Understanding Garbage Collectors

in object-oriented programming

Lecture 2 - Generational Garbage Collectors

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Memory Management

Garbage Collection

Automatic Memory Management

Garbage Collectors

Compute the size
Allocate in the memory

```
data = malloc(size)
...
... use data ...
...
free(data)
```

Manually
Memory Management

```
data = Data new
...
... use data ...
...
??????????
```

Maybe move the data for better use of the memory

Free the space when data is not used anymore

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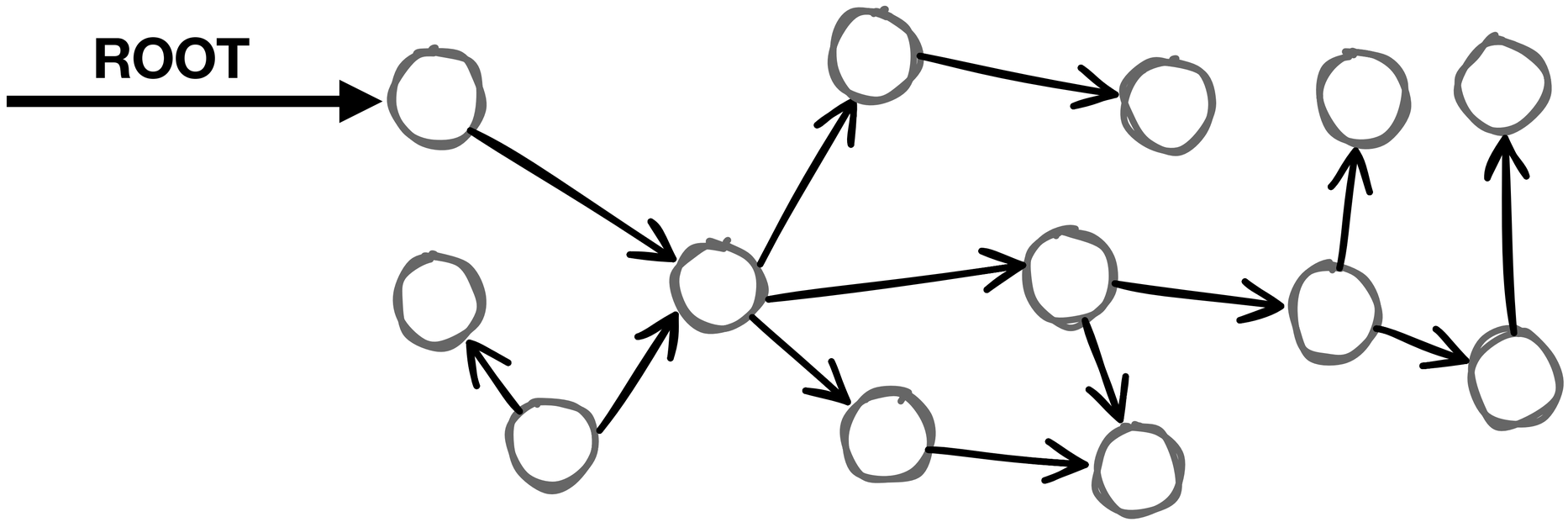
Developer

Application's Allocation Patterns

When an object dies?



"Must be accessible from the roots"

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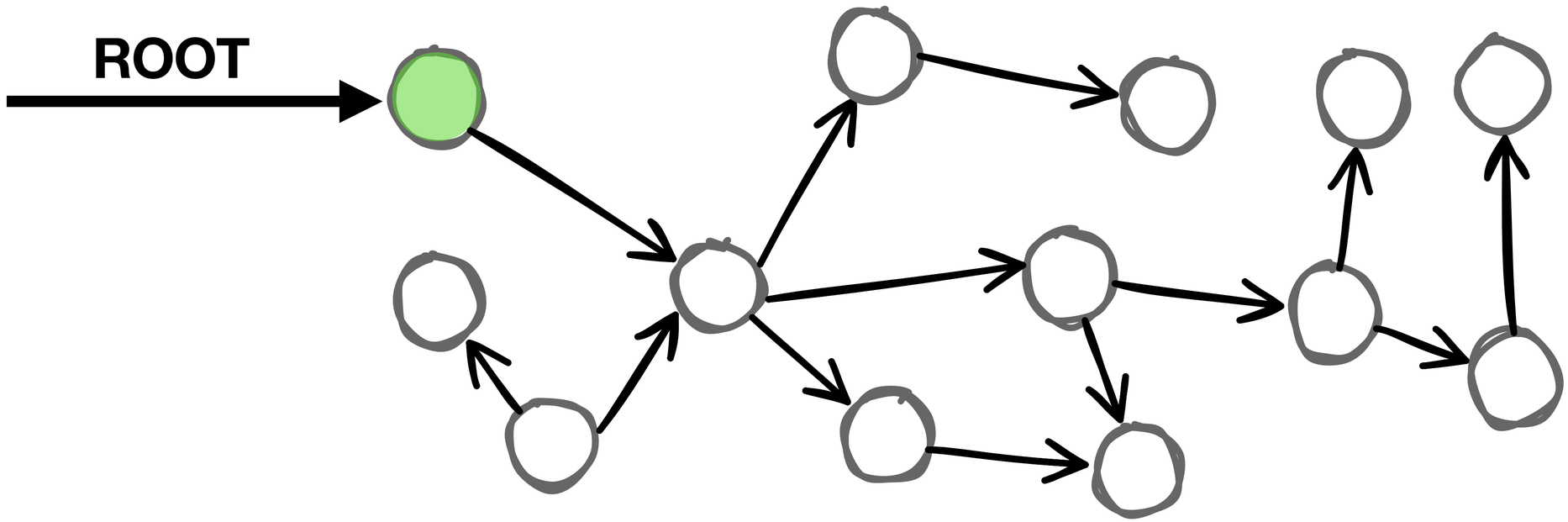

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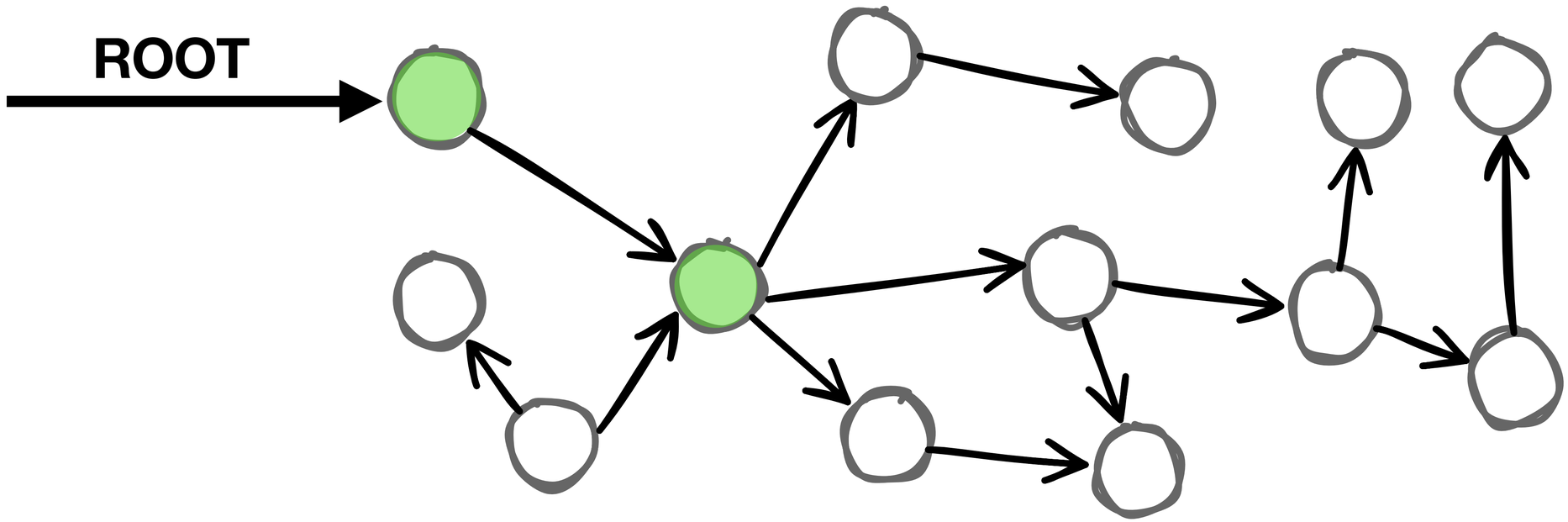

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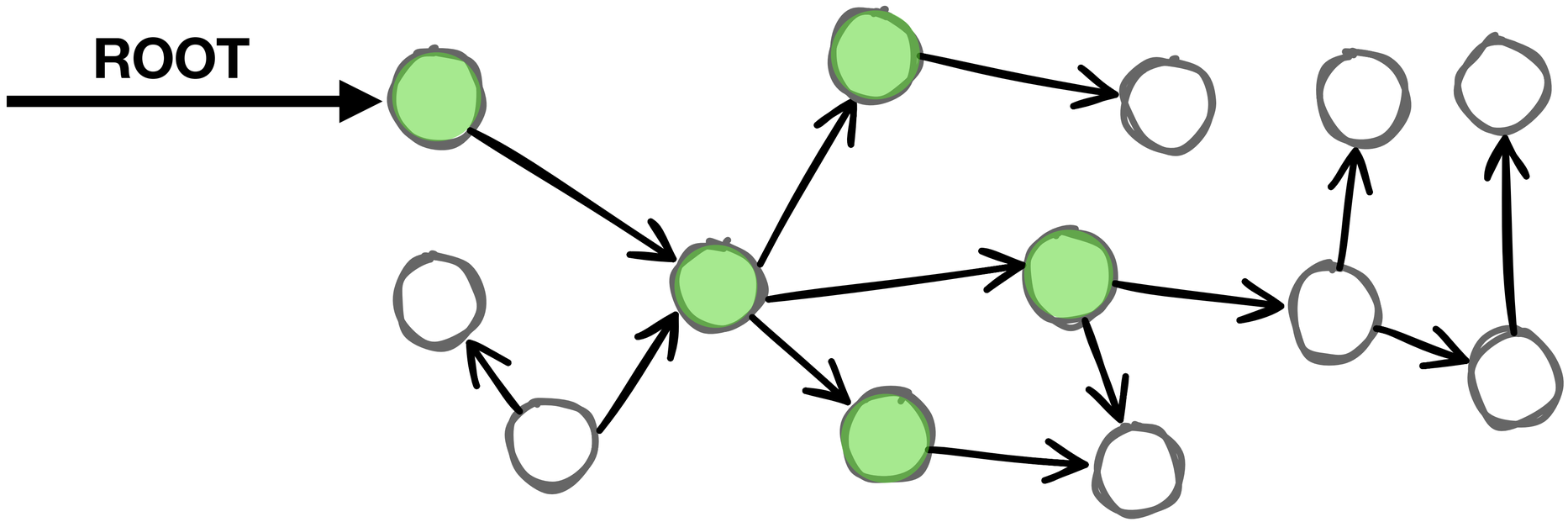

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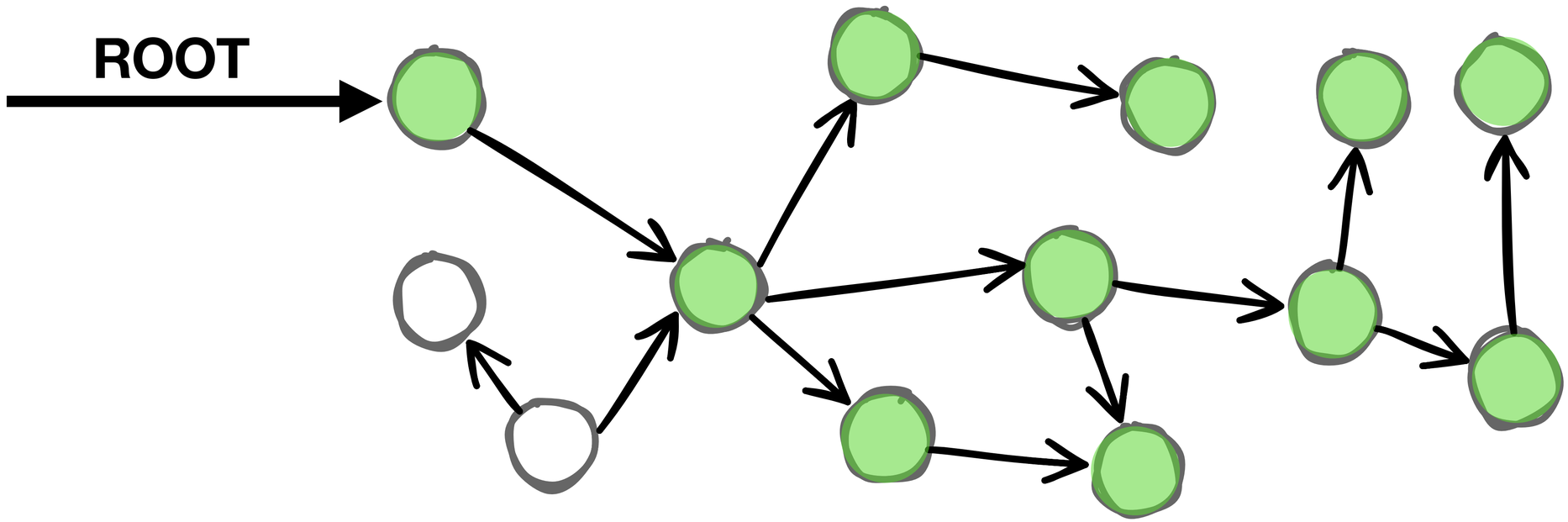

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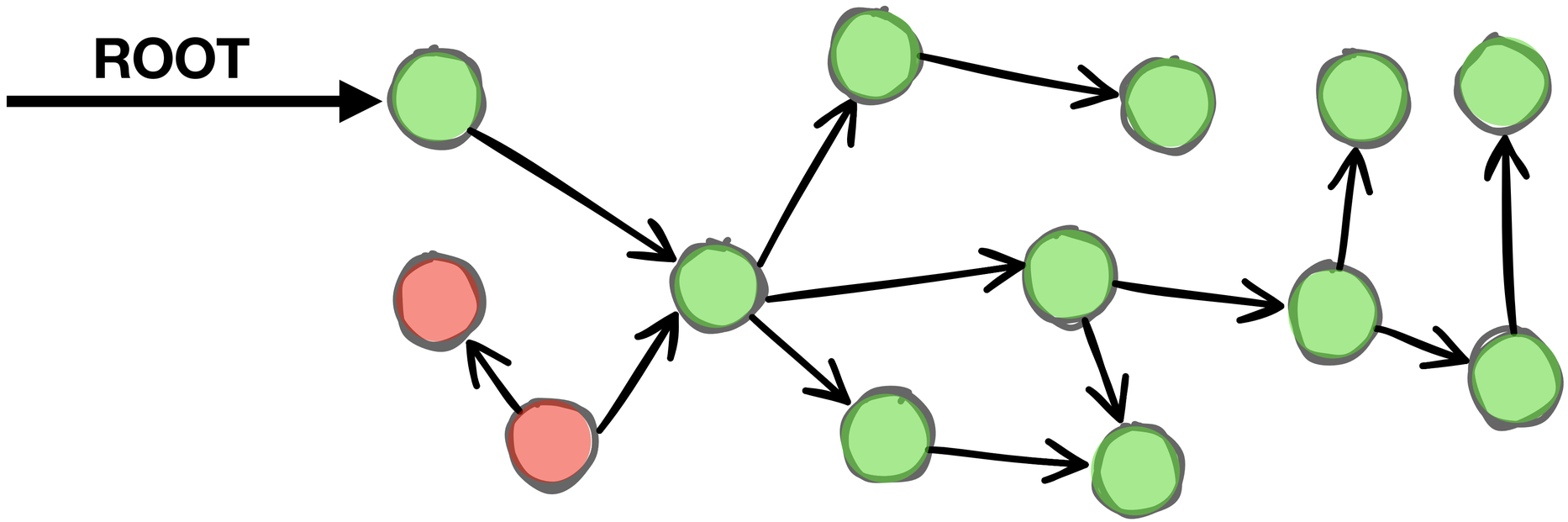

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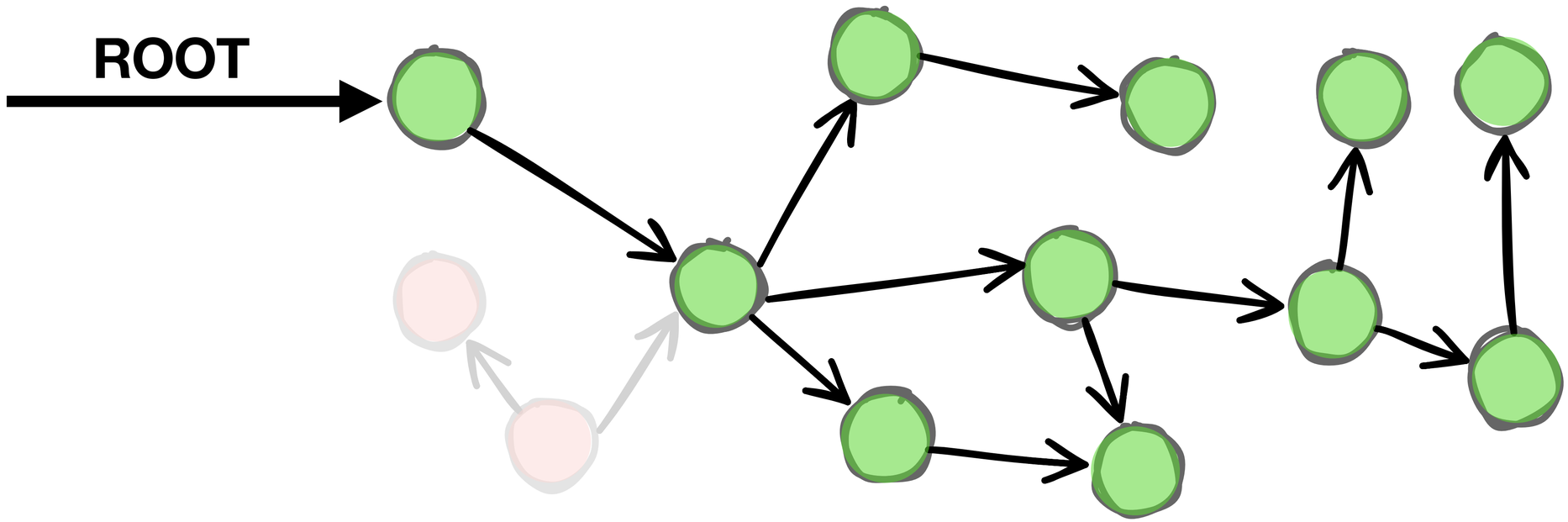

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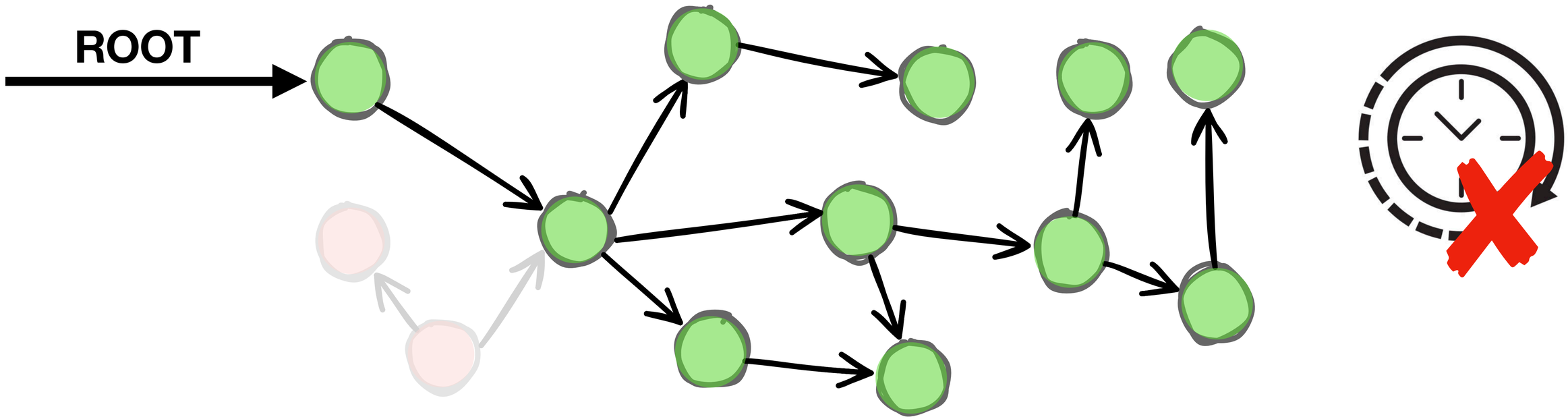

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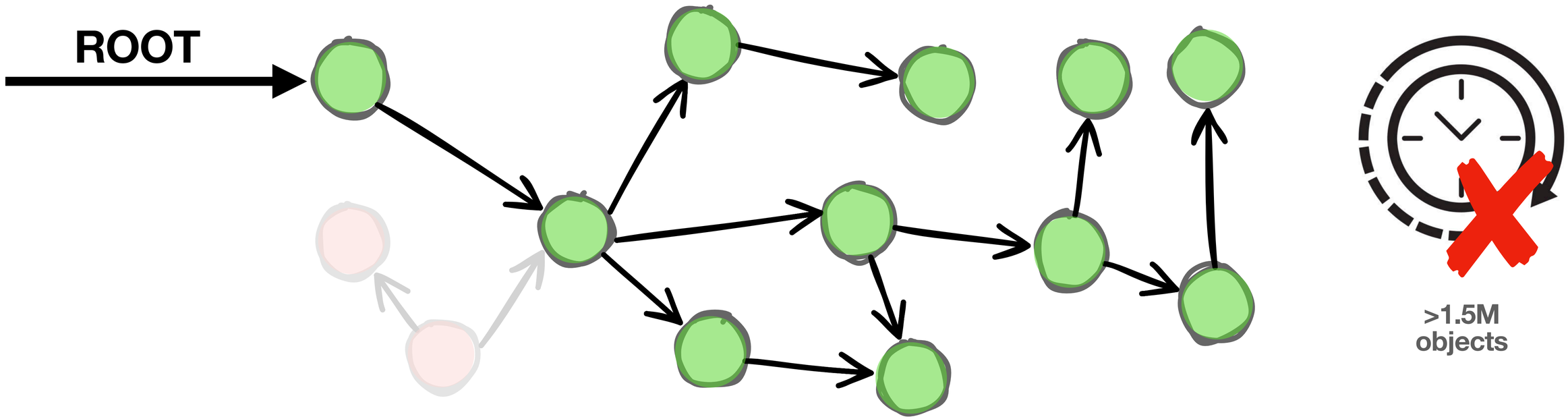

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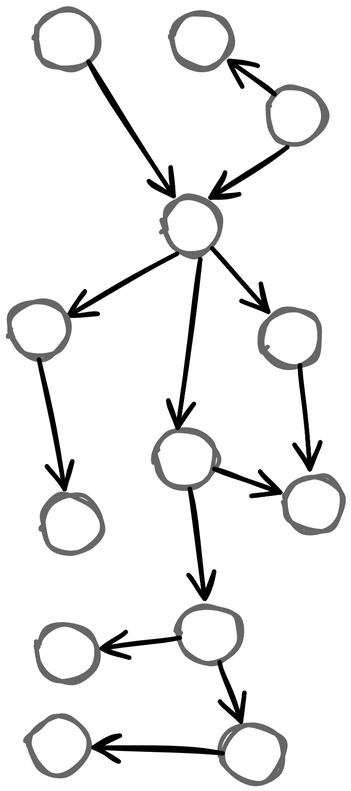
Application's Allocation Patterns

How do the applications use the memory?

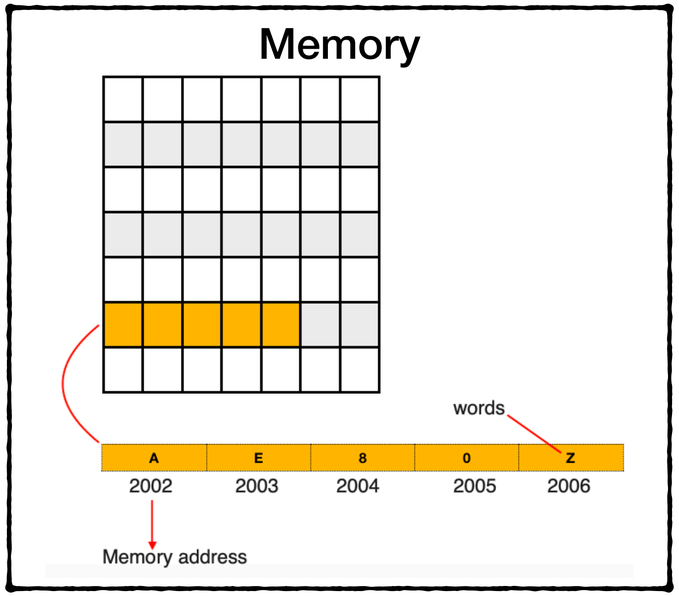


Allocations are particular for each application

→ **Hard to predict**

There are some general heuristics

→ **Easy to predict**



Application's Allocation Patterns

Weak generational hypothesis

```
data = Data new
... first use of data ...
??????????
```

Will you use it again?

Mostly

No, you can free the memory

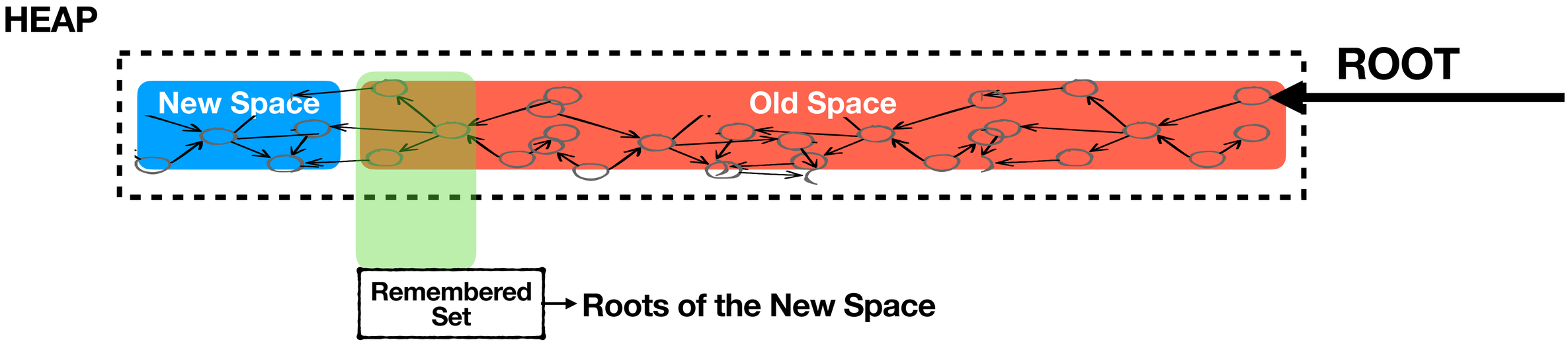
Sometimes

Yes, keep it!

"Most of the objects die young"

Generational Garbage Collector

High-Performance Automatic Memory Management for OOP



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Generational Garbage Collector

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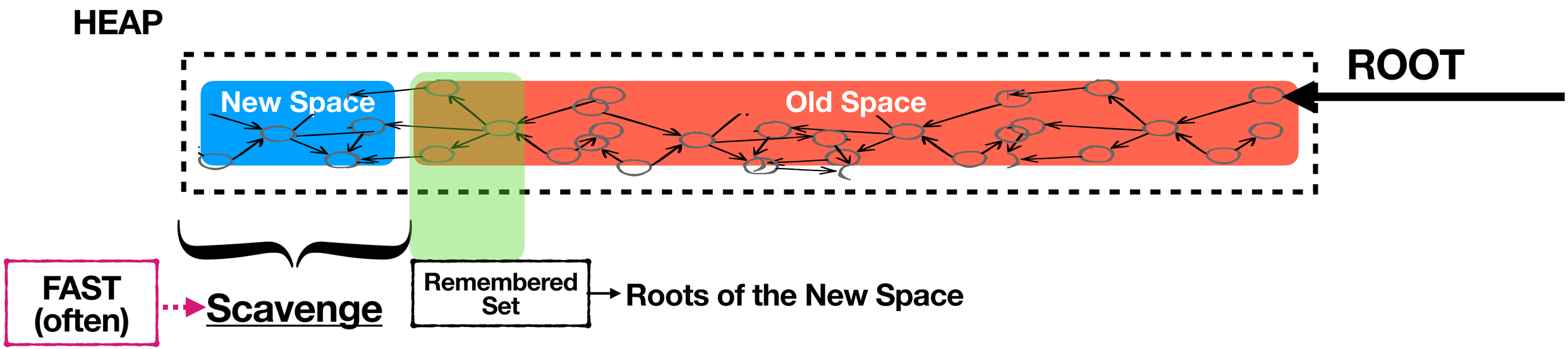

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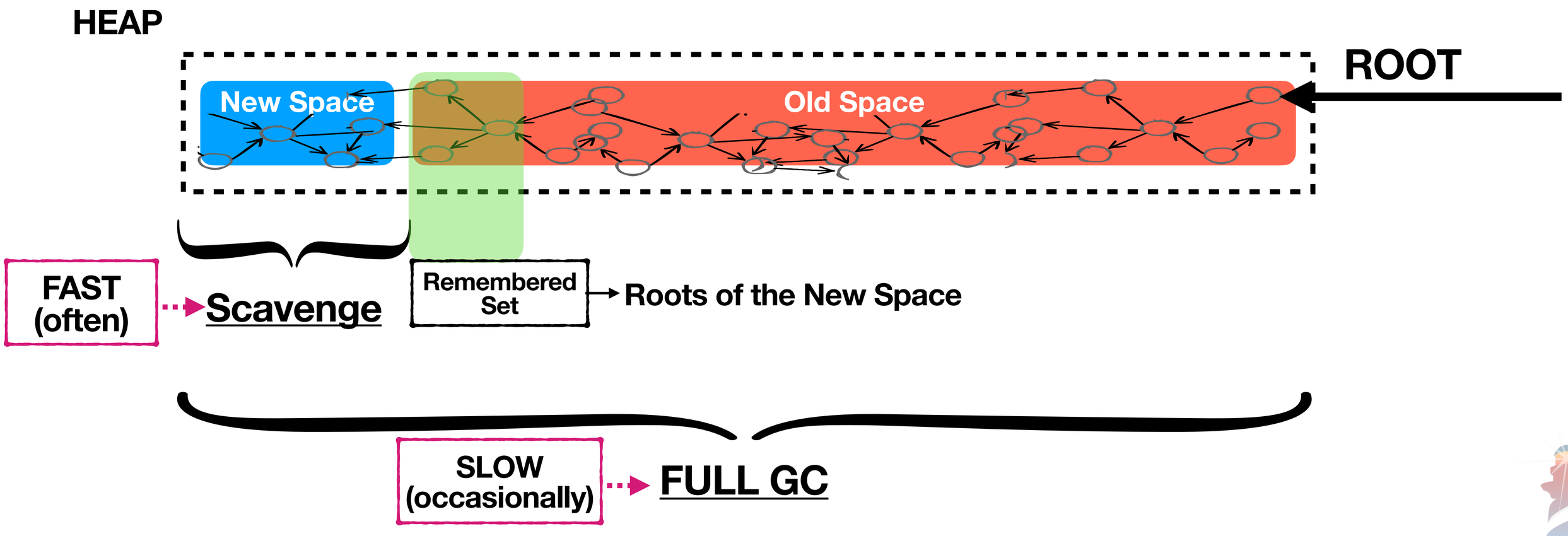

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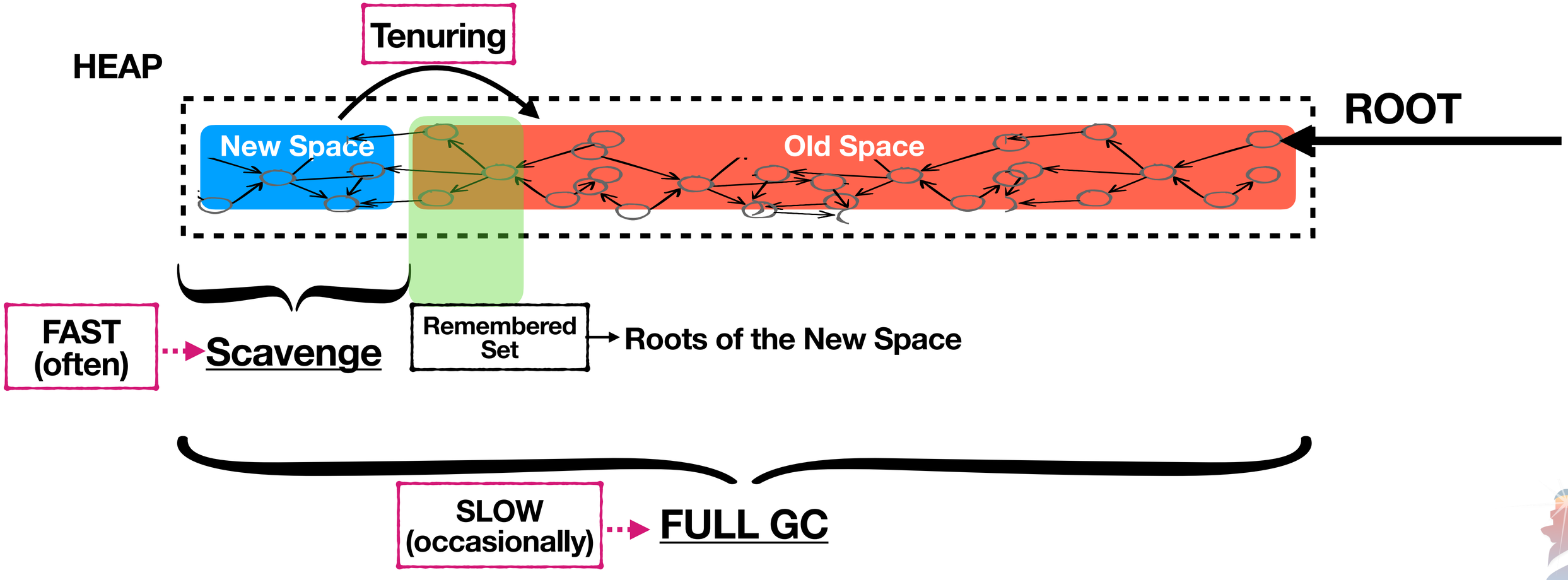

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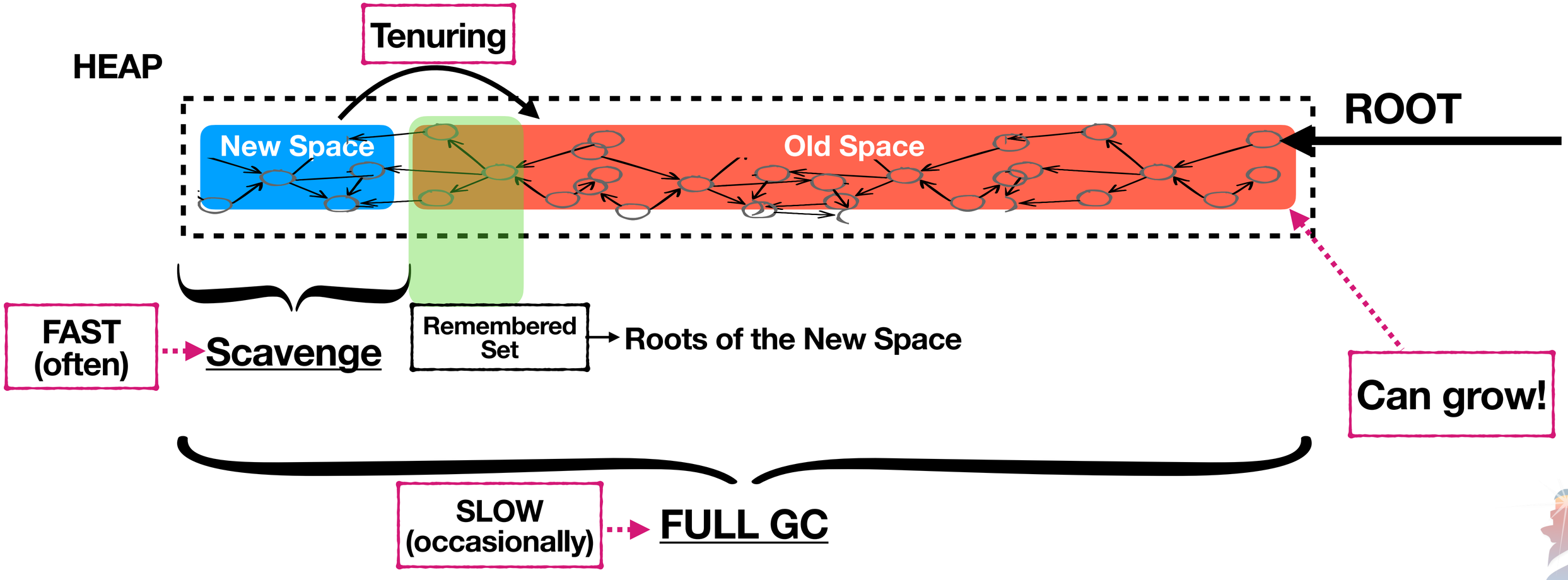

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