

Understanding Garbage Collectors

in object-oriented programming

Lecture 3 - Profiling the Garbage Collector

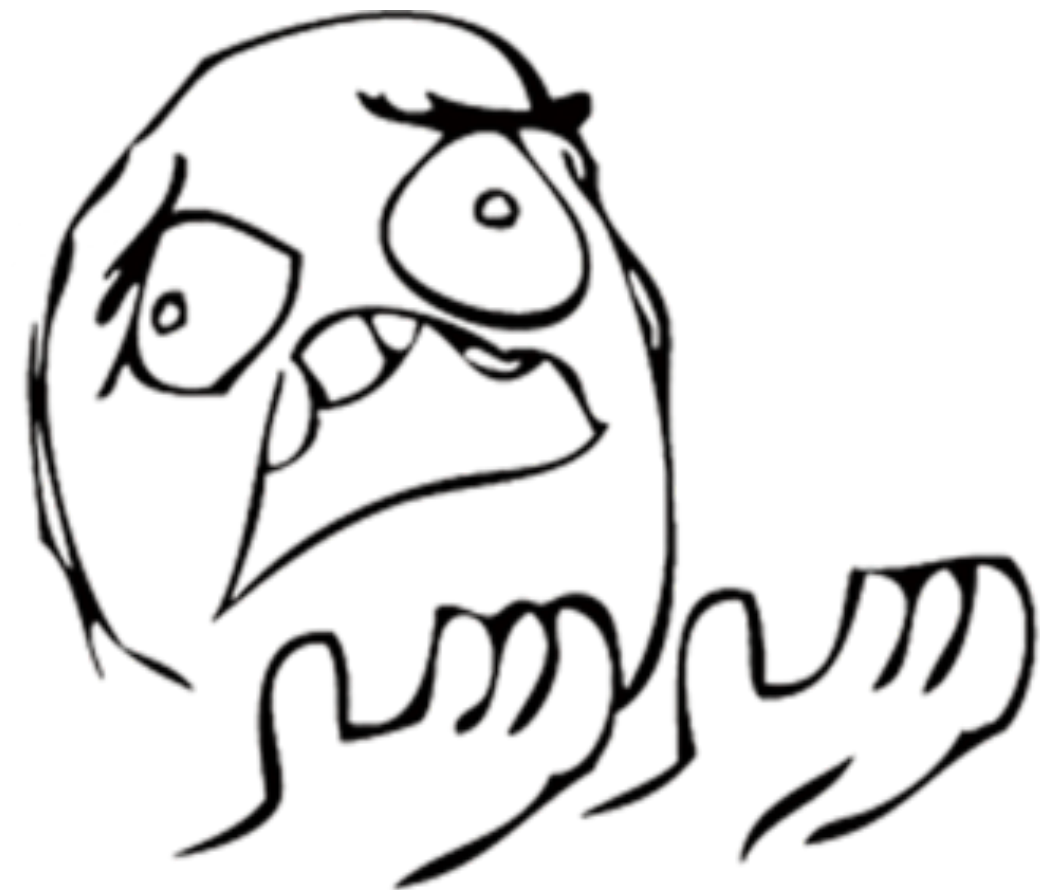
Nahuel Palumbo

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Pop Quiz

!!!!



Memory management

What it means?

In programming language virtual machines with
garbage collectors,
programs *must* manage their own memory



TRUE or FALSE

Memory management

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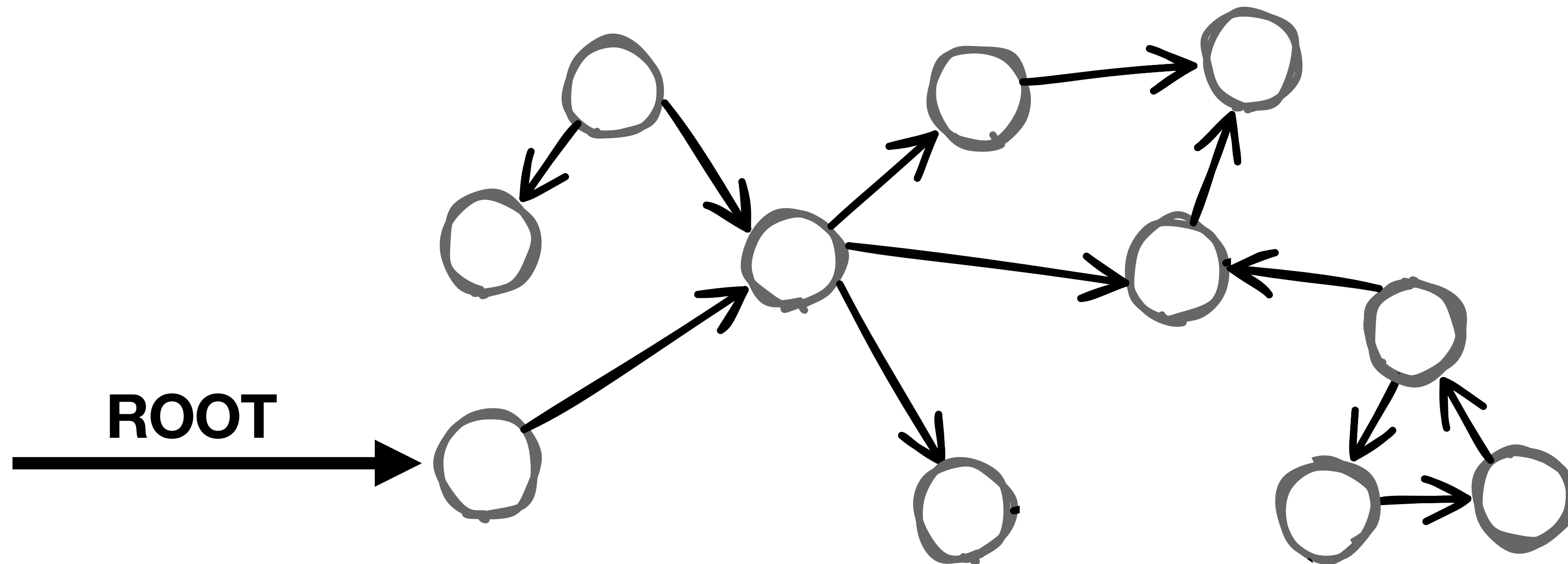


FALSE

```
Playground
Do it Publish Bindings Versions Pages
1 pepita := Swallow new.
2 pepita areYouTired.
3 pepita fly: 30.
4
```

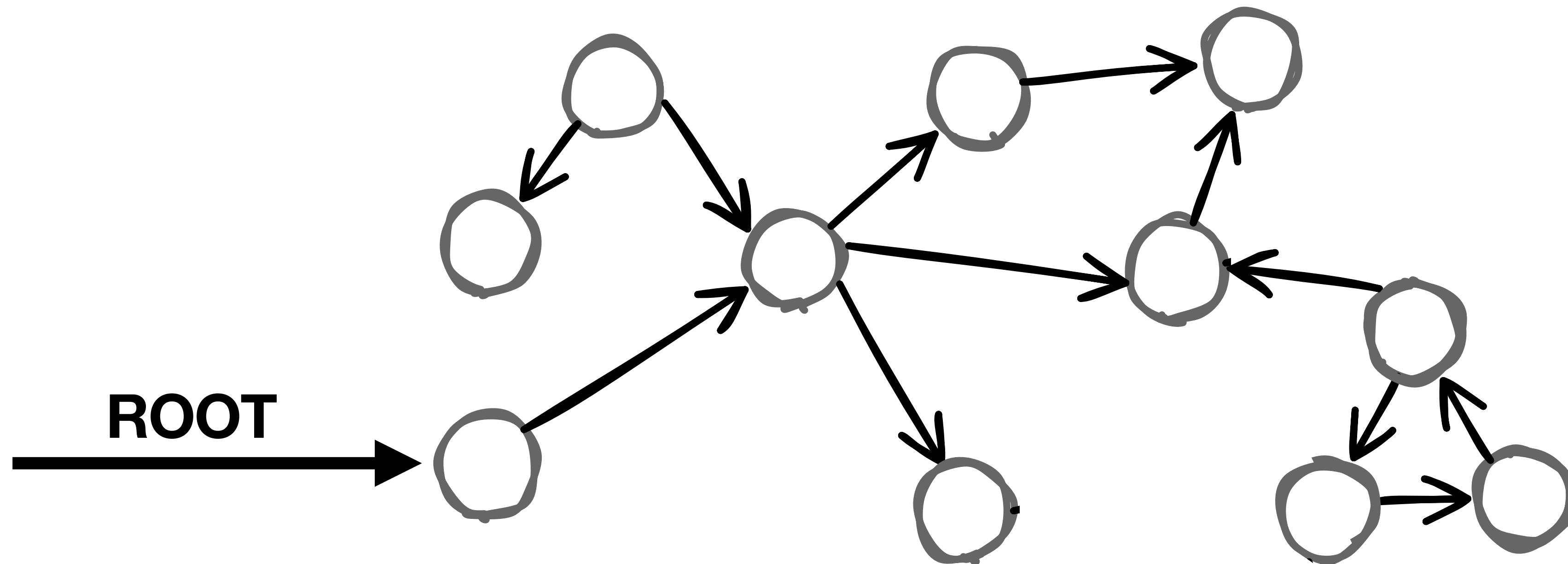
Running the Garbage Collection

What objects are *garbage* here?



Running the Garbage Collection

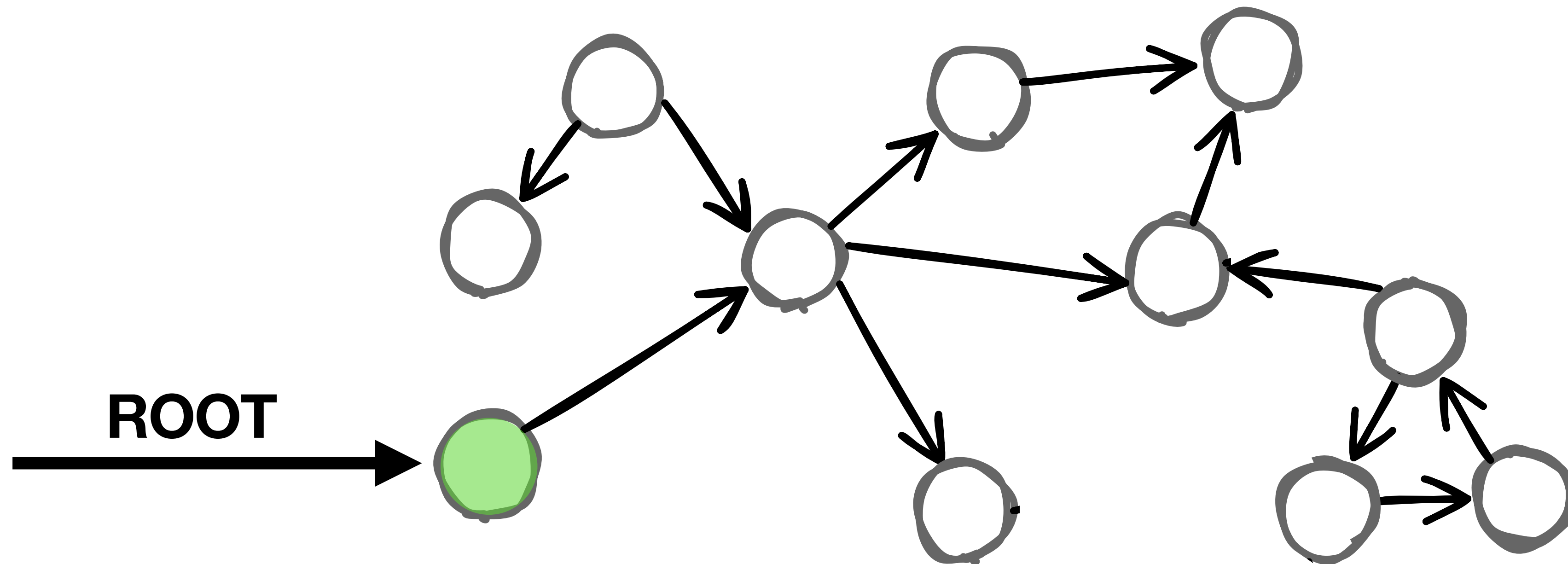
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“Must be accessible from the roots”

Running the Garbage Collection

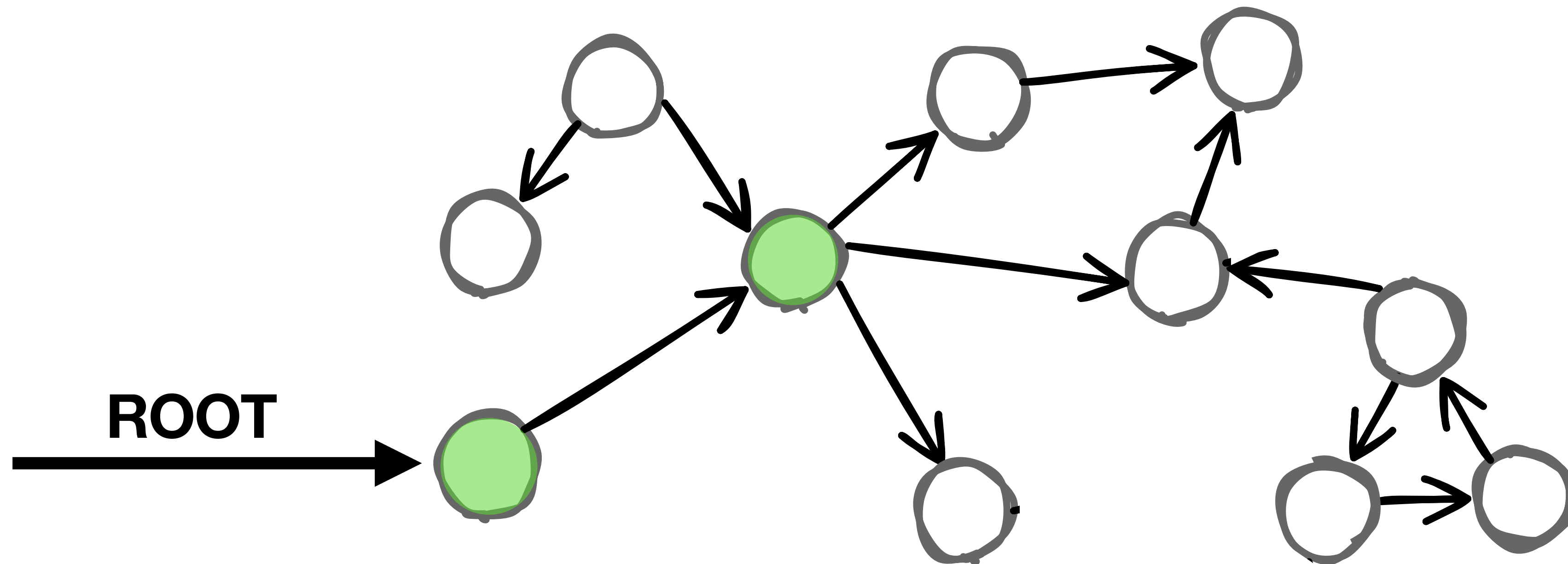
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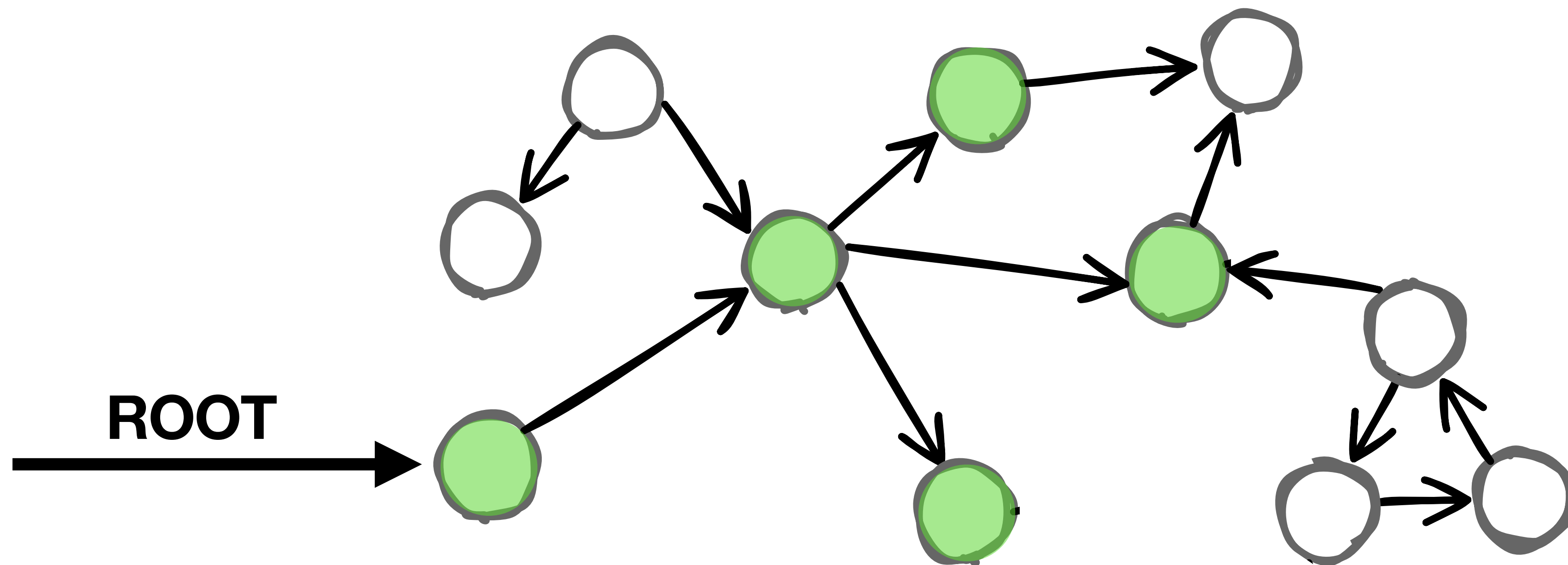
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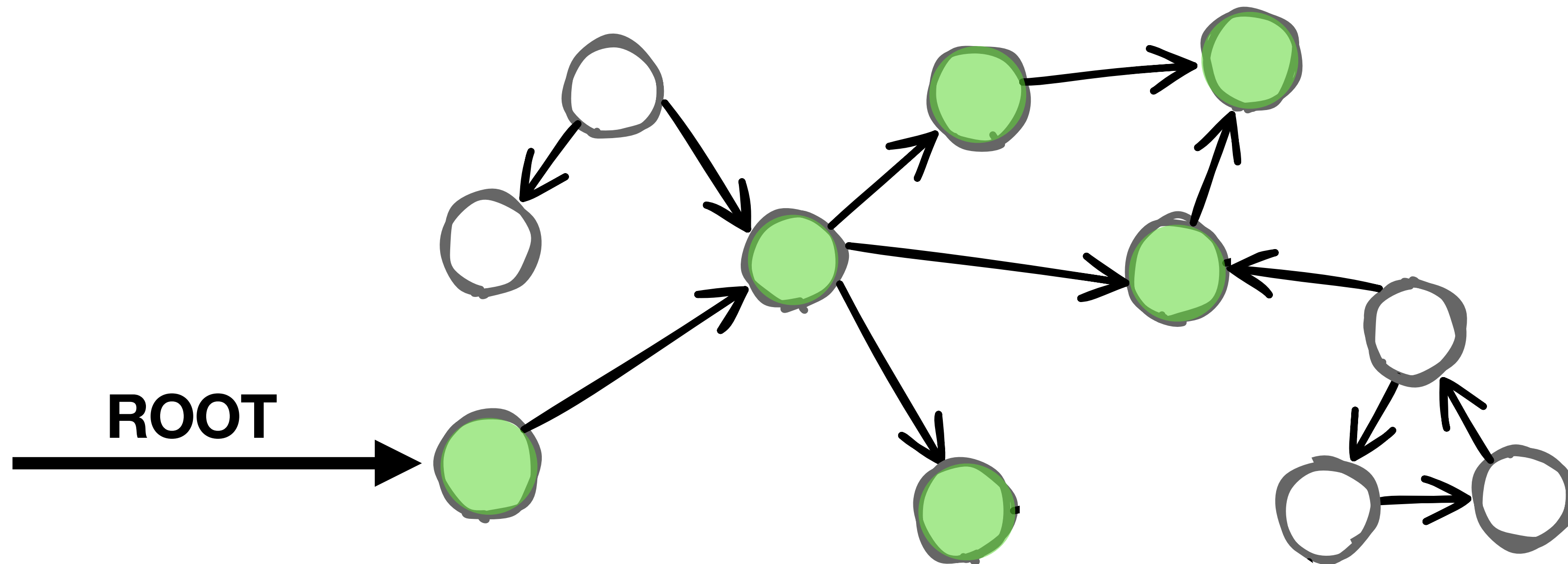
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Running the Garbage Collection

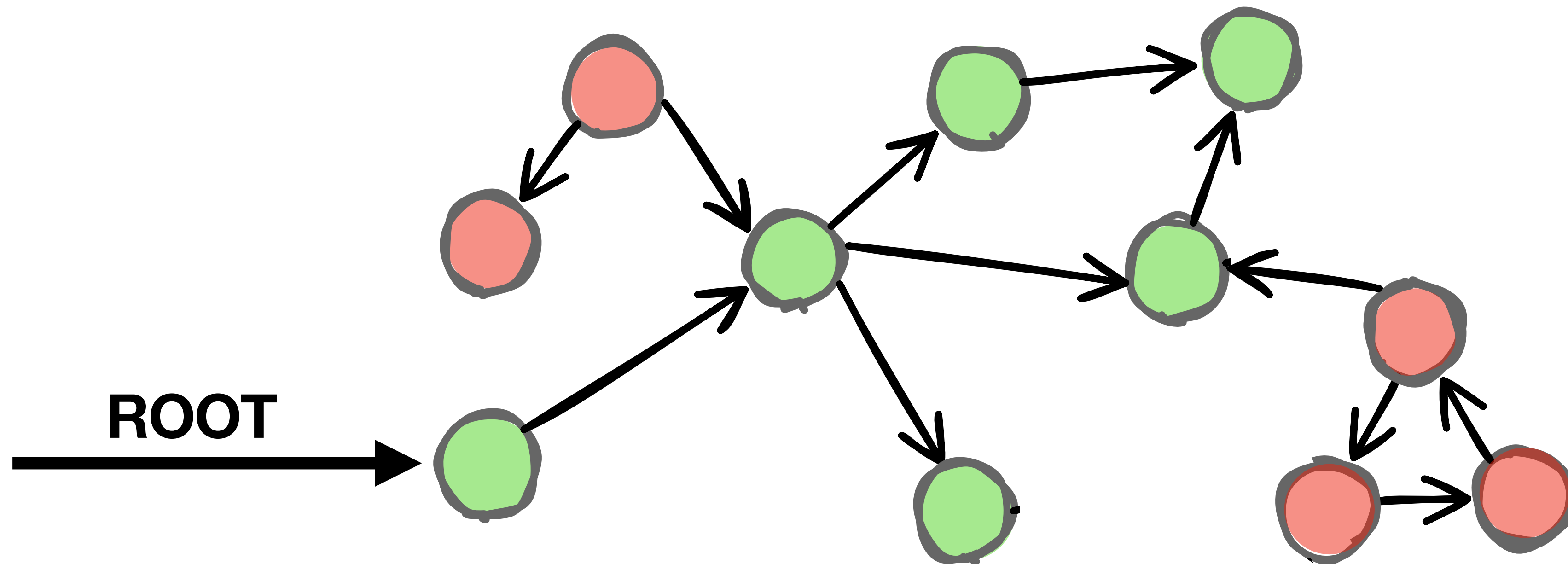
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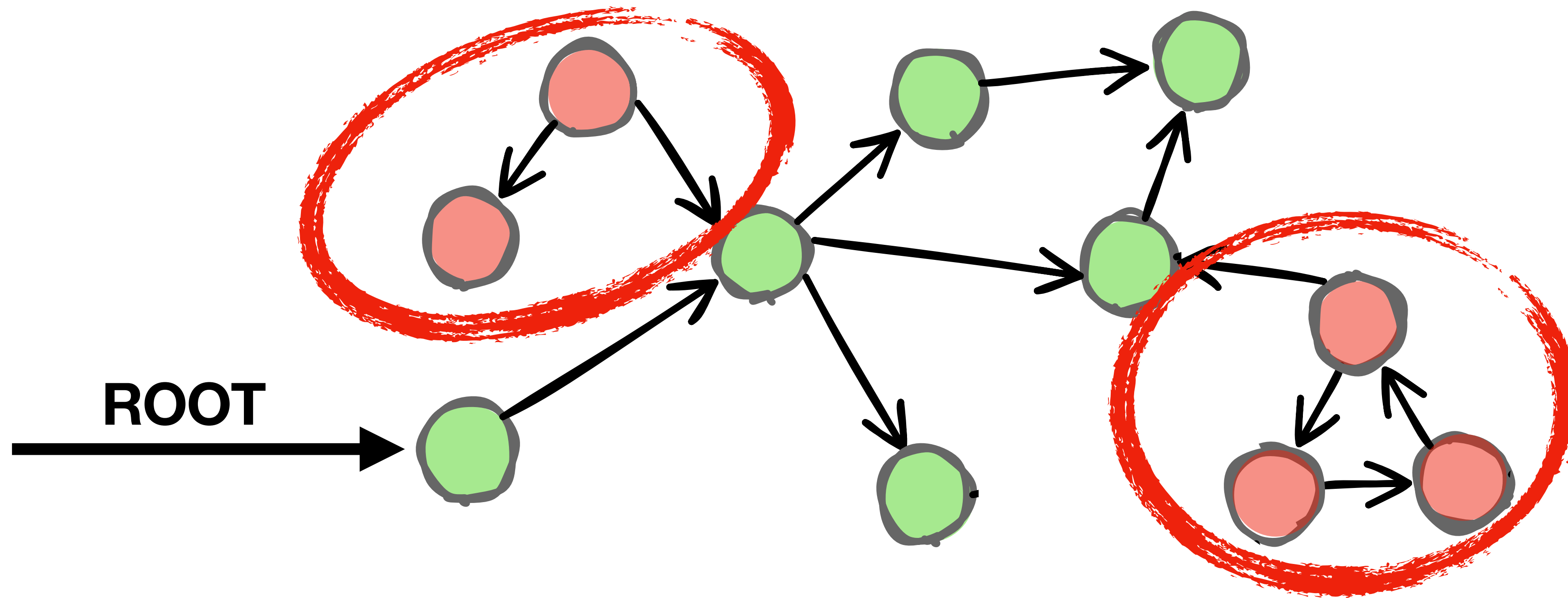
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“Must be accessible from the roots”

Running the Garbage Collection

What objects are *garbage* here?



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High-Performance Garbage Collection

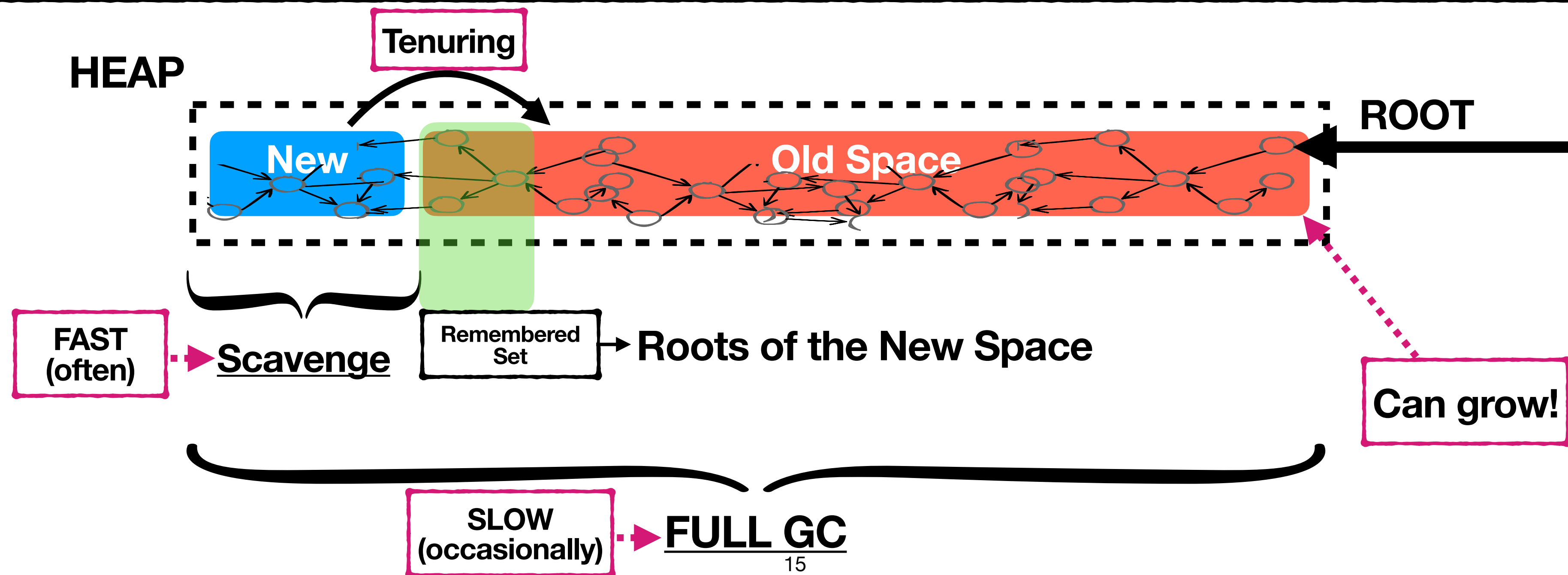
Generational Garbage Collectors

What is the main strategy for *Generational Garbage Collectors* to be performant?

High-Performance Garbage Collection

Generational Garbage Collectors

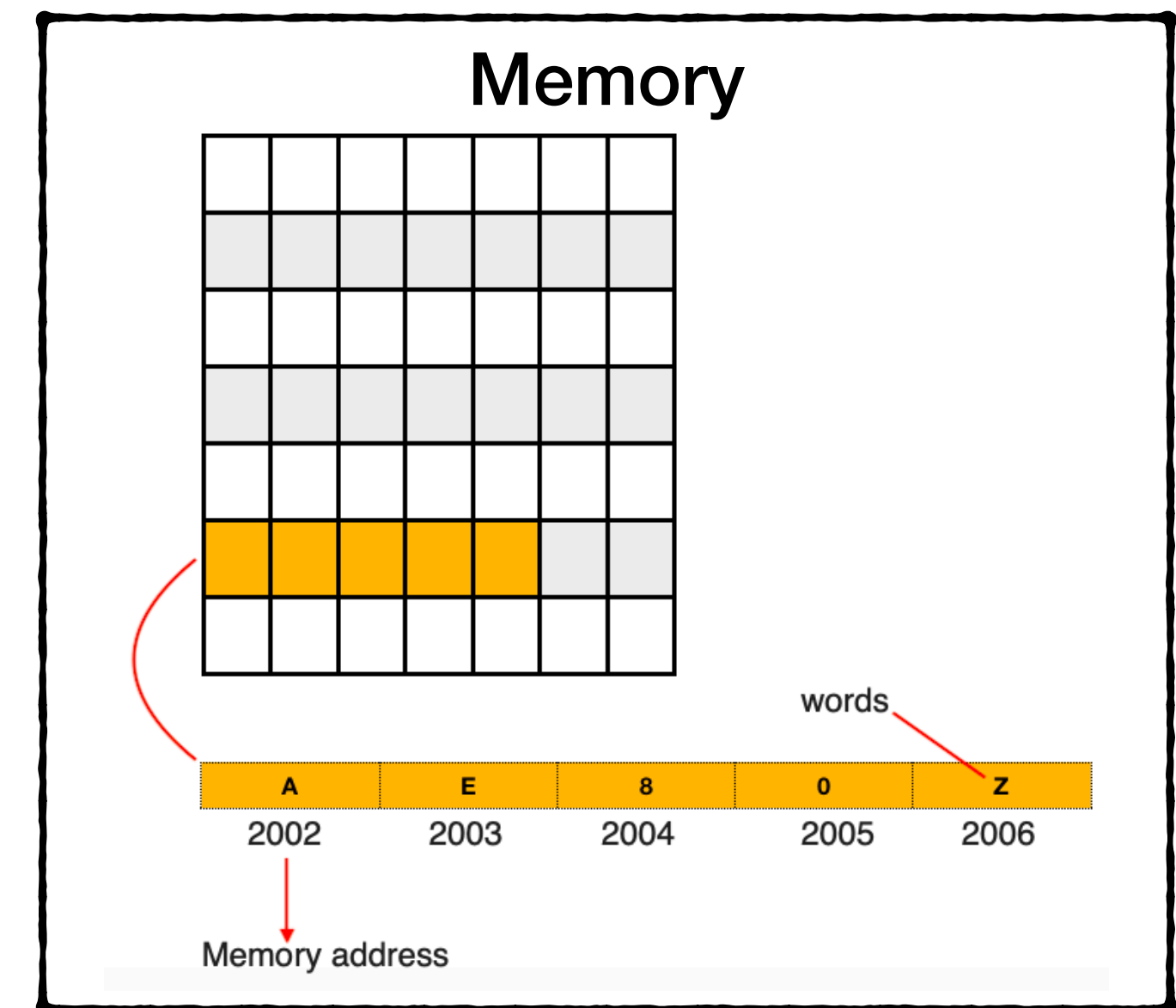
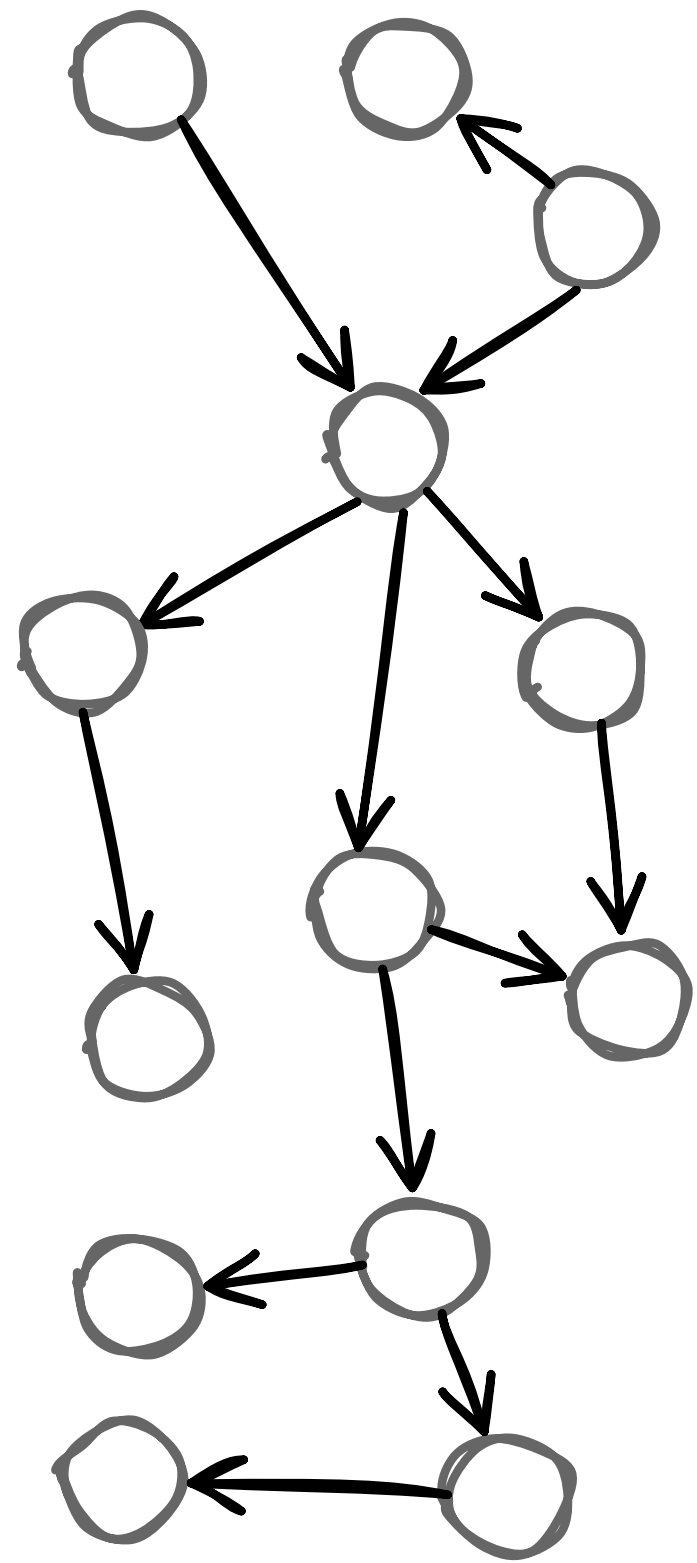
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Profiling Garbage Collectors Events

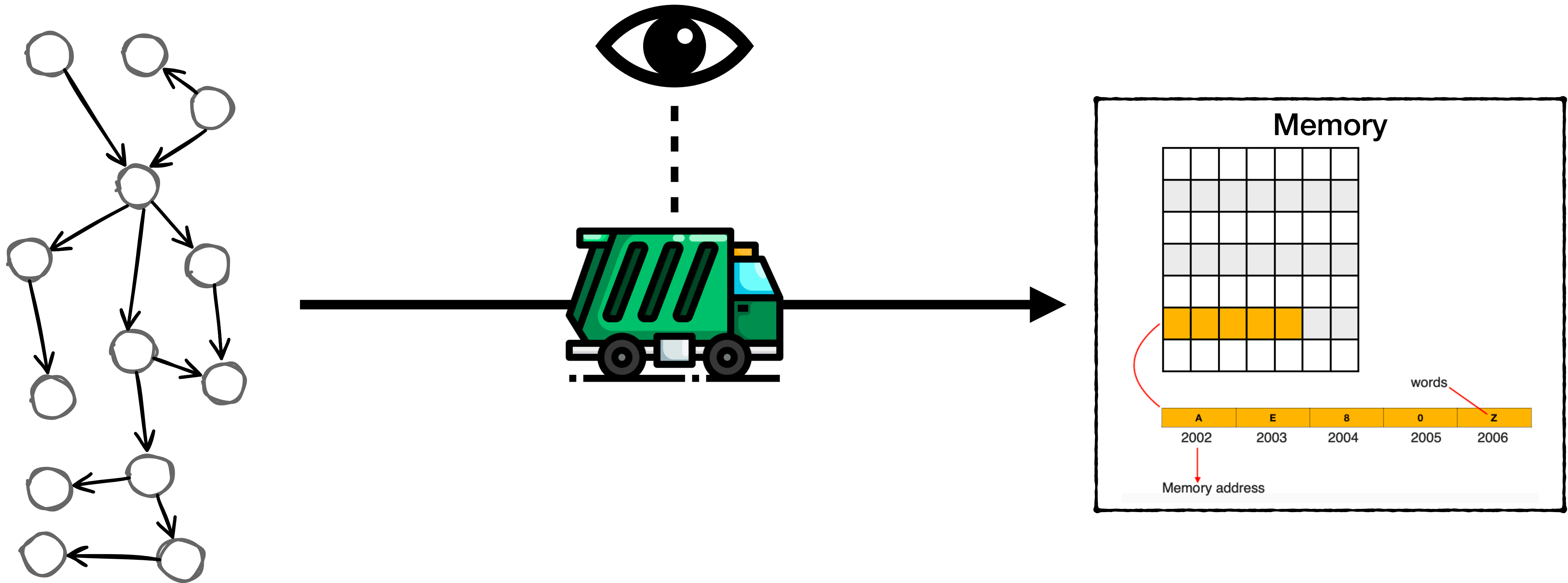
Application's Allocation Patterns

How do the applications use the memory?



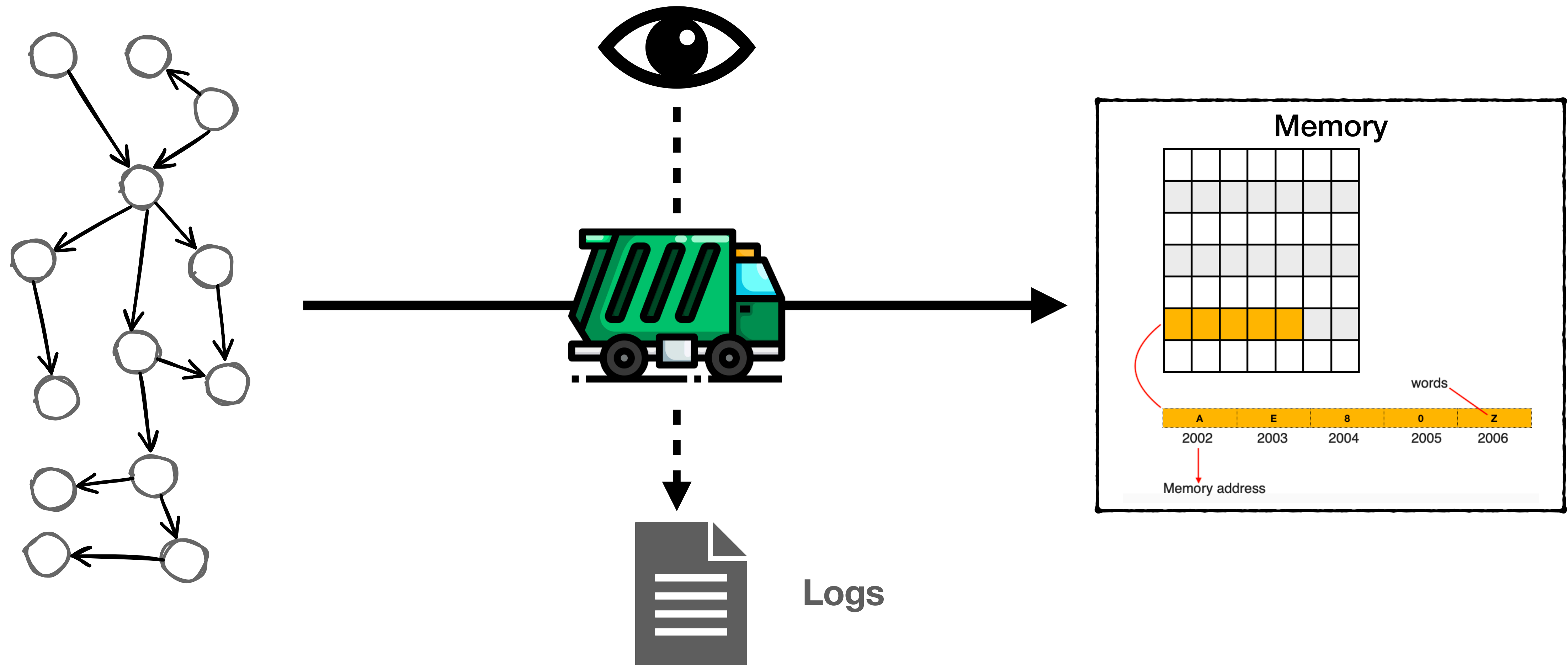
Application's Allocation Patterns

Profiling the GC



Application's Allocation Patterns

Profiling the GC

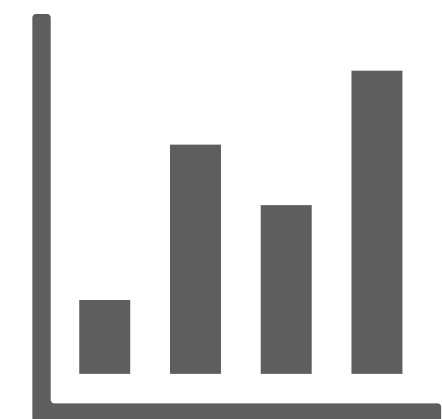


Let's do some experiments

DIY: Do It Yourself



Logs



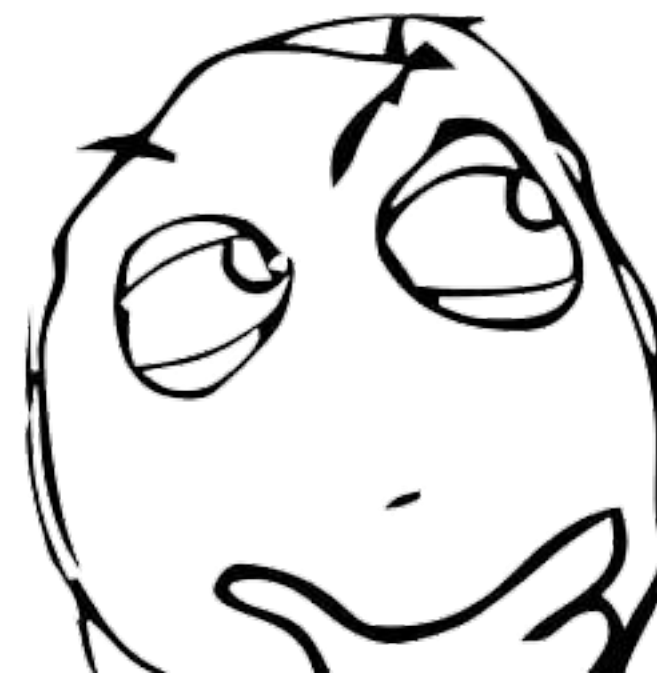
Plots

From Scavenges:

- Amount of memory used (before and after).
- Size of the Remembered Set (before and after).
- Tenuring info (amount of data - threshold).
- Executed time.

From FullGC:

- Time spent marking/sweeping/compacting.
- Executed time.



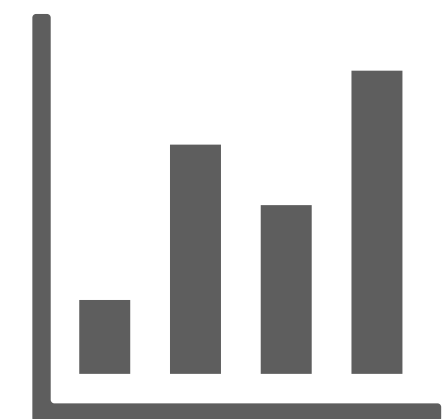
Developer

Let's do some experiments

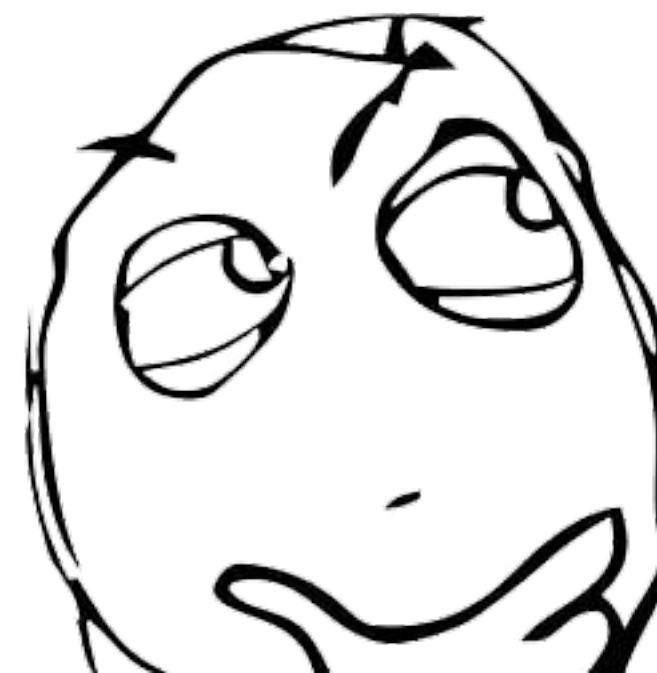
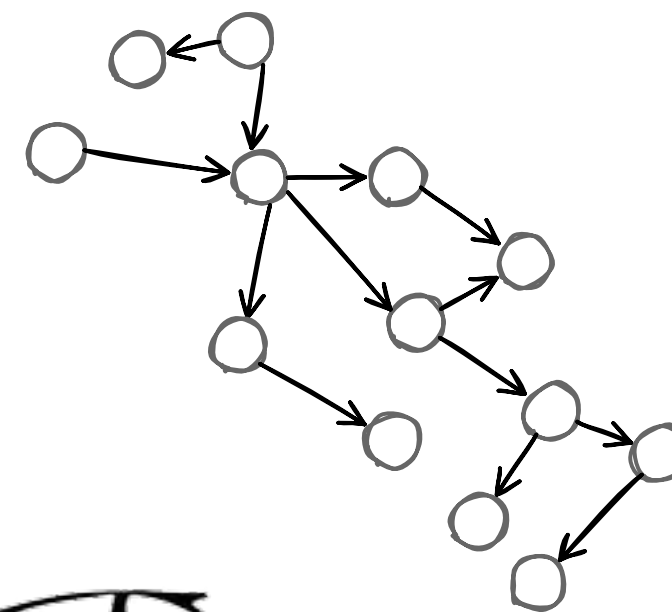
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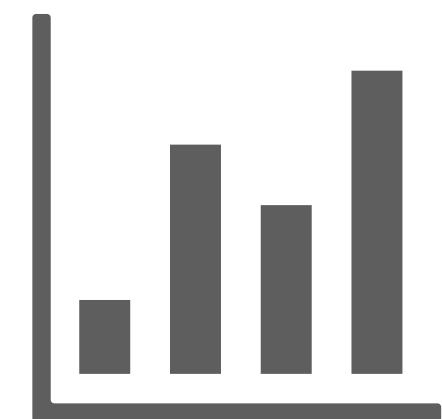
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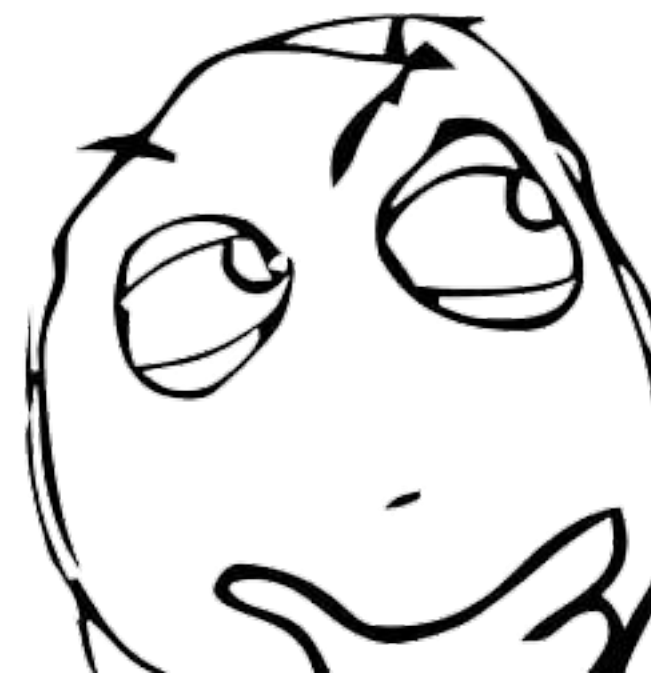
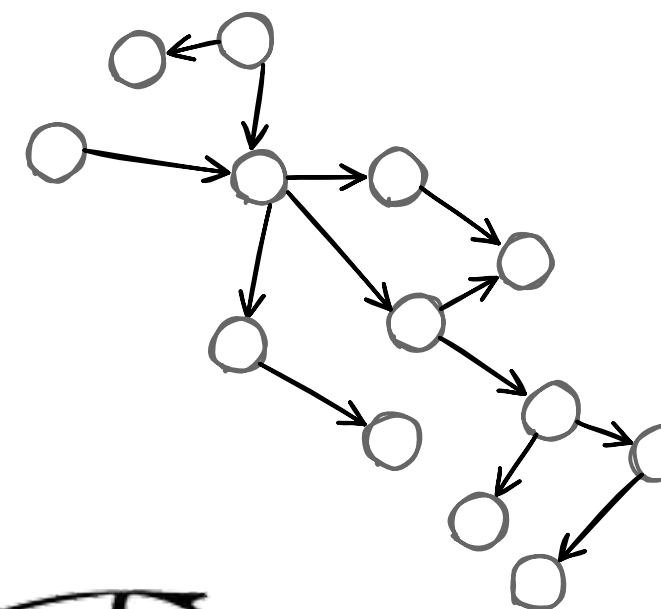
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