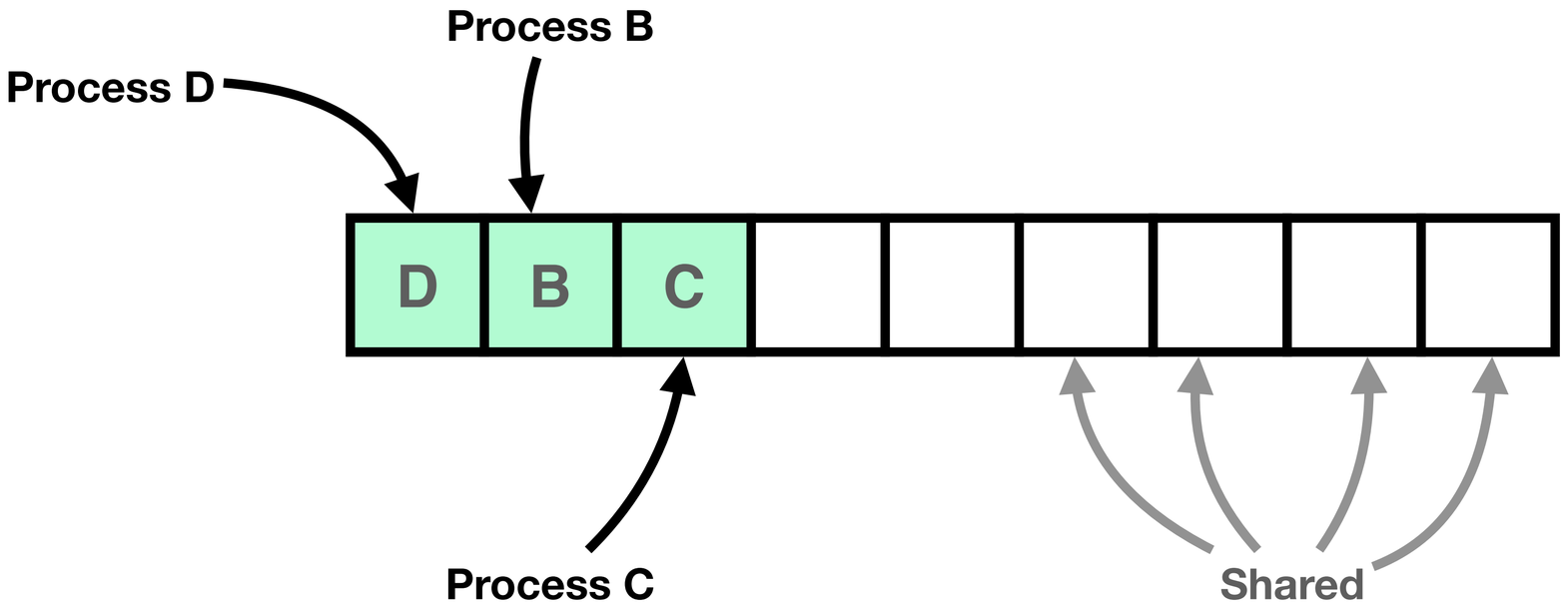
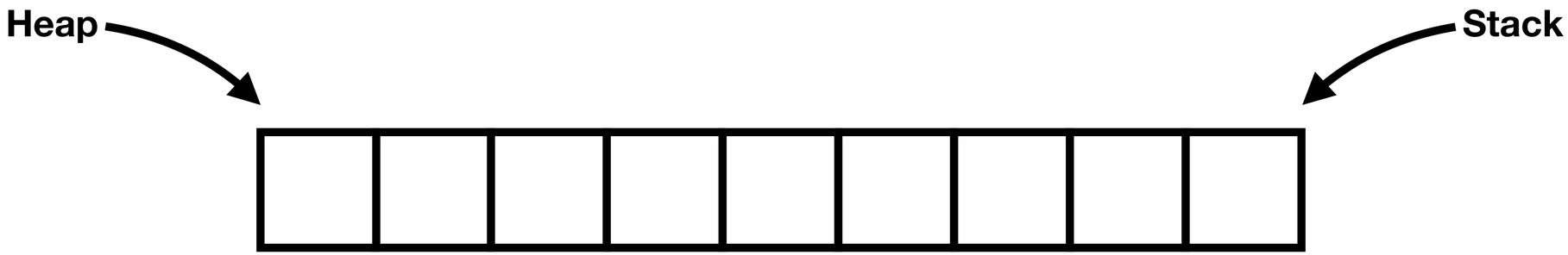


PROCESS MEMORY



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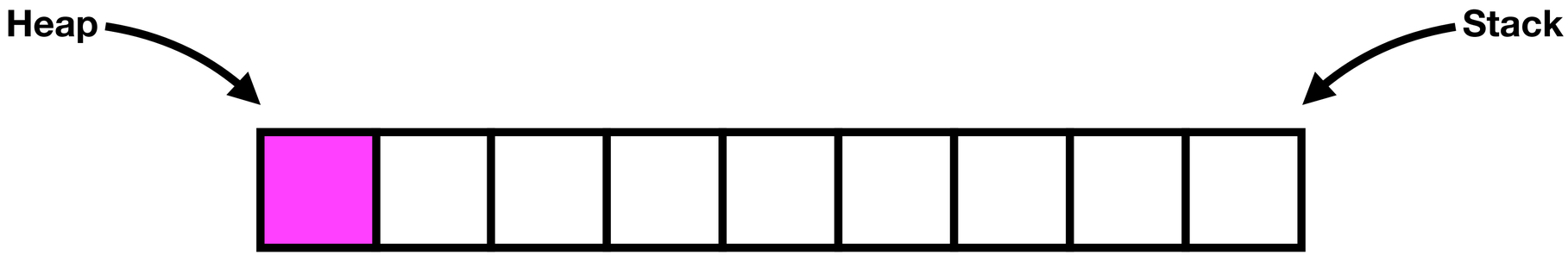

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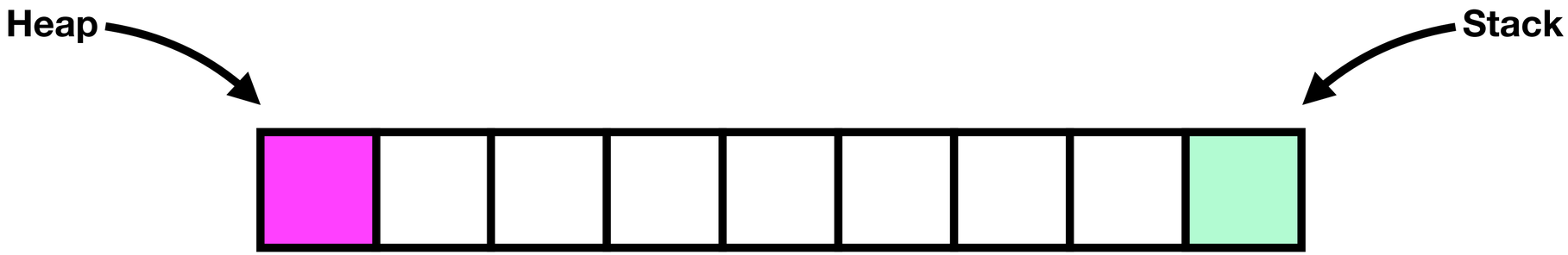

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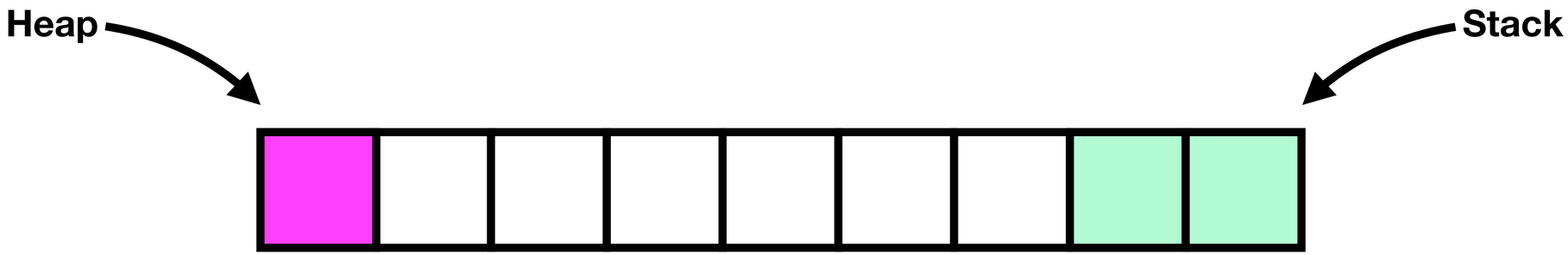

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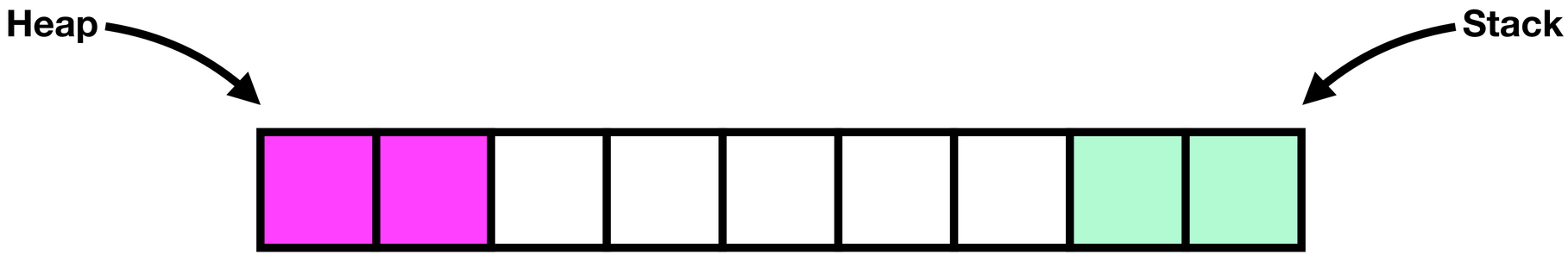

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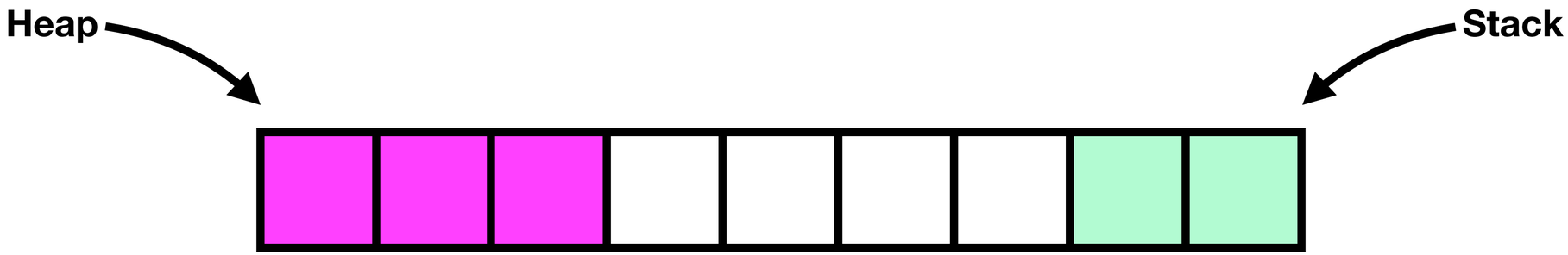

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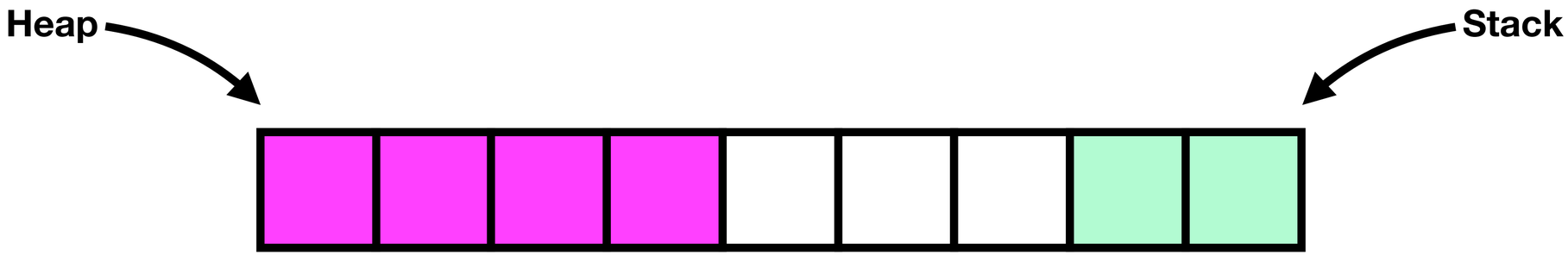

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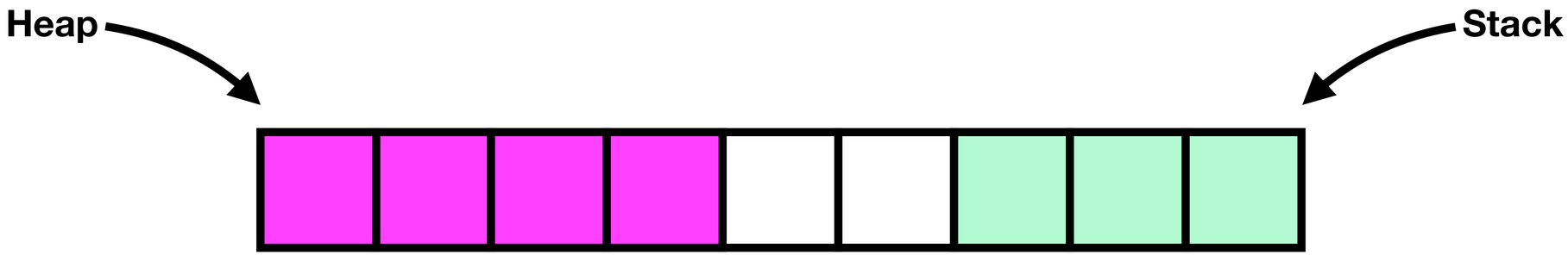

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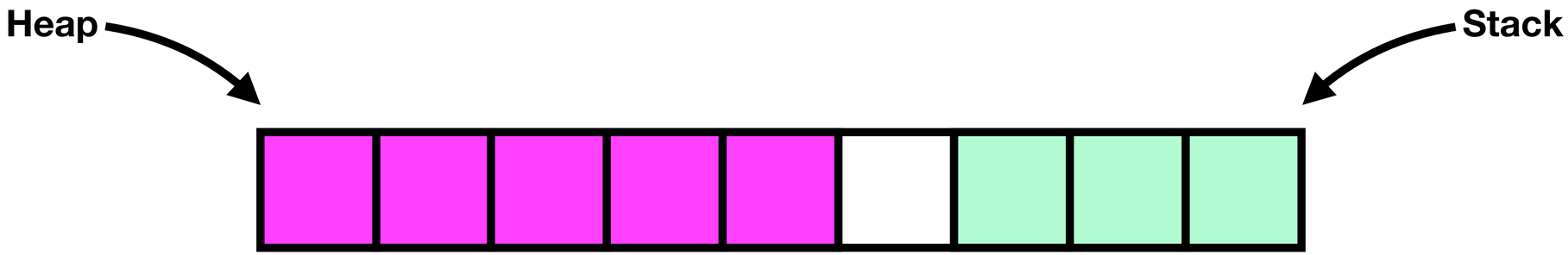

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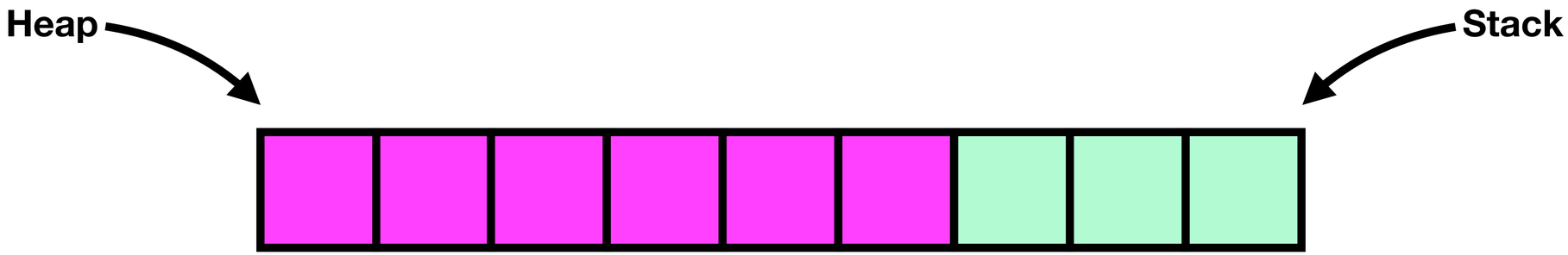

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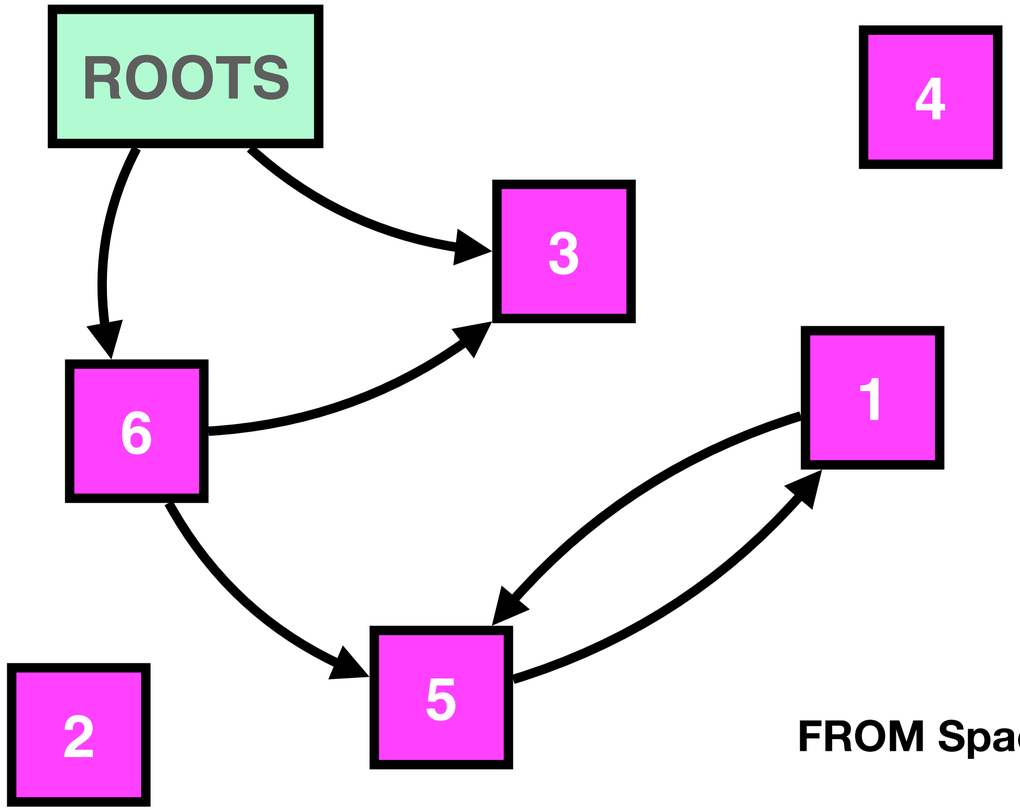

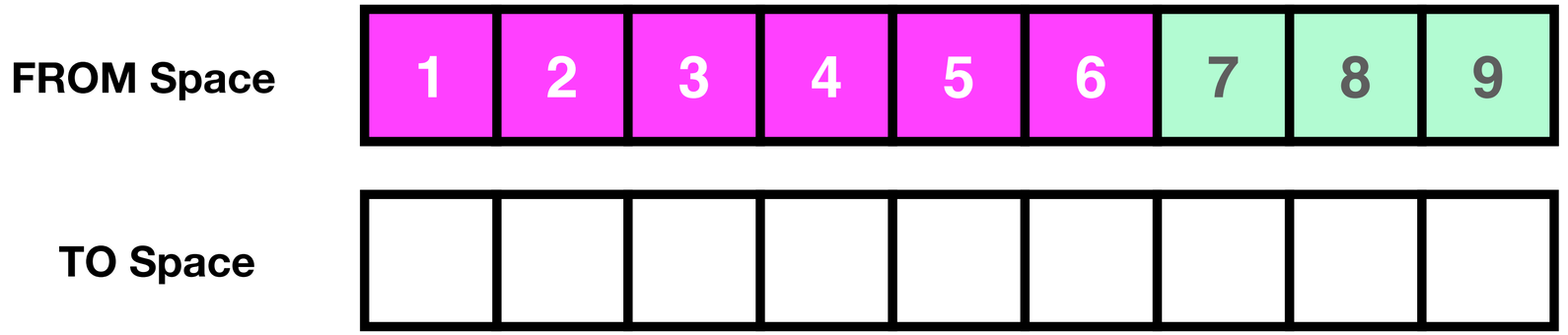

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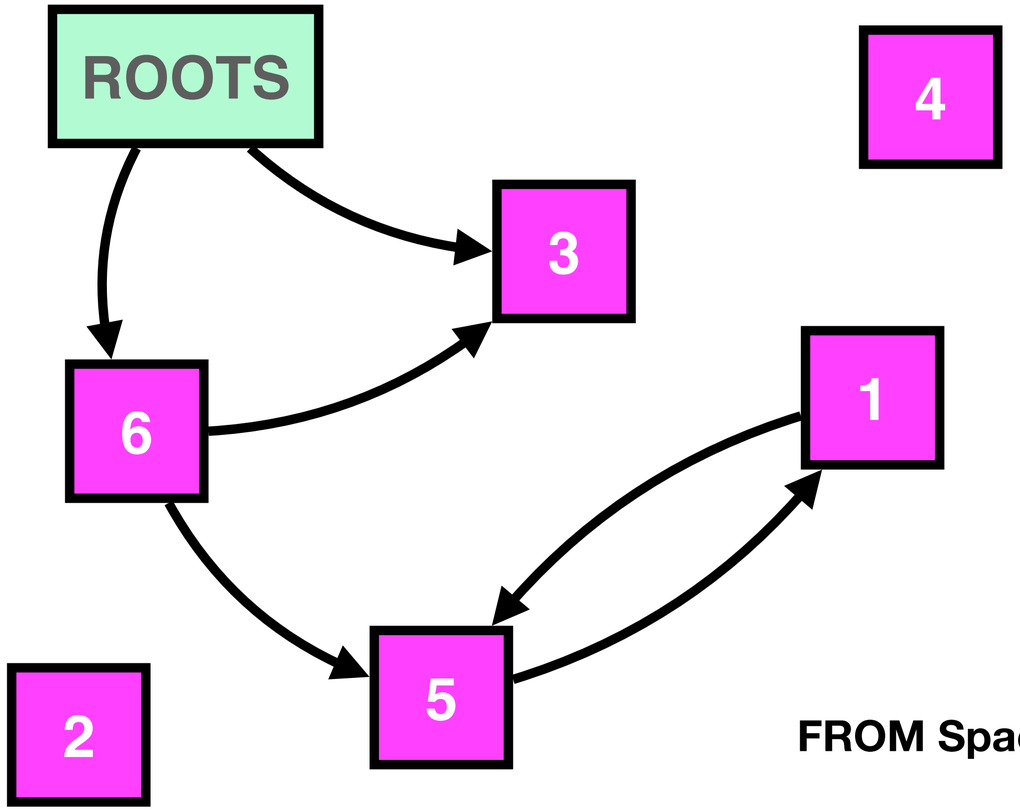

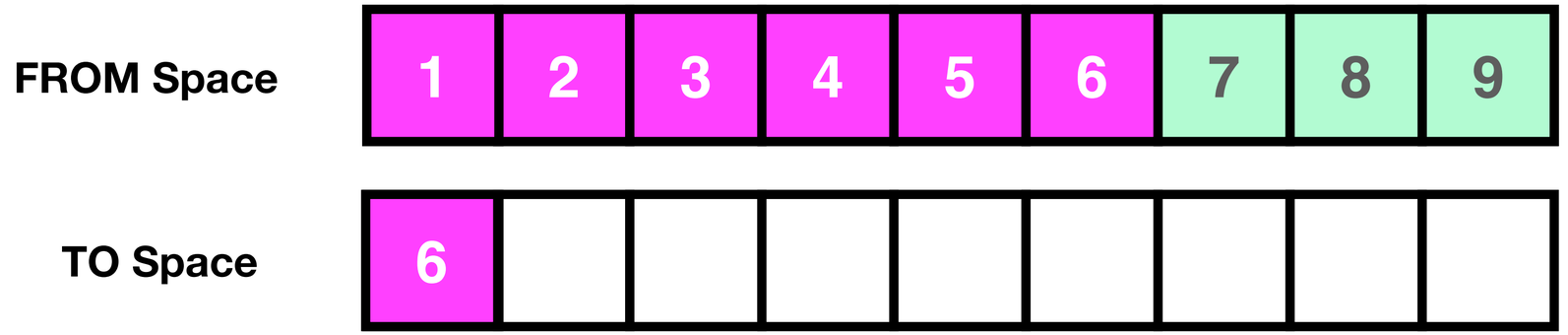

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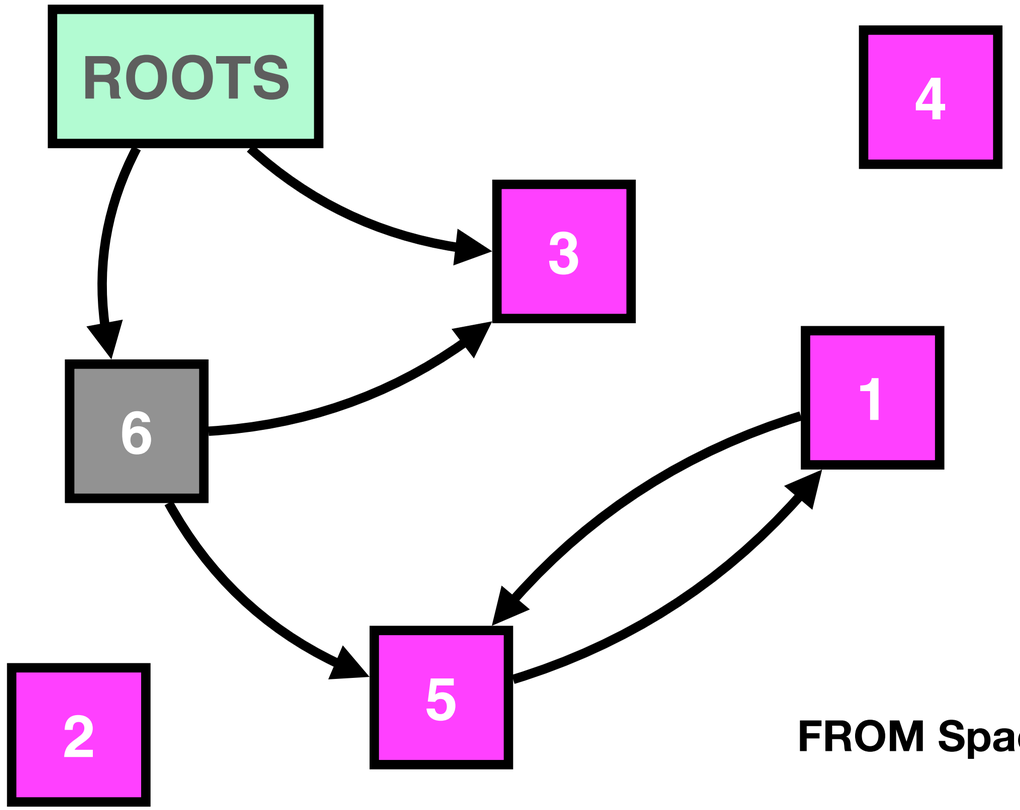

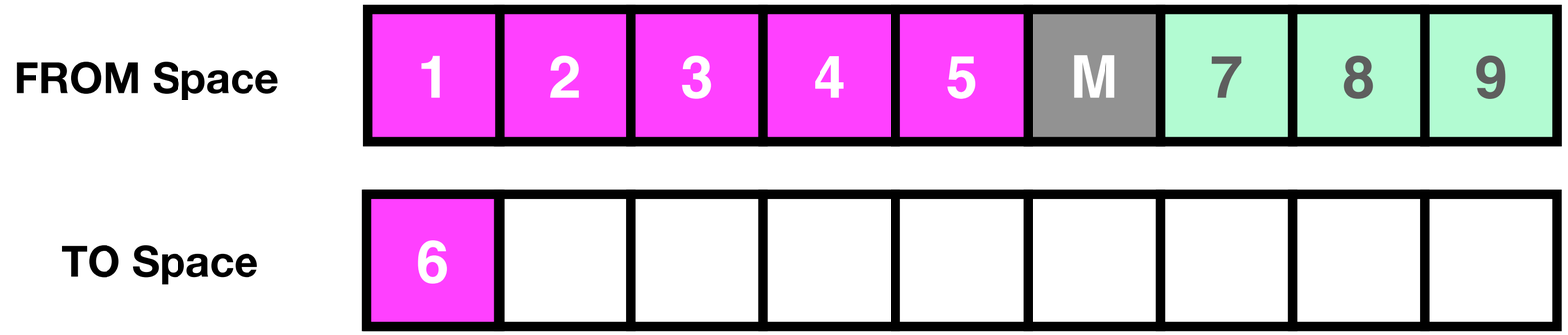

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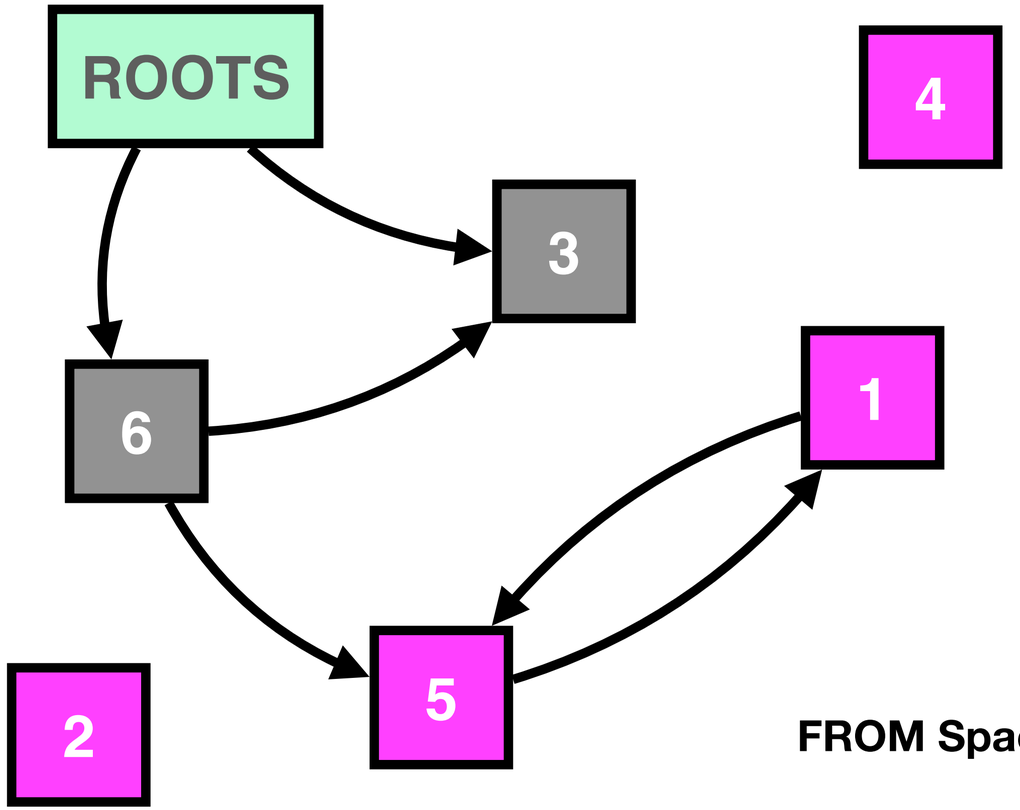

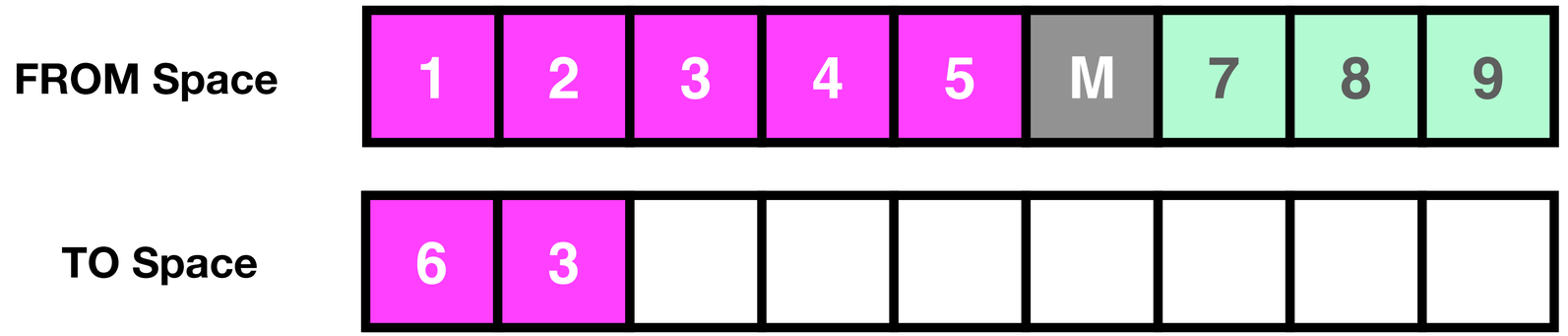

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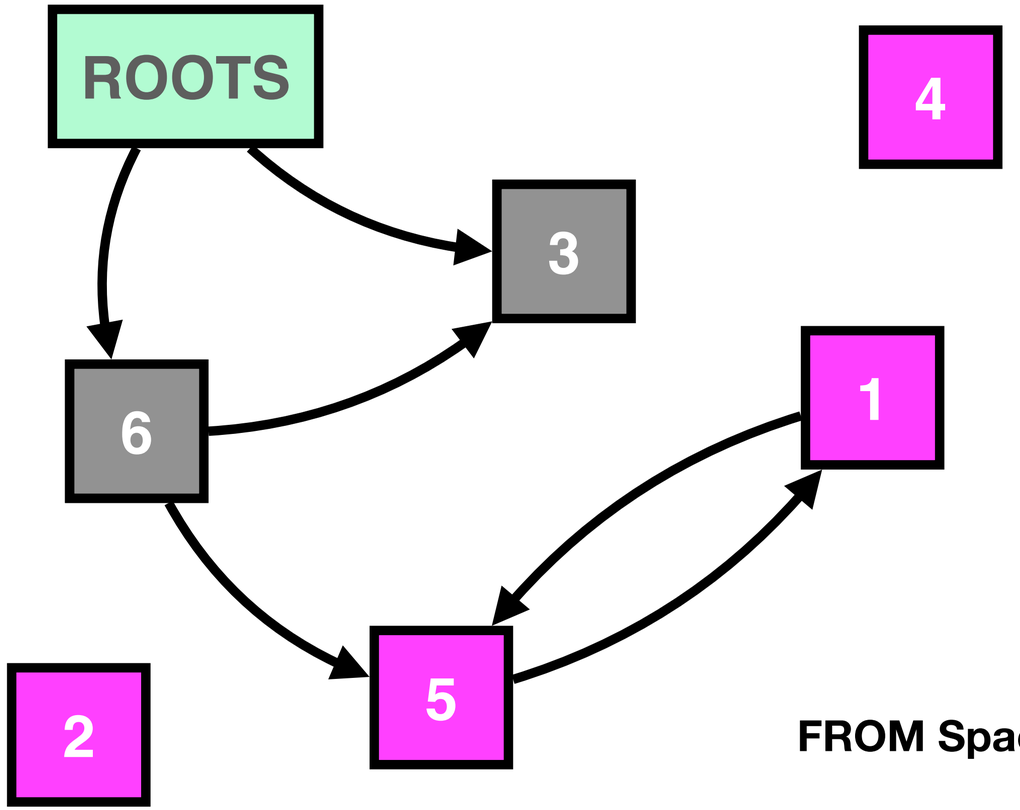

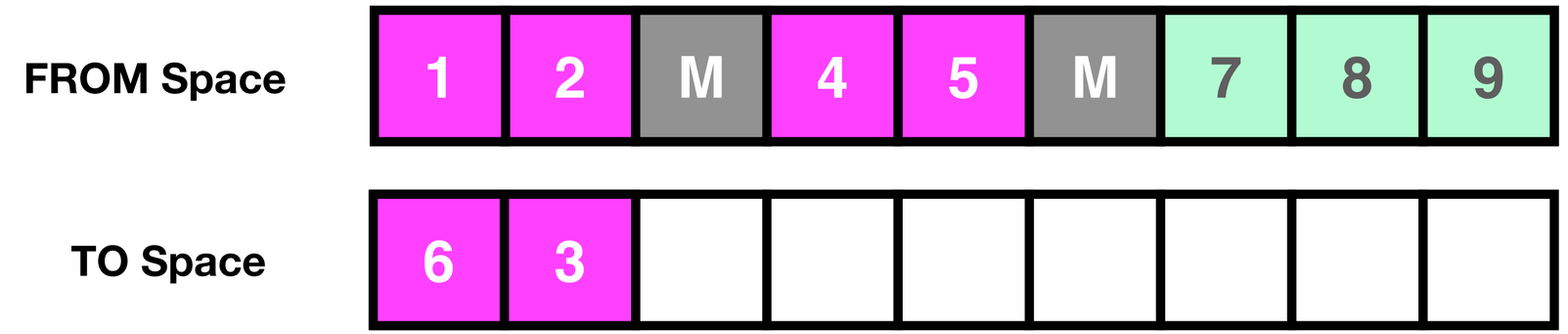

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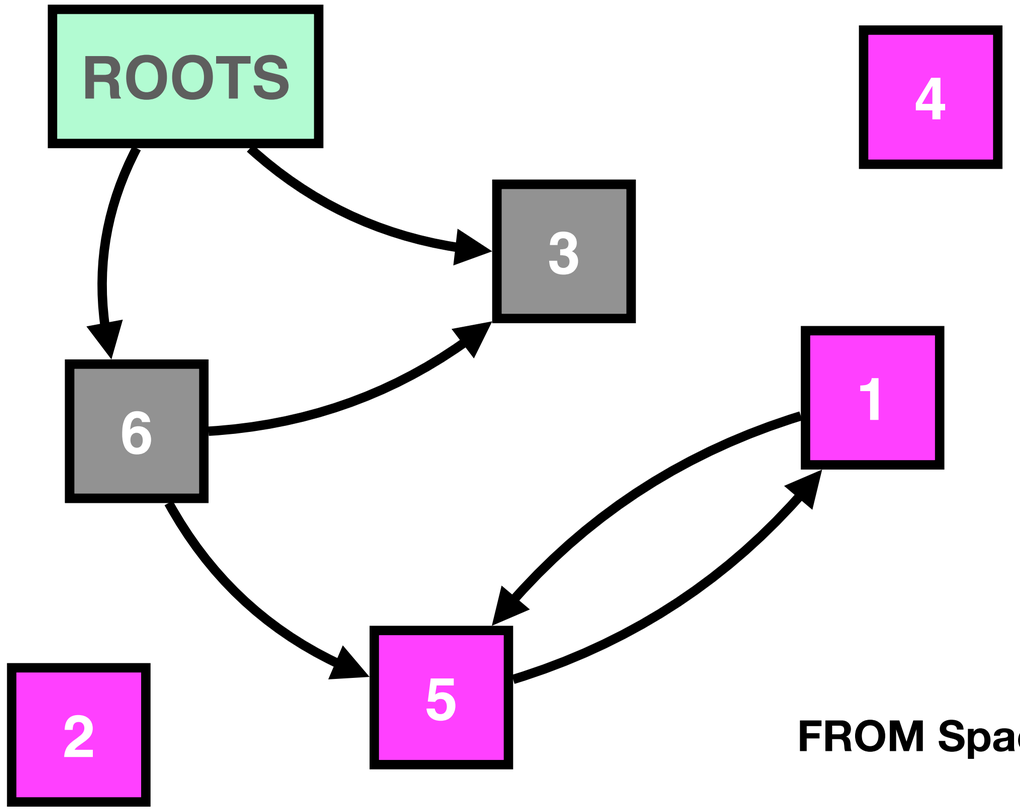

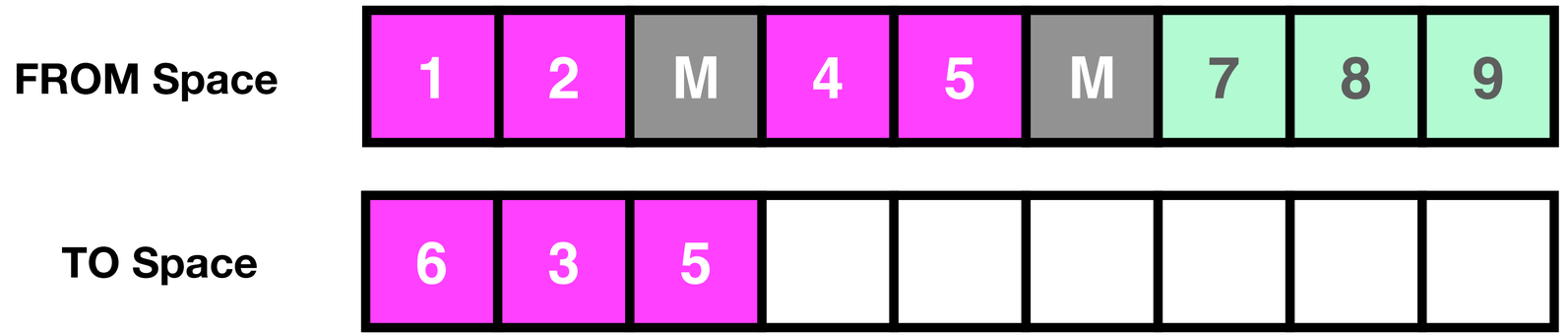

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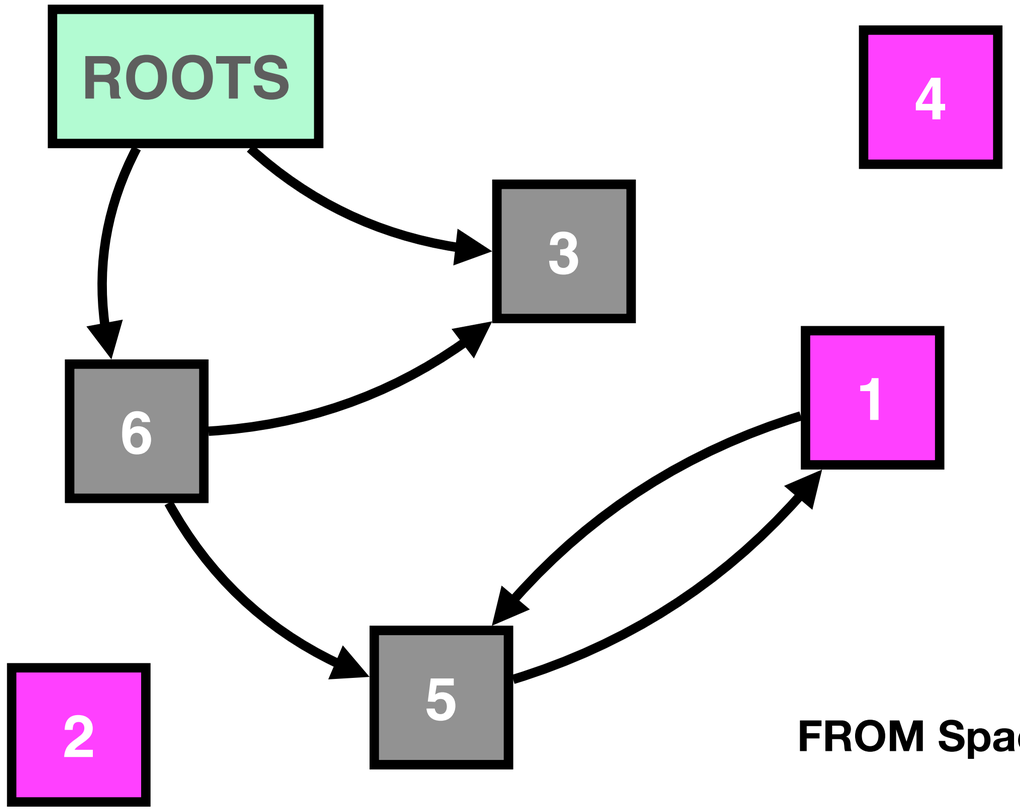

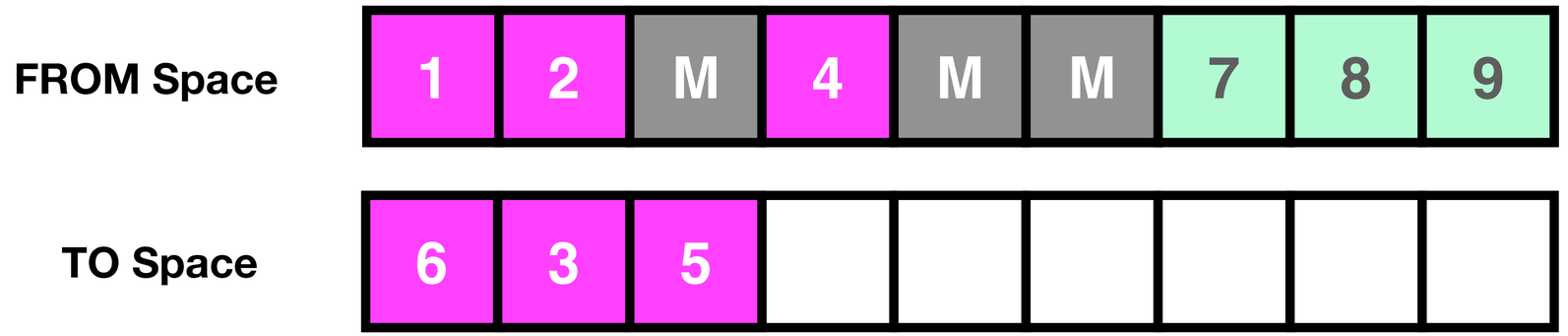

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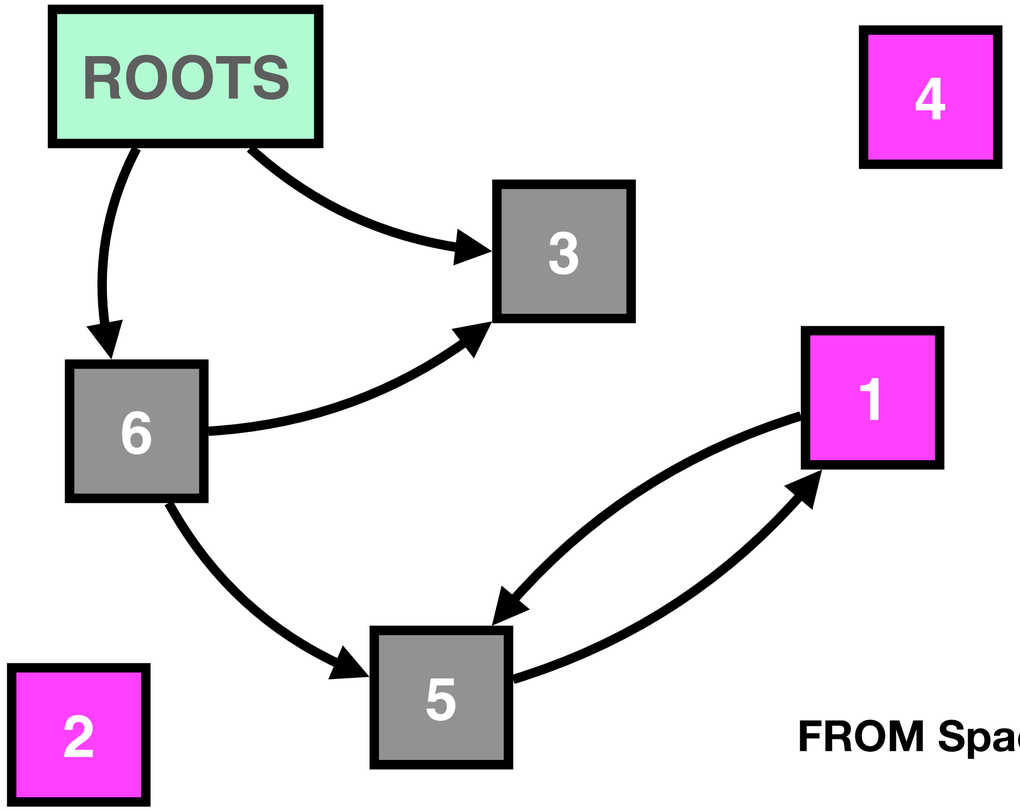

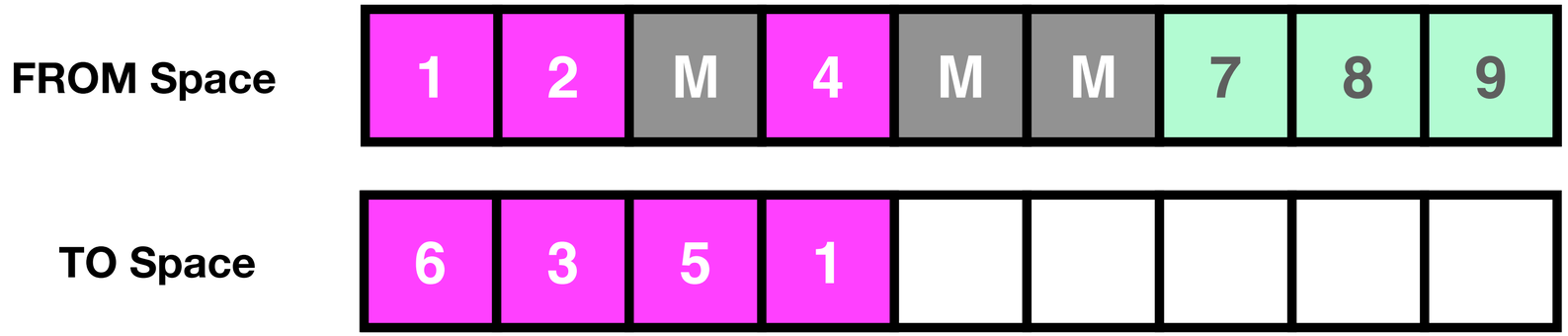

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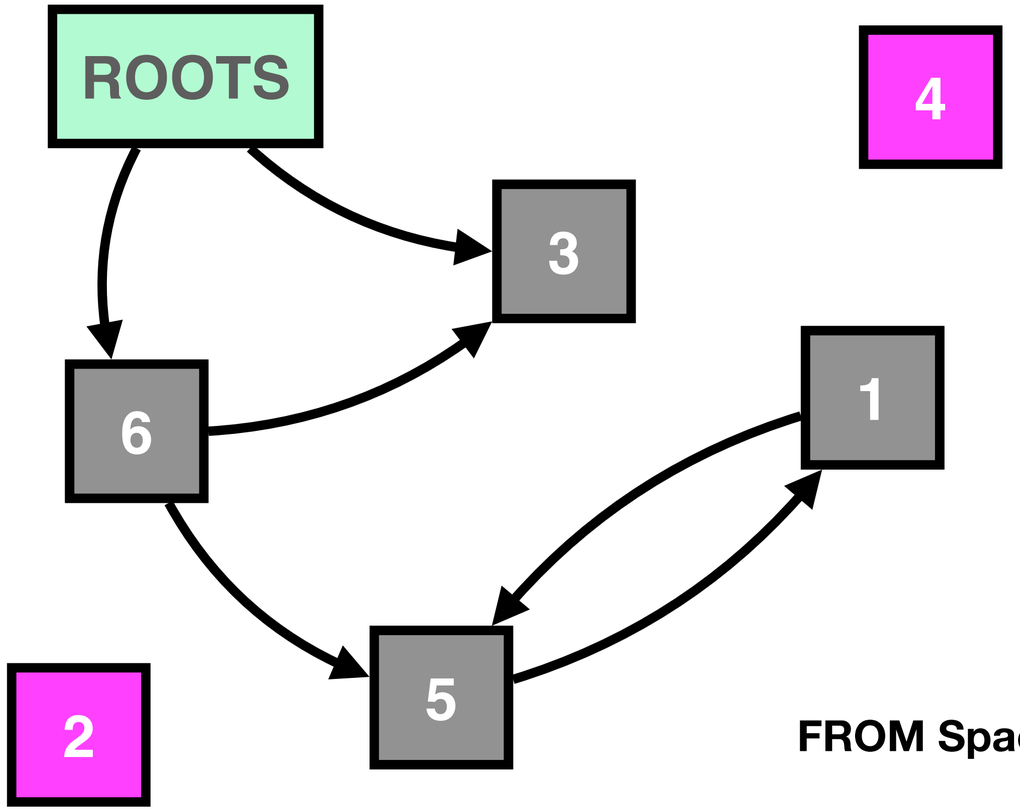

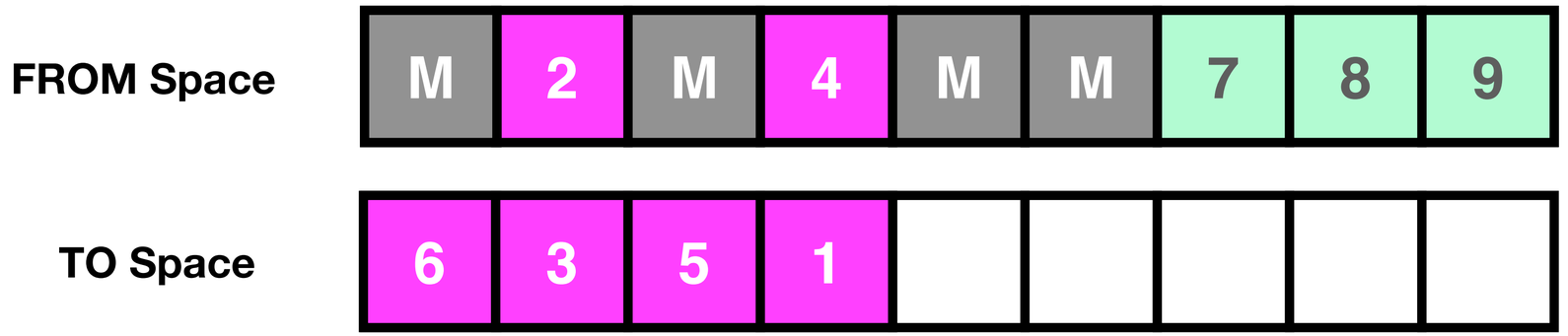

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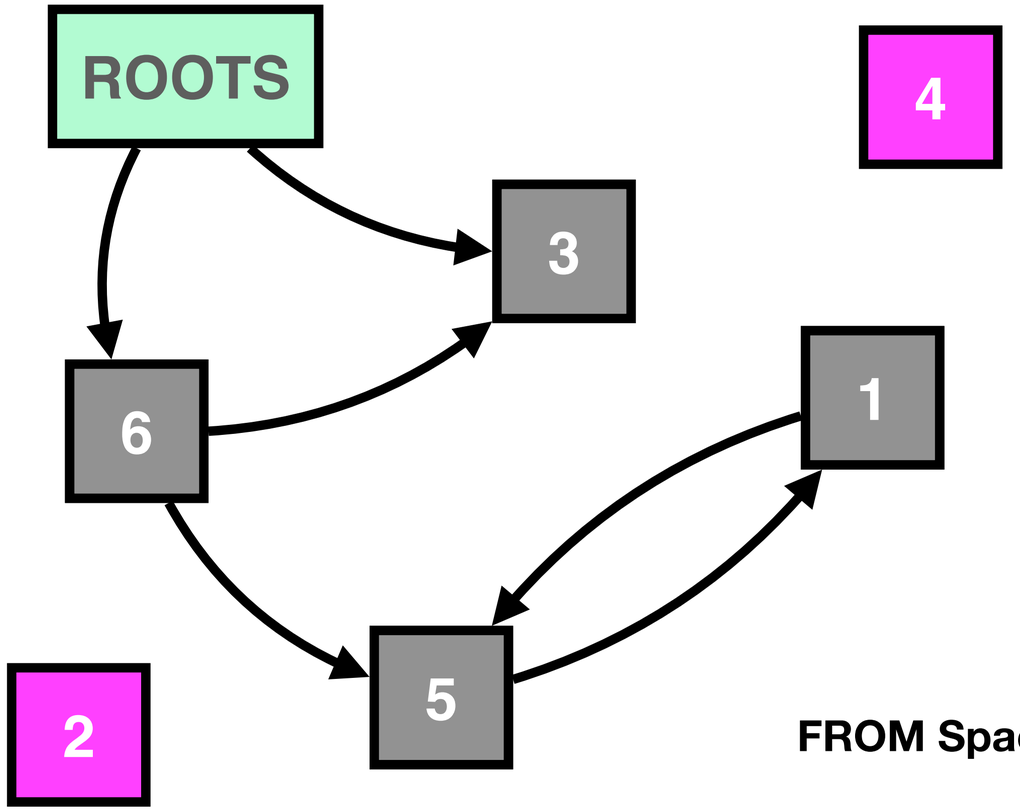

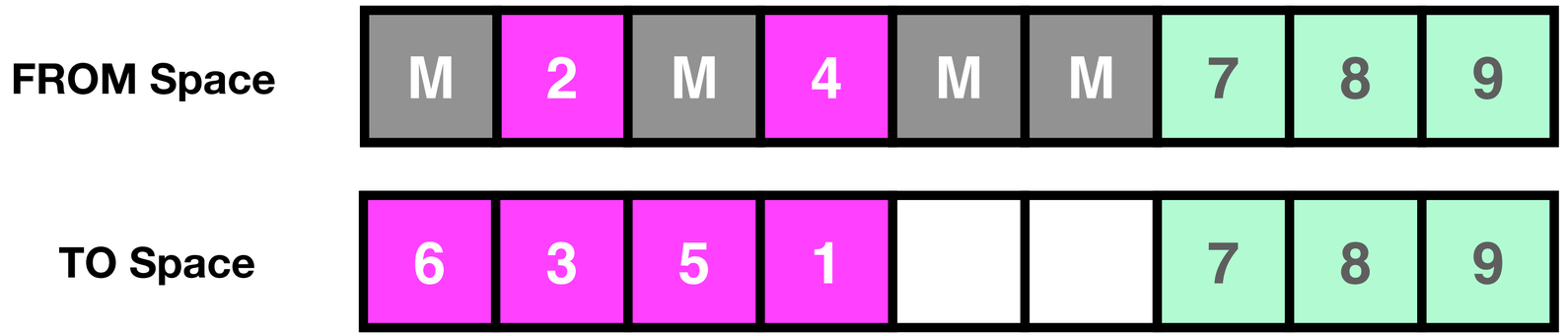

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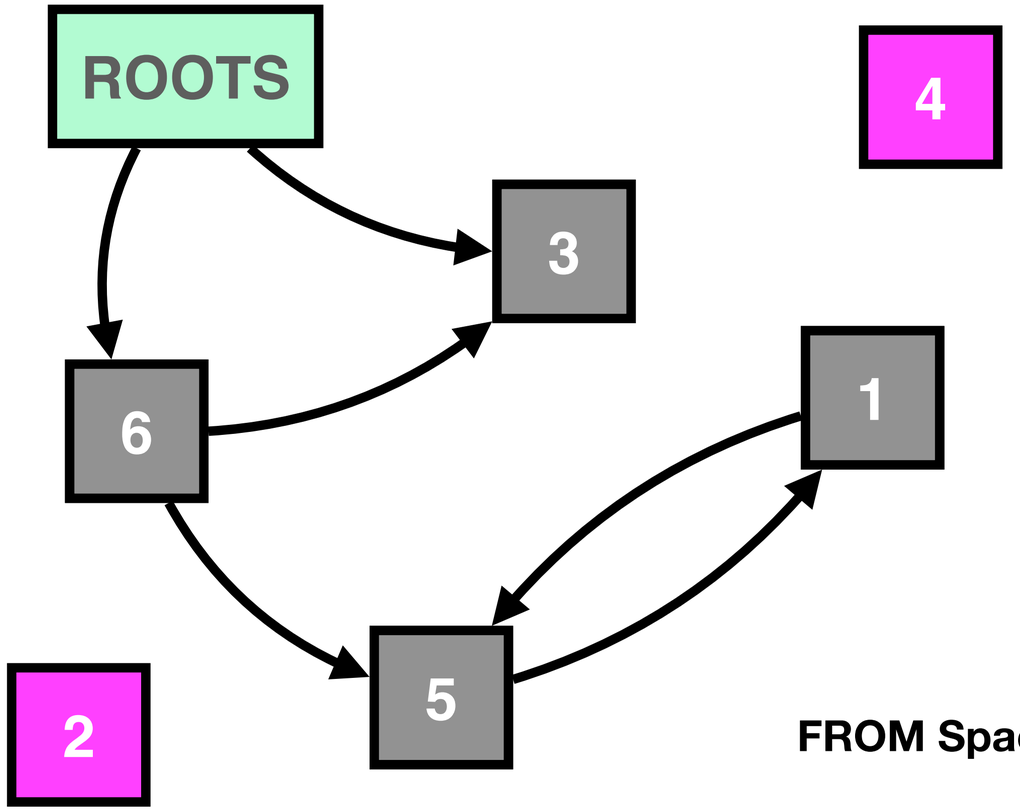
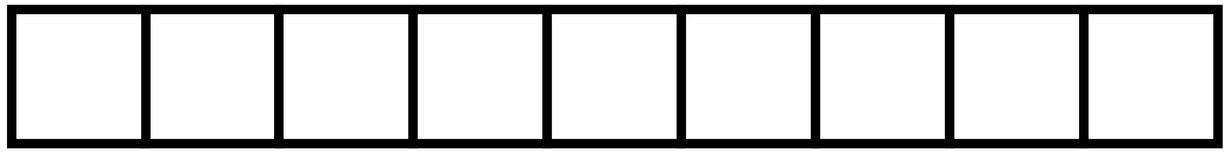
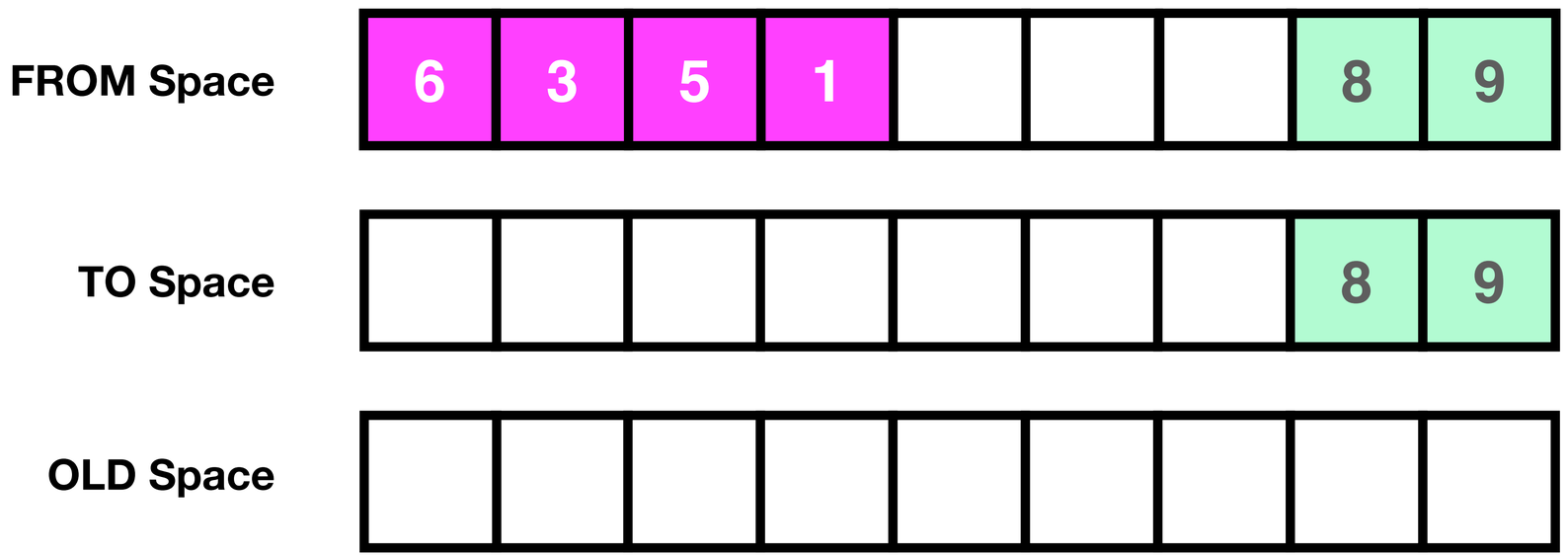


FROM Space



TO Space

GENERATIONAL COLLECTION



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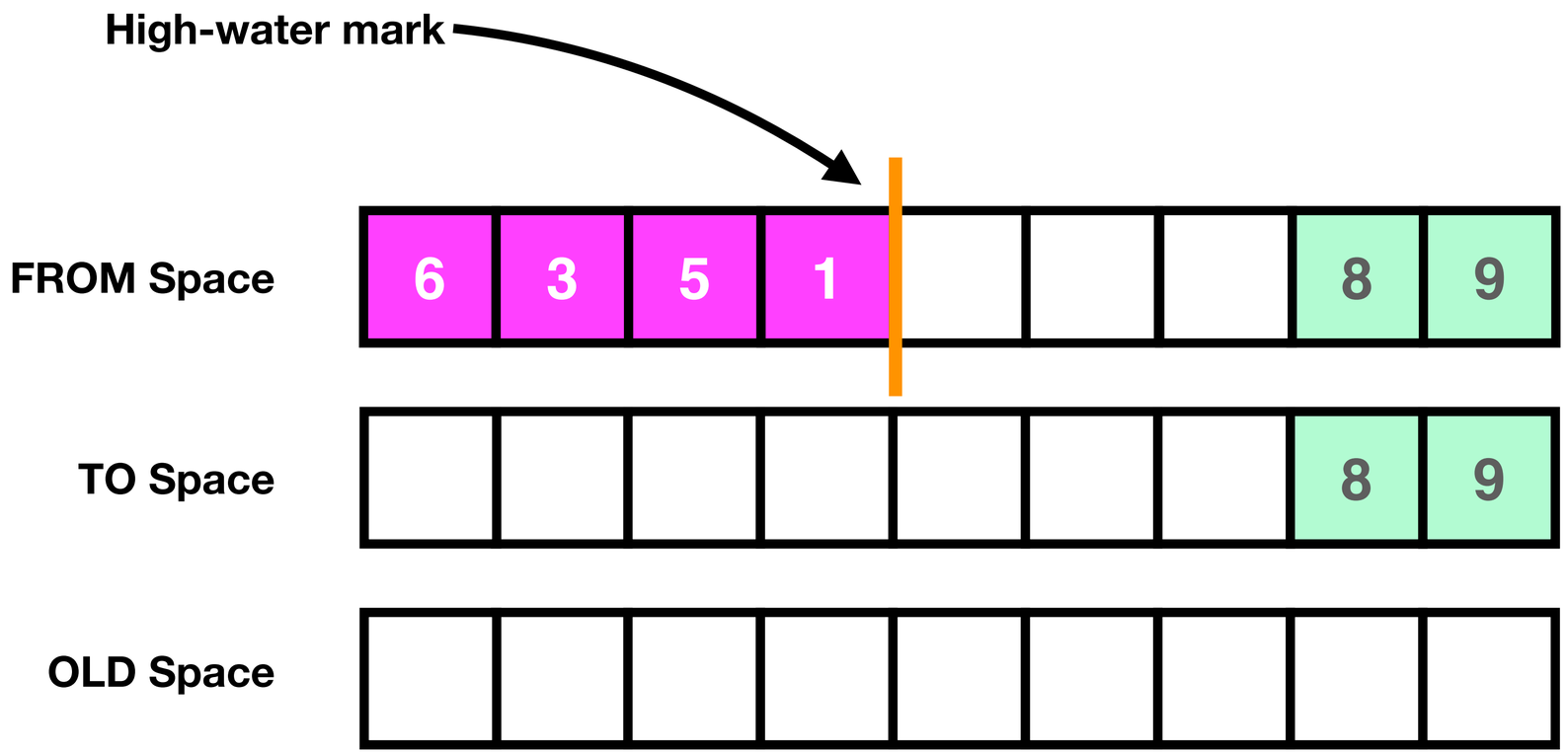

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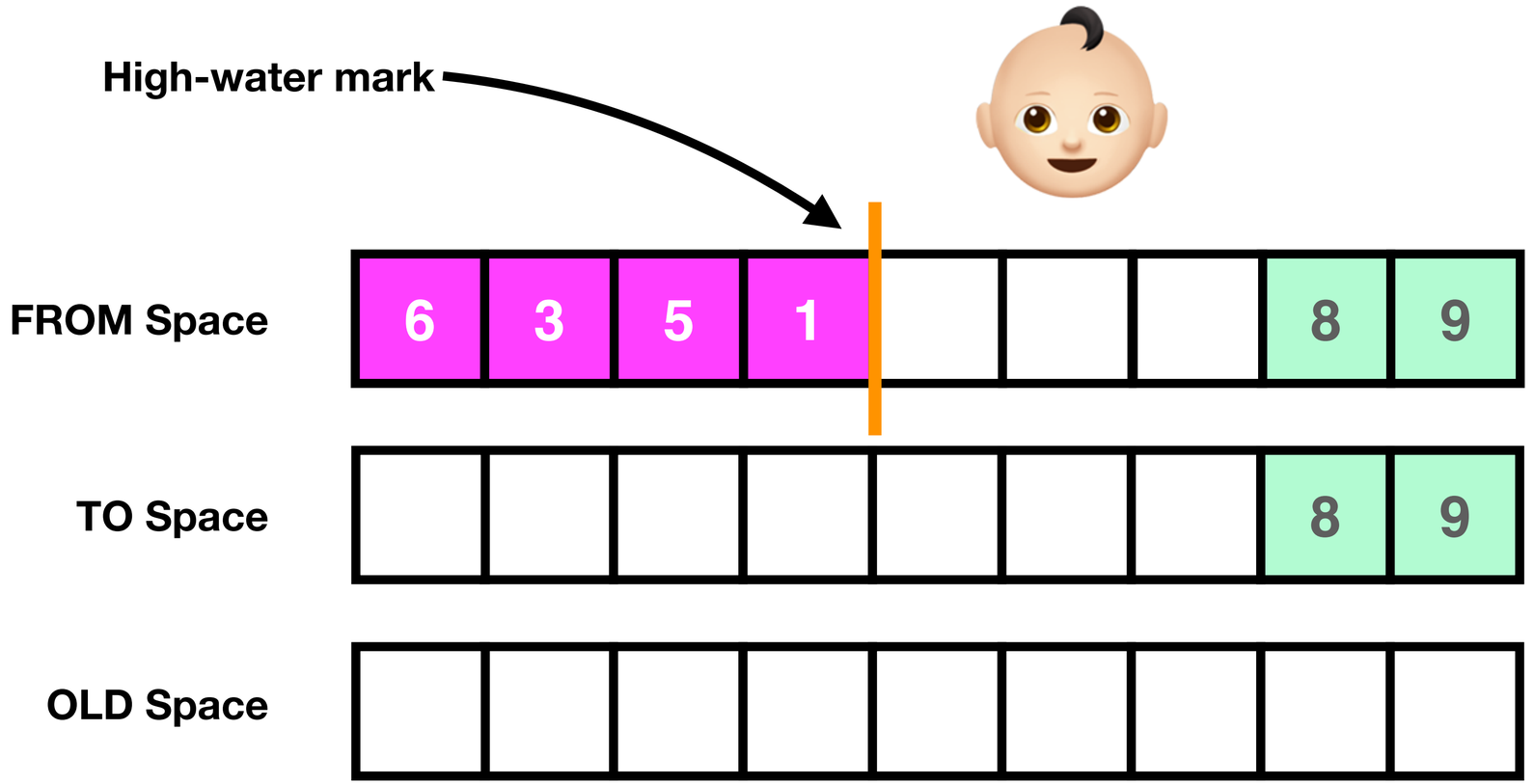

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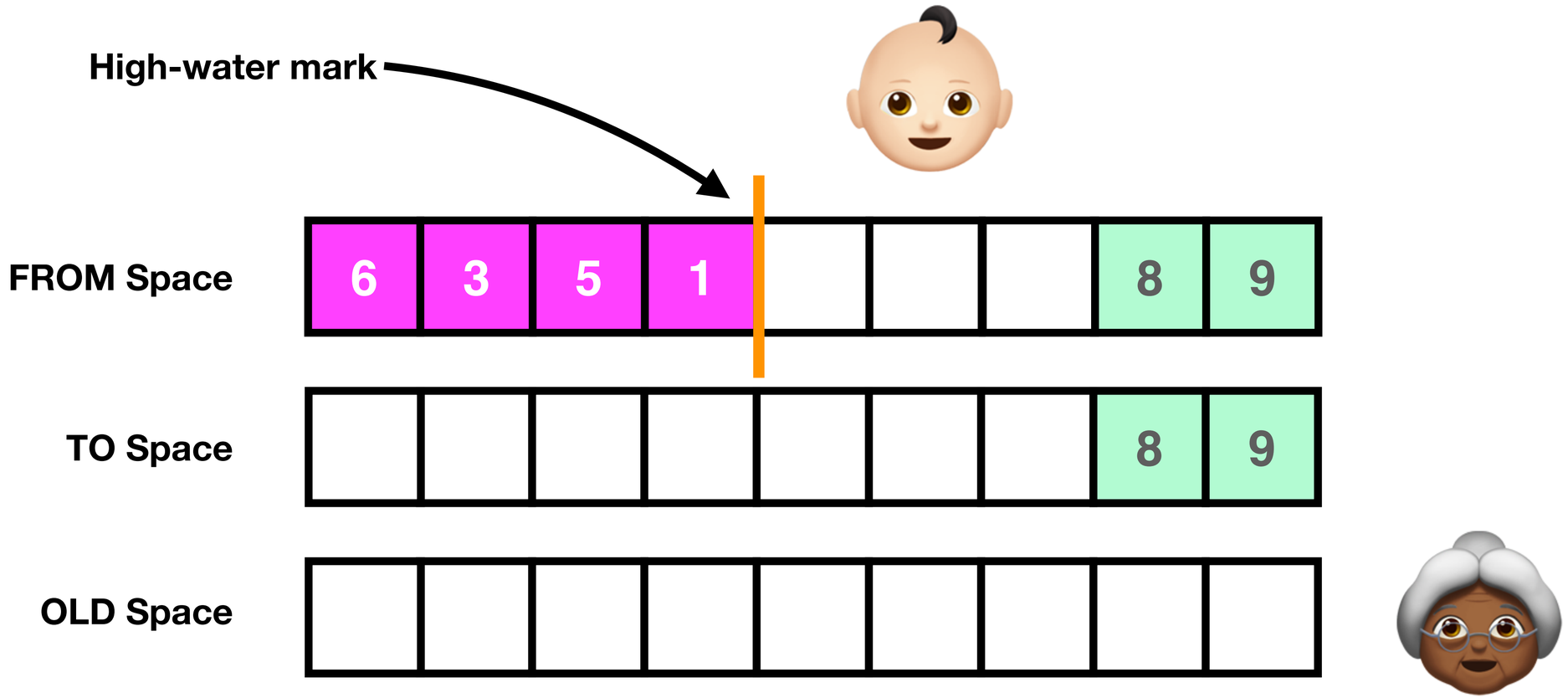

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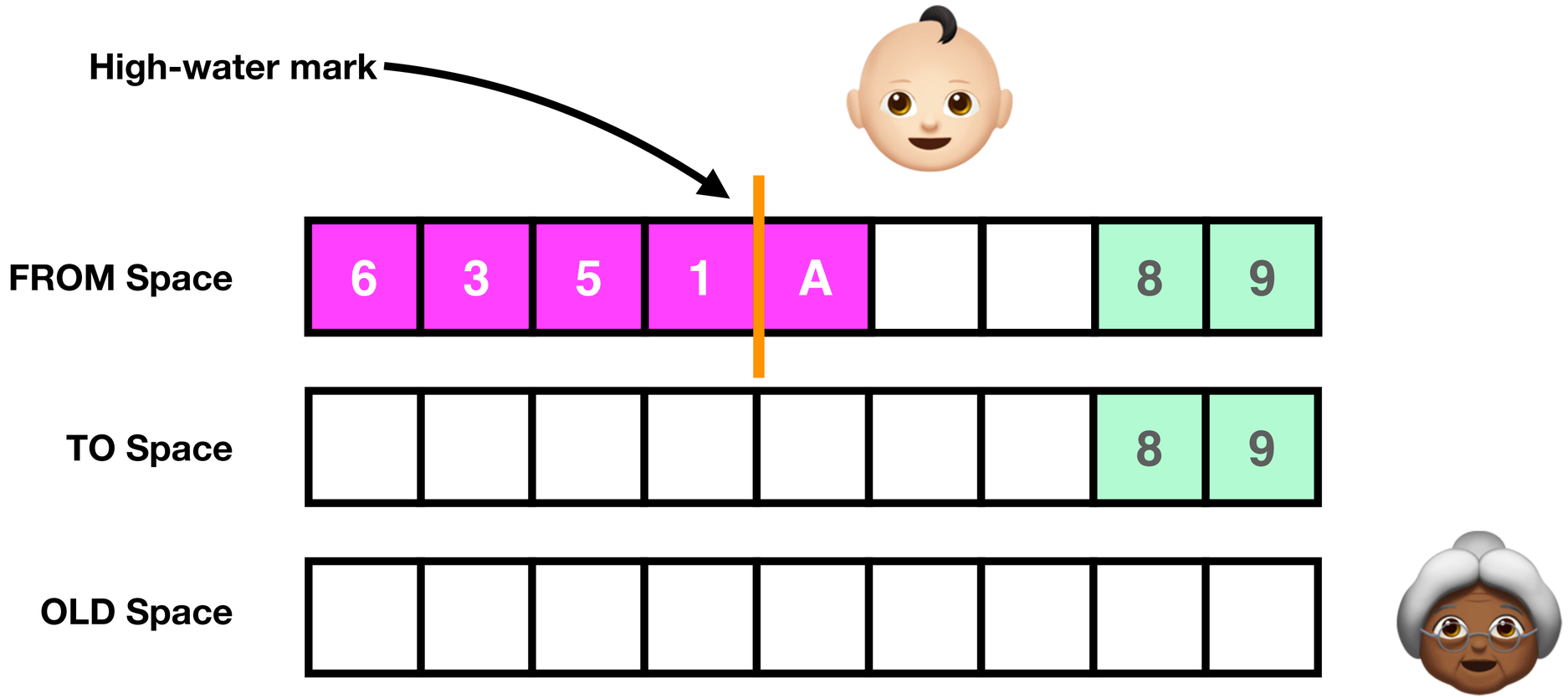

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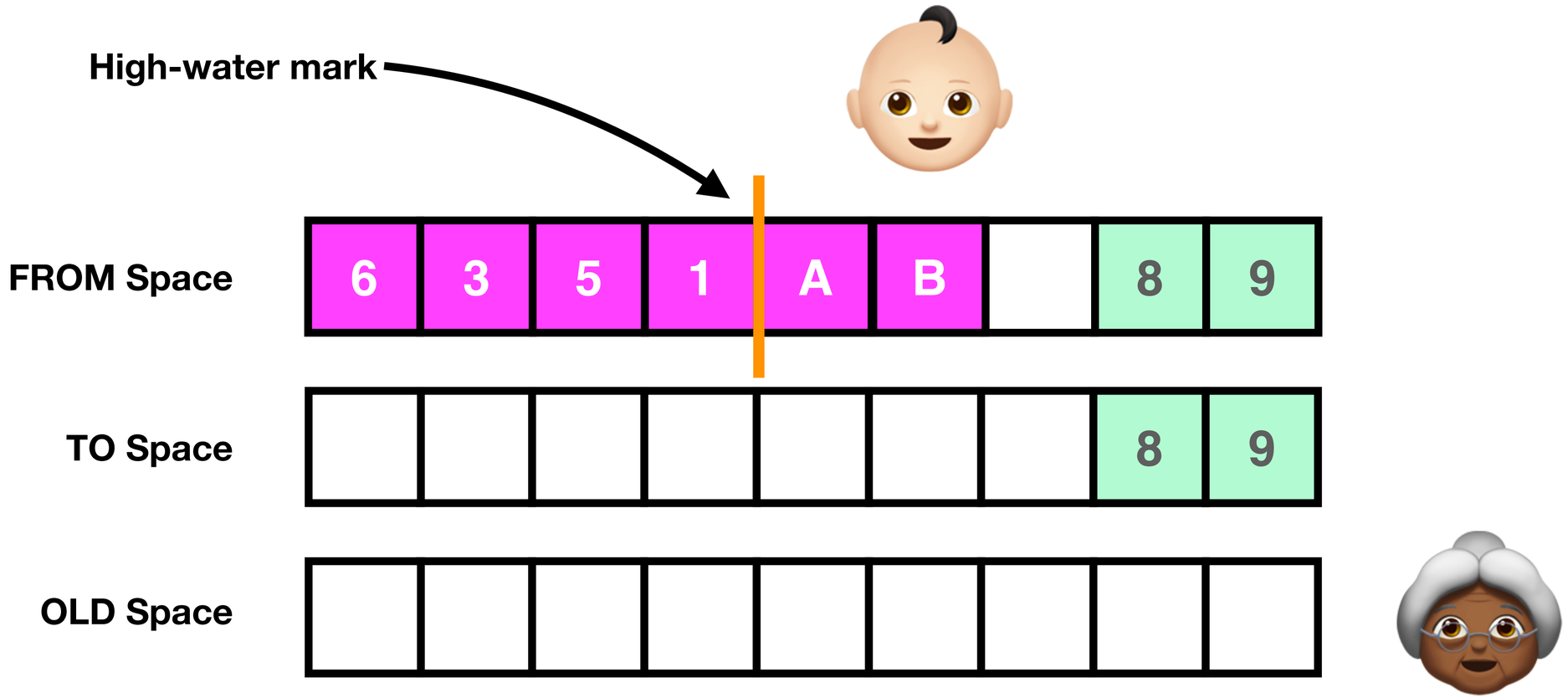

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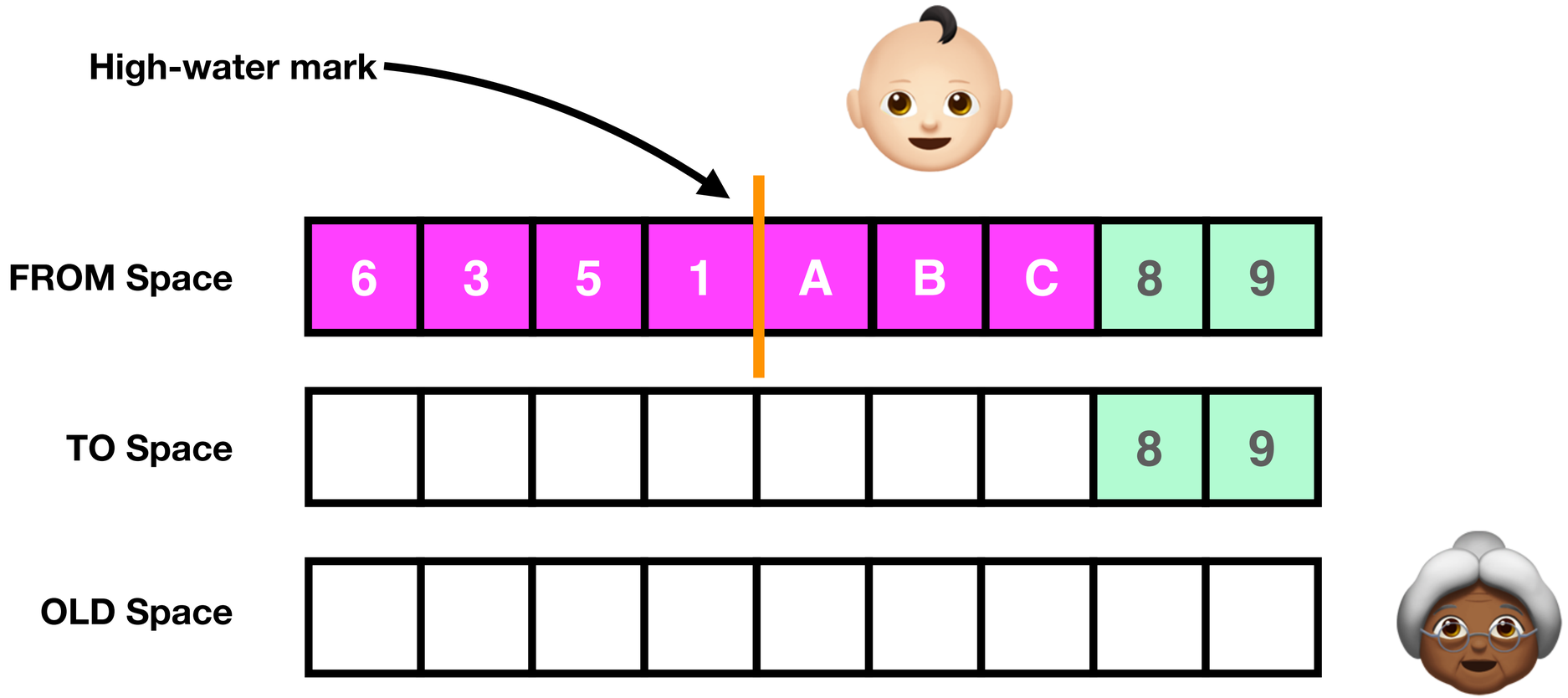
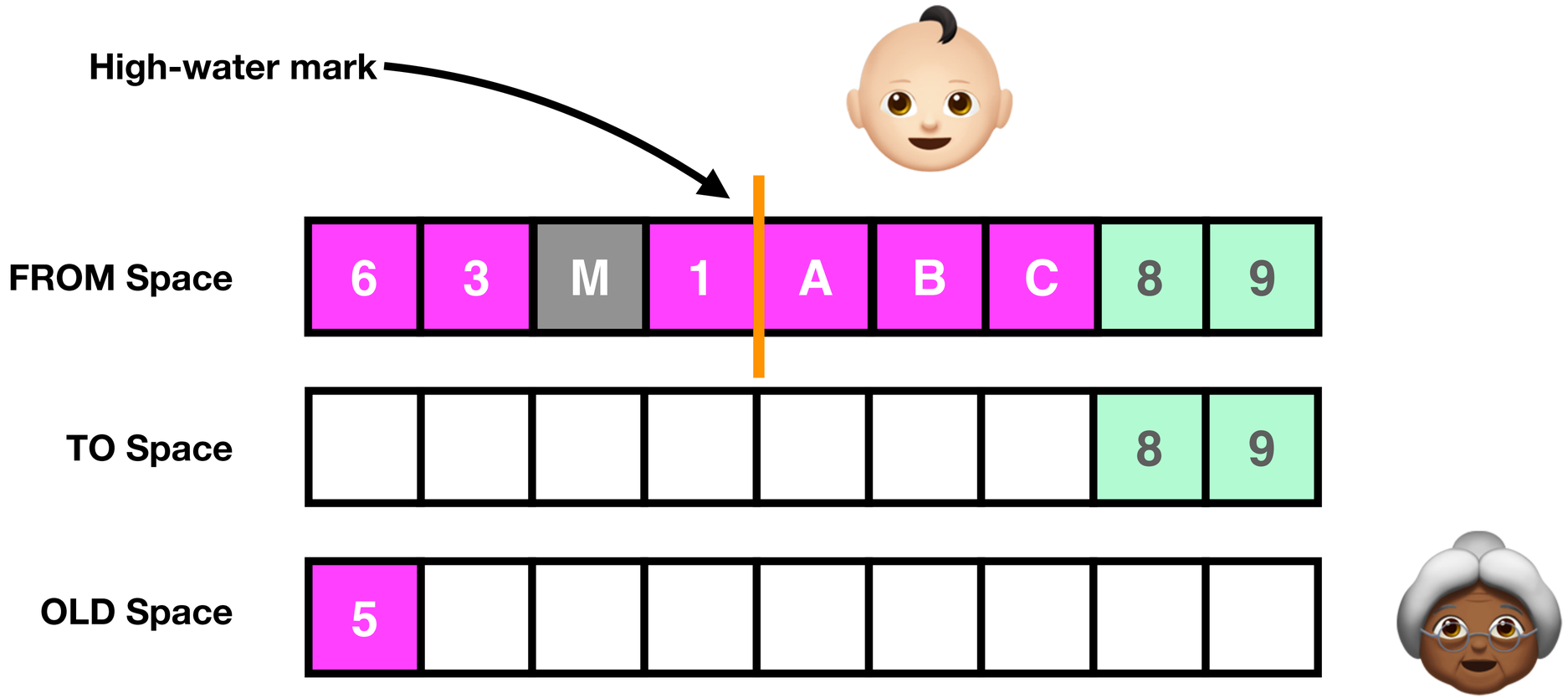


GENERATIONAL COLLECTION



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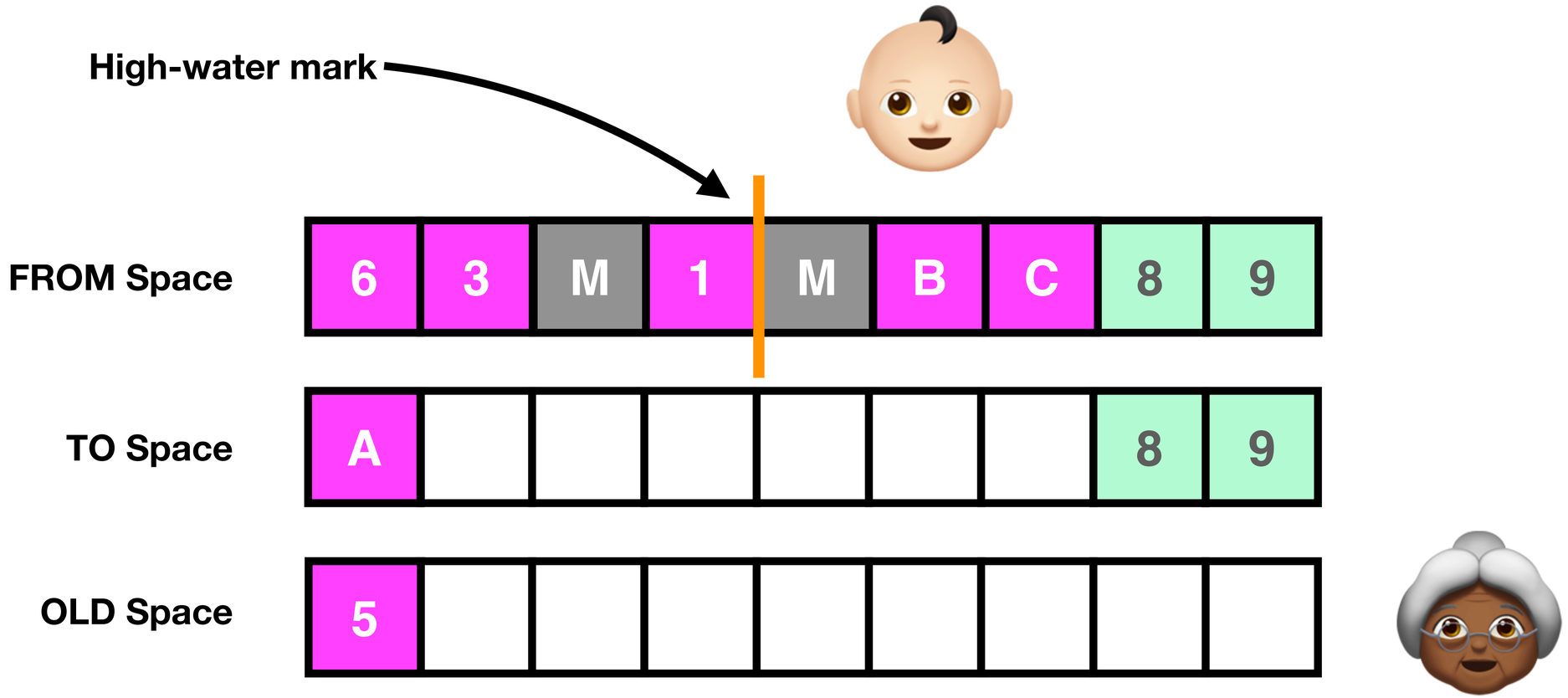

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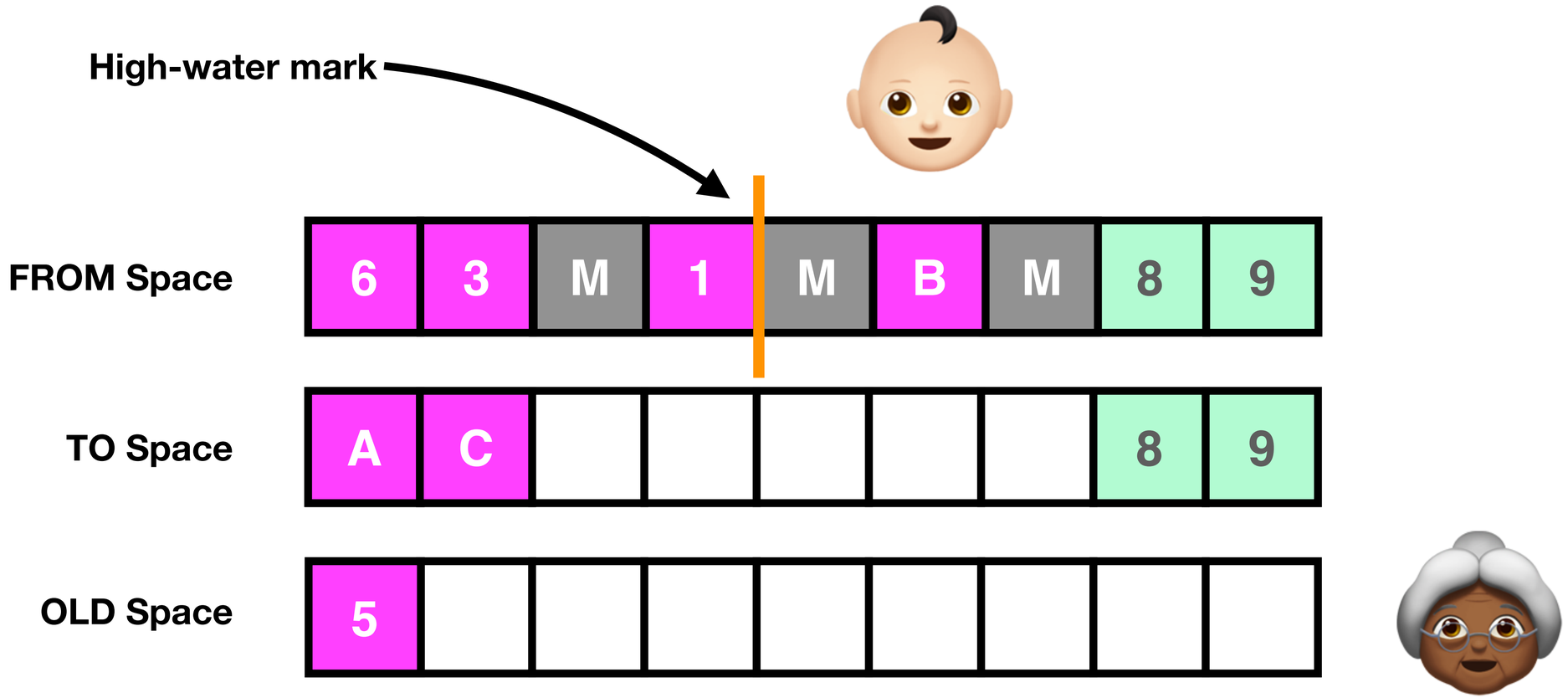

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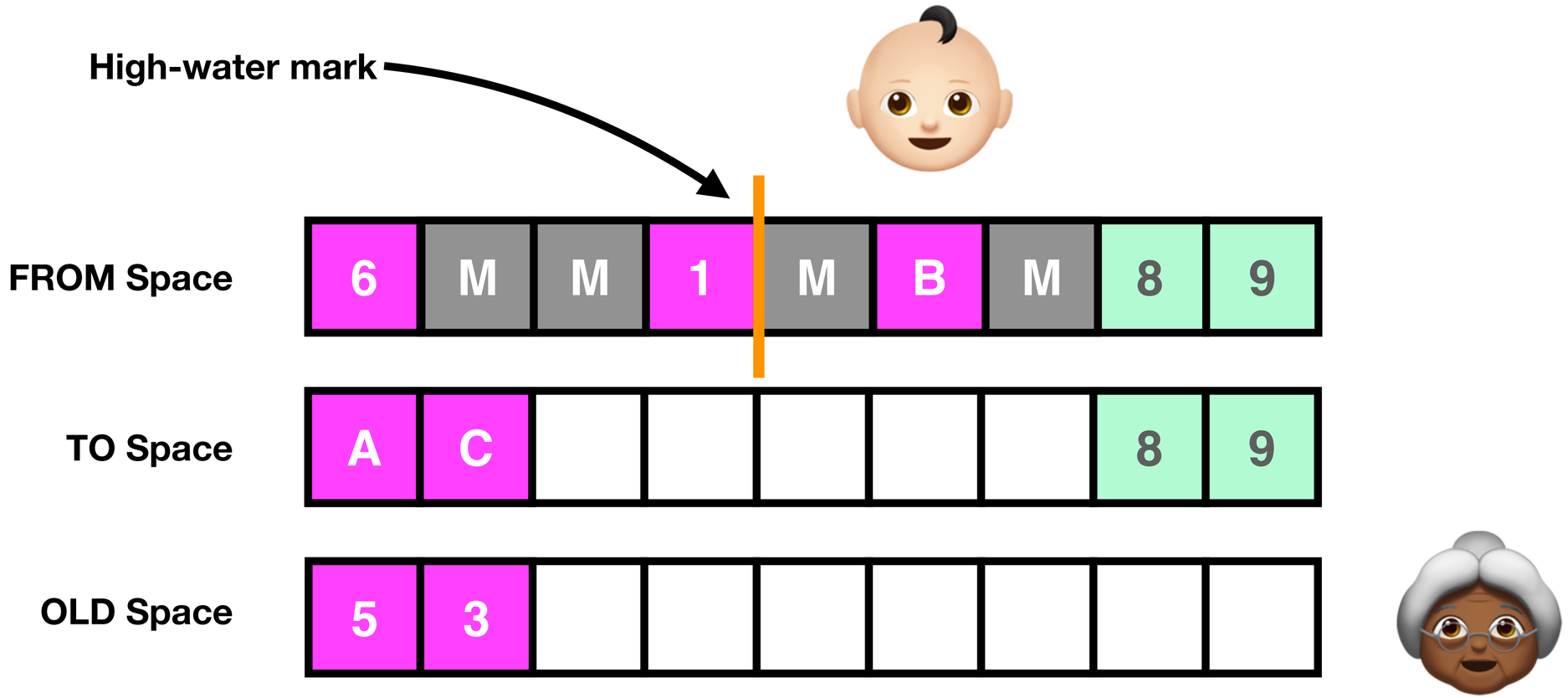

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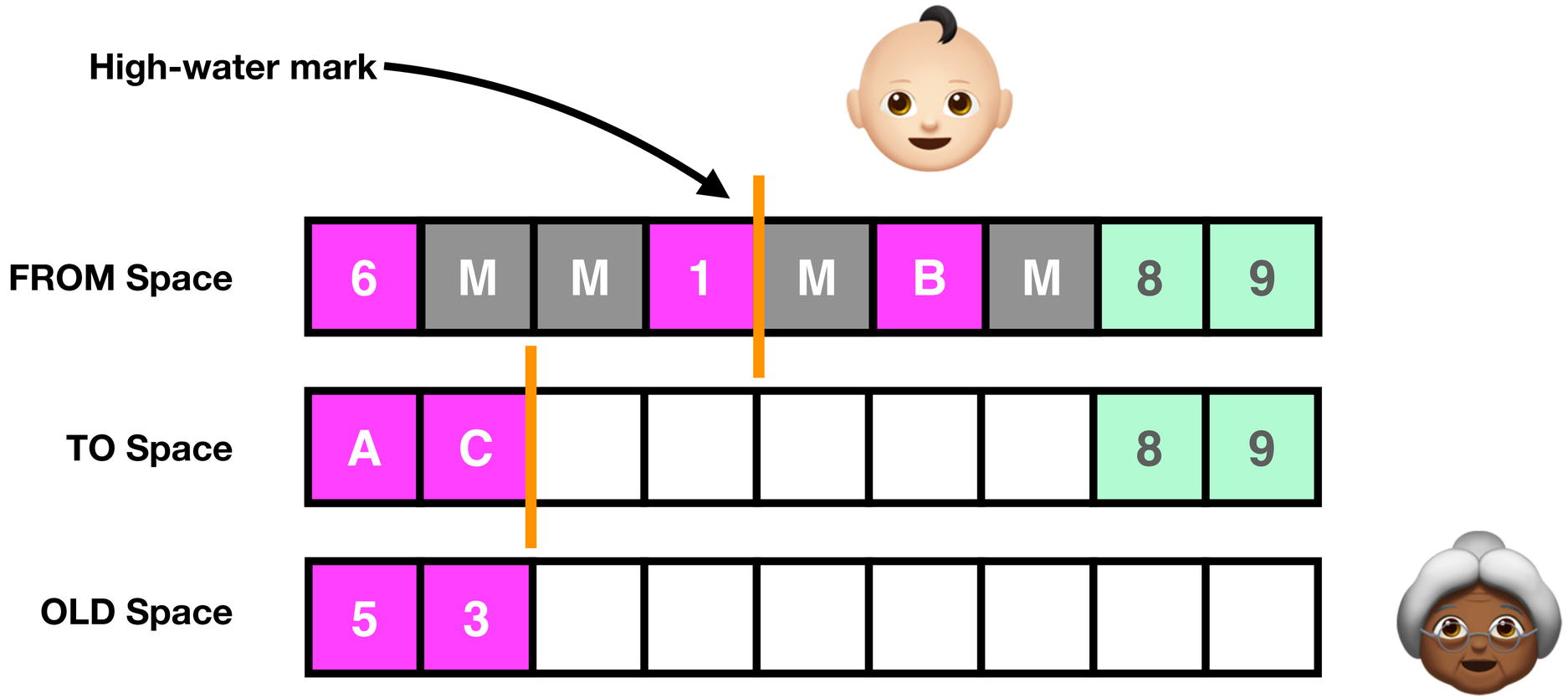

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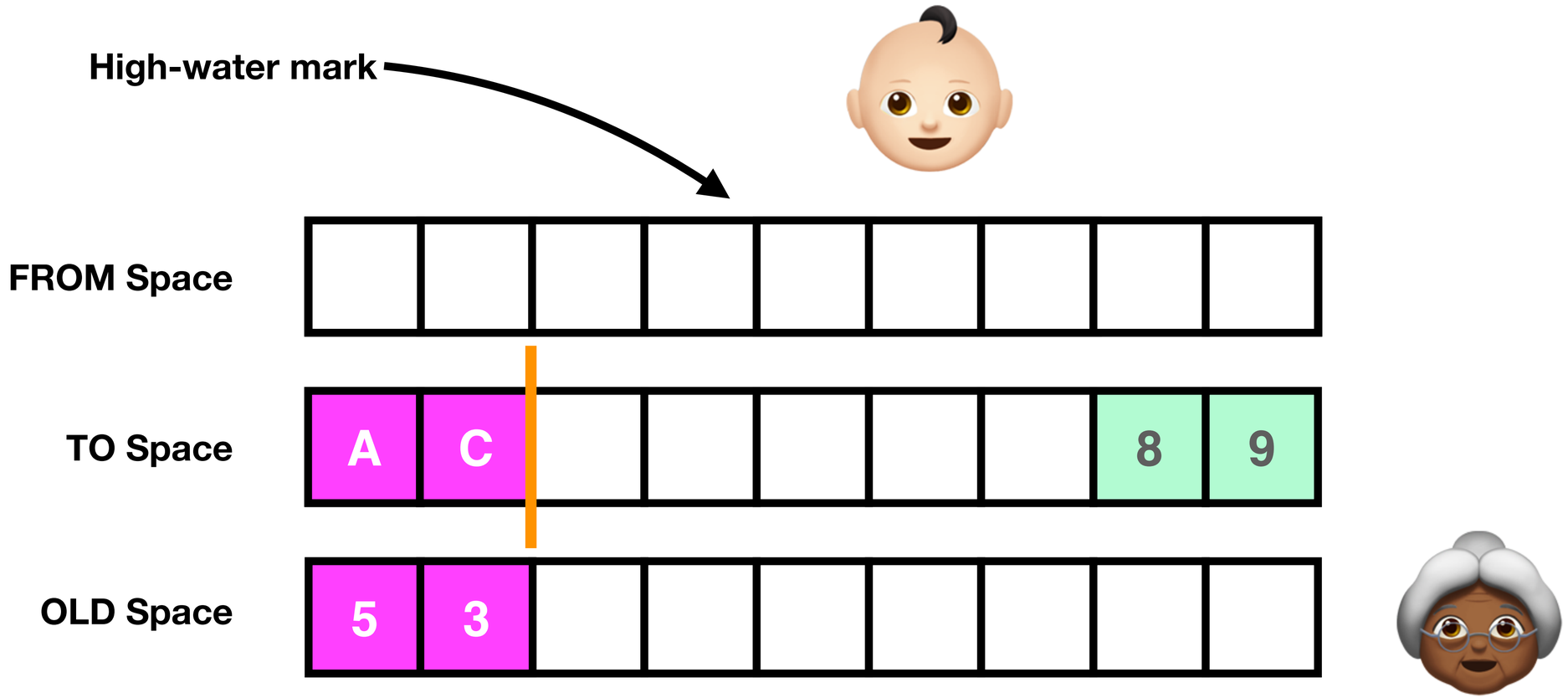

BINARY HEAP

BINARY HEAP

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BINARY HEAP

Binaries > 64 bytes

Reference counted

Garbage collection is no longer magic!

LET ME KNOW WHAT YOU THINK!

Tweet me @sannekalkman

Find me in person later!

The Garbage Collection Handbook - Jones, Hoskin & Moss

Erlang Garbage Collector - Lukas Larsson (Erlang Solutions)