# Operating Systems

## Lecture 2: The Process

Nipun Batra

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4. Energy efficiency (esp. for mobile systems!)

# Process

- Process = Running program
- Review example from previous lecture
    - Output of top
    - Activity monitor

# Memory in C

– **static**: global variable storage, permanent for the entire run of the program.
– **stack**: local variable storage (automatic, continuous memory).
– **heap**: dynamic storage (large pool of memory, not allocated in contiguous order).

https://craftofcoding.wordpress.com/2015/12/07/memory-in-c-the-stack-the-heap-and-static/

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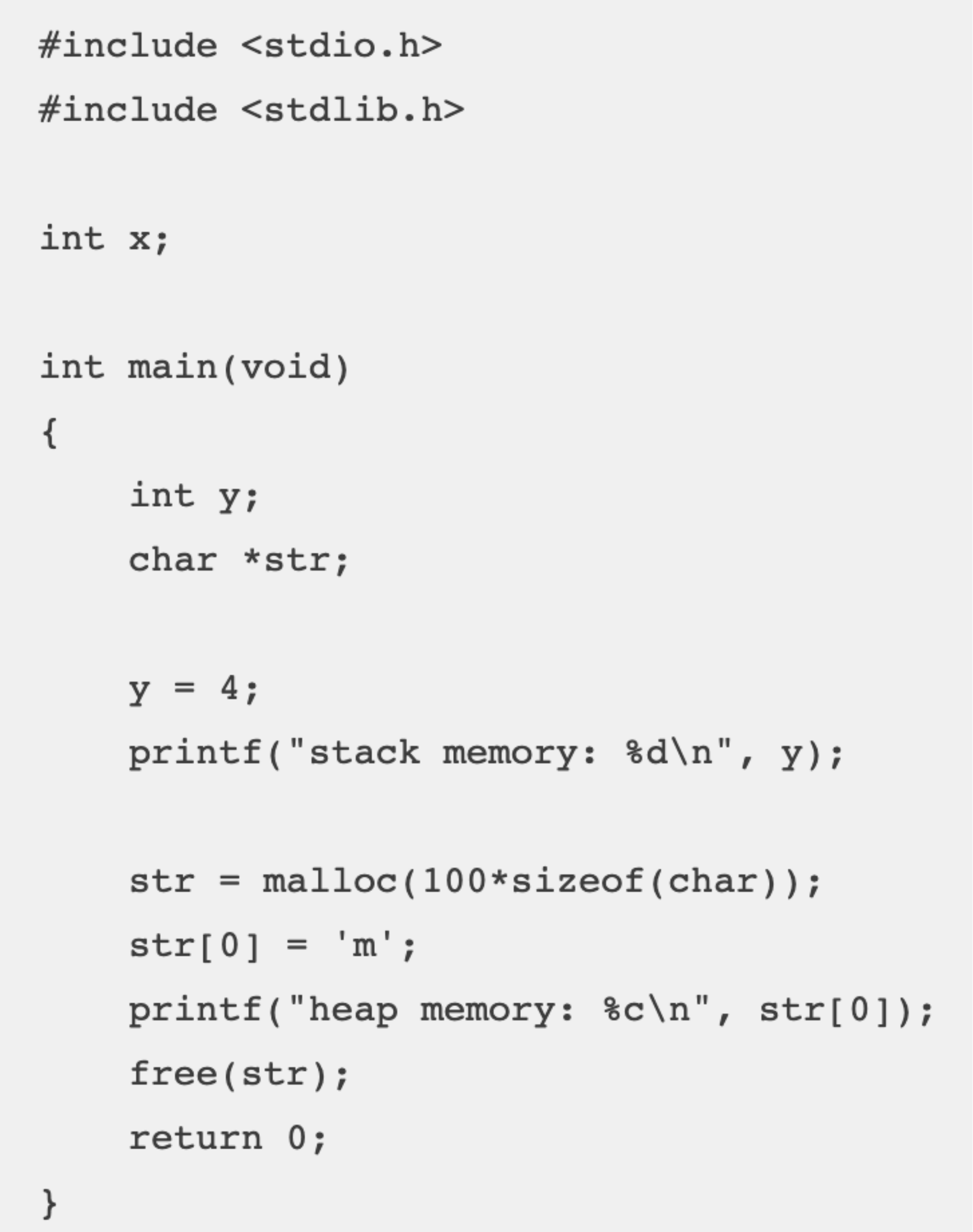

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#include <stdio.h>
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int x;

int main(void)
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    int y;
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    y = 4;
    printf("stack memory: %d\n", y);

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    str[0] = 'm';
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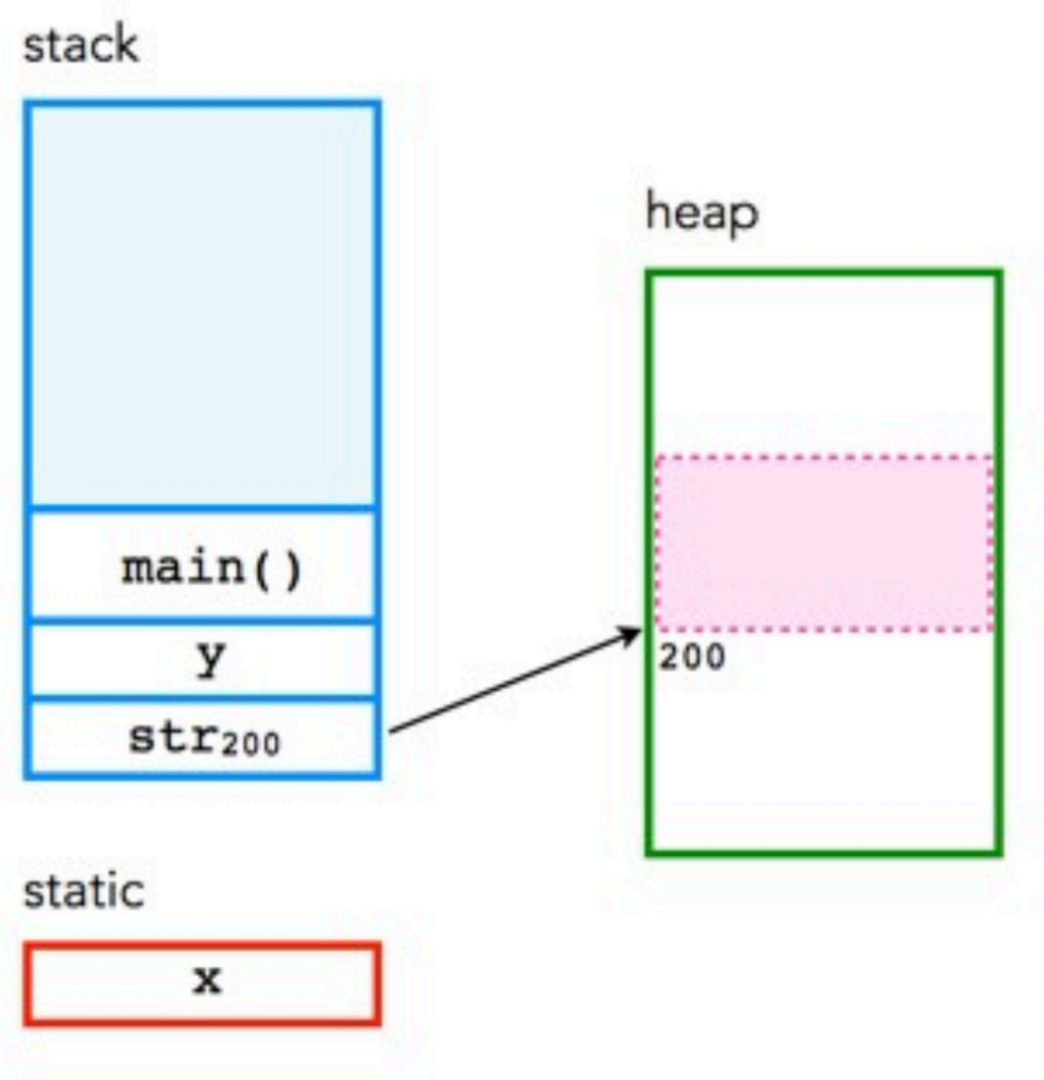

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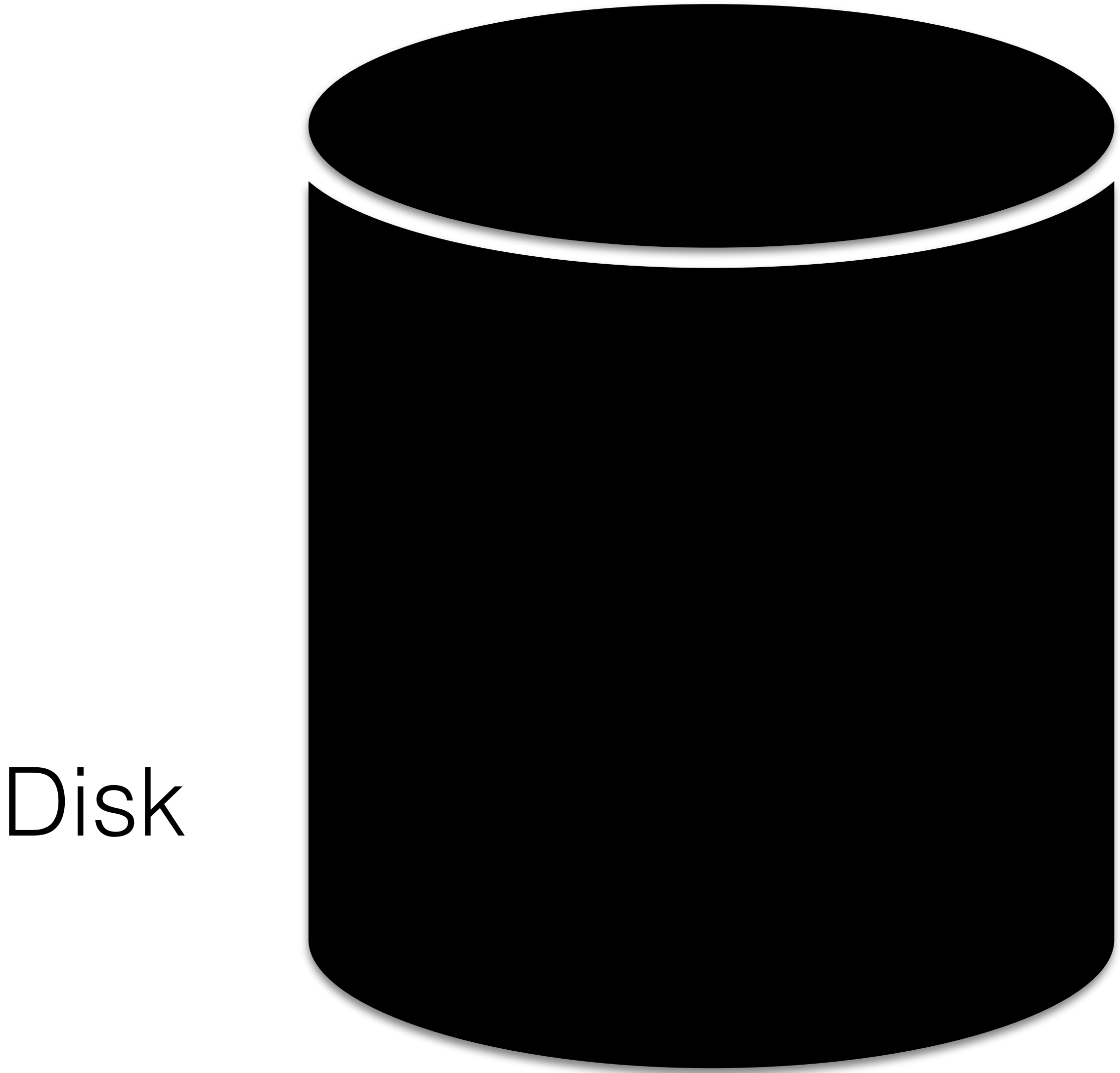

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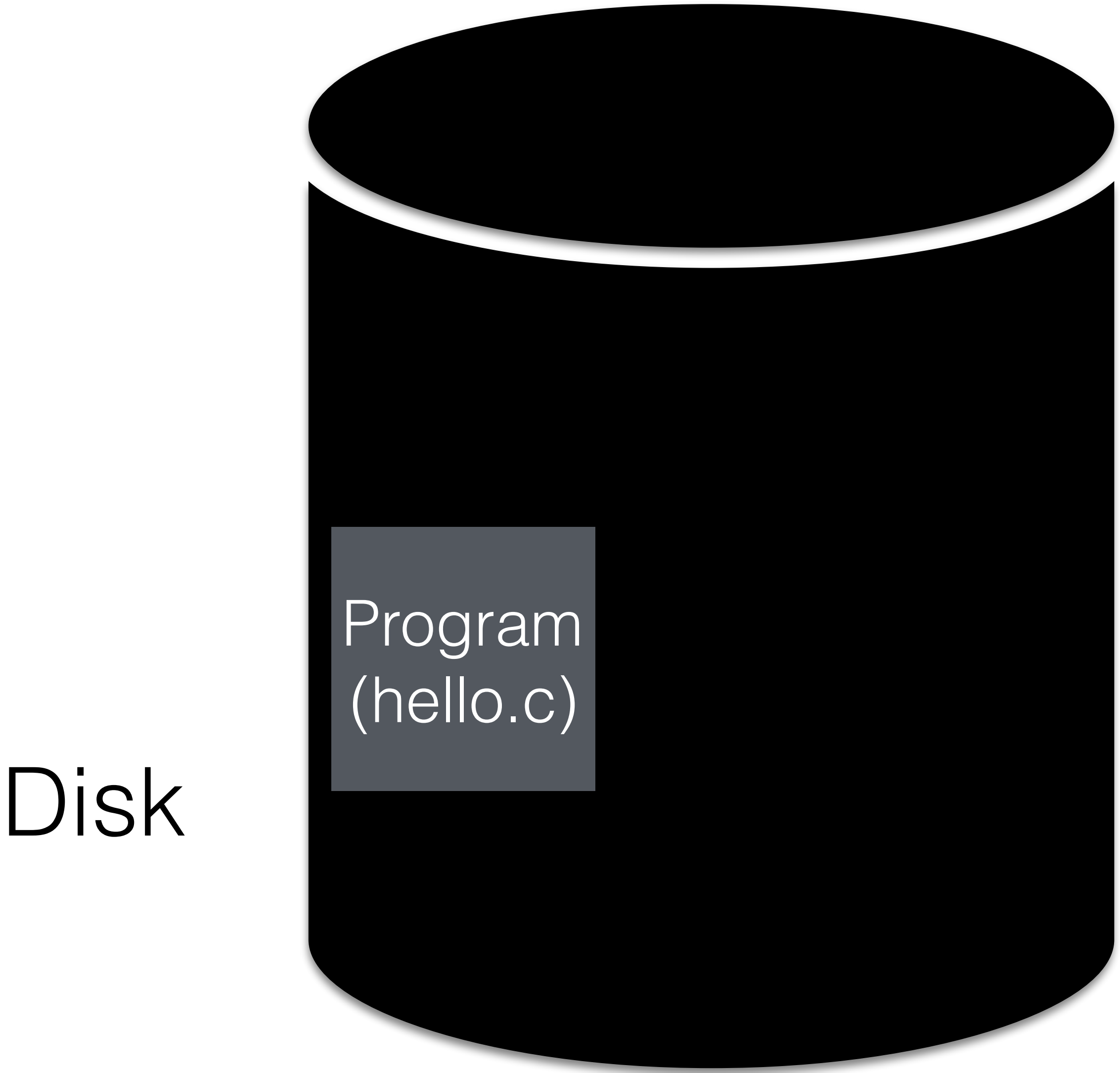

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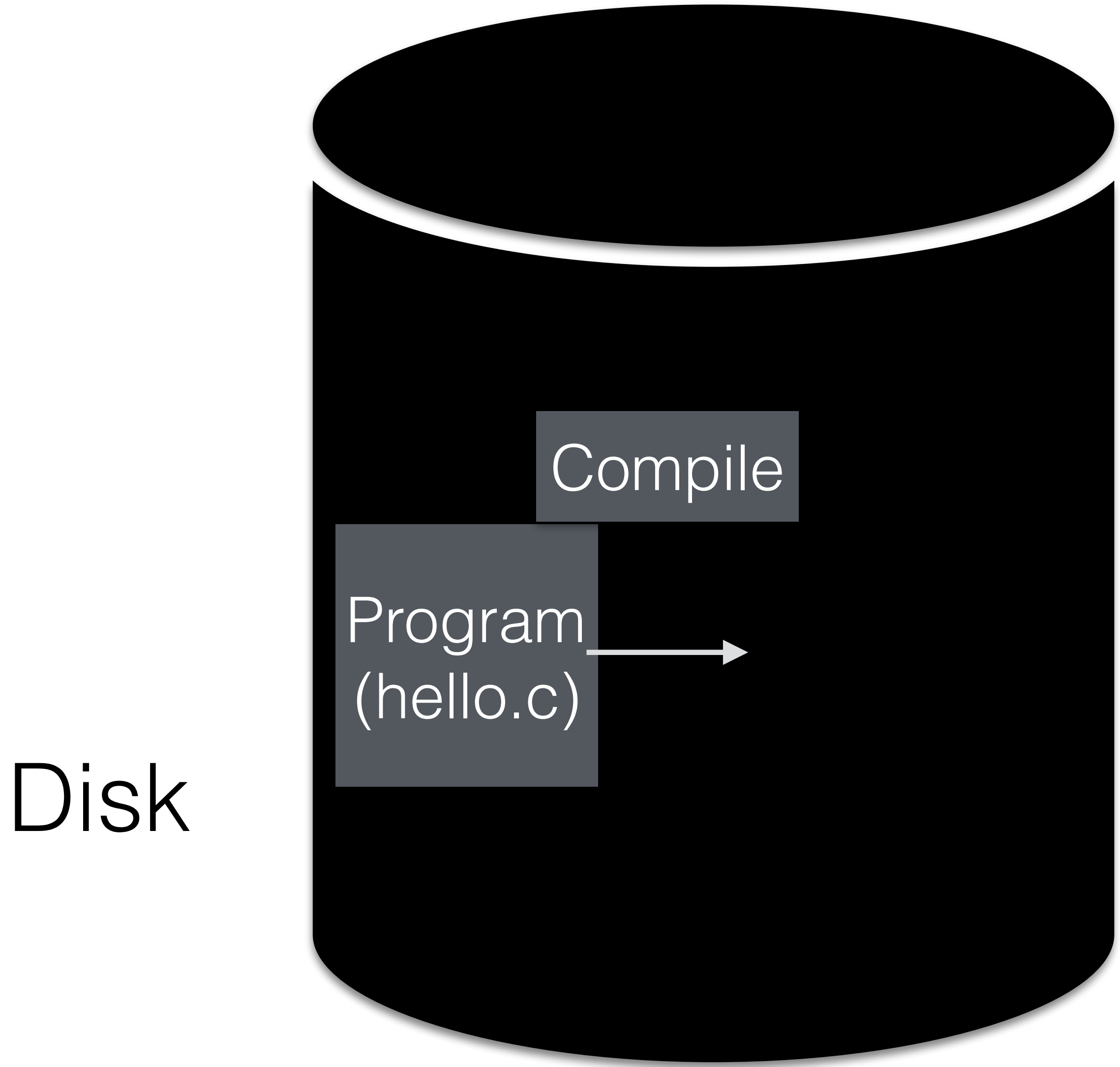

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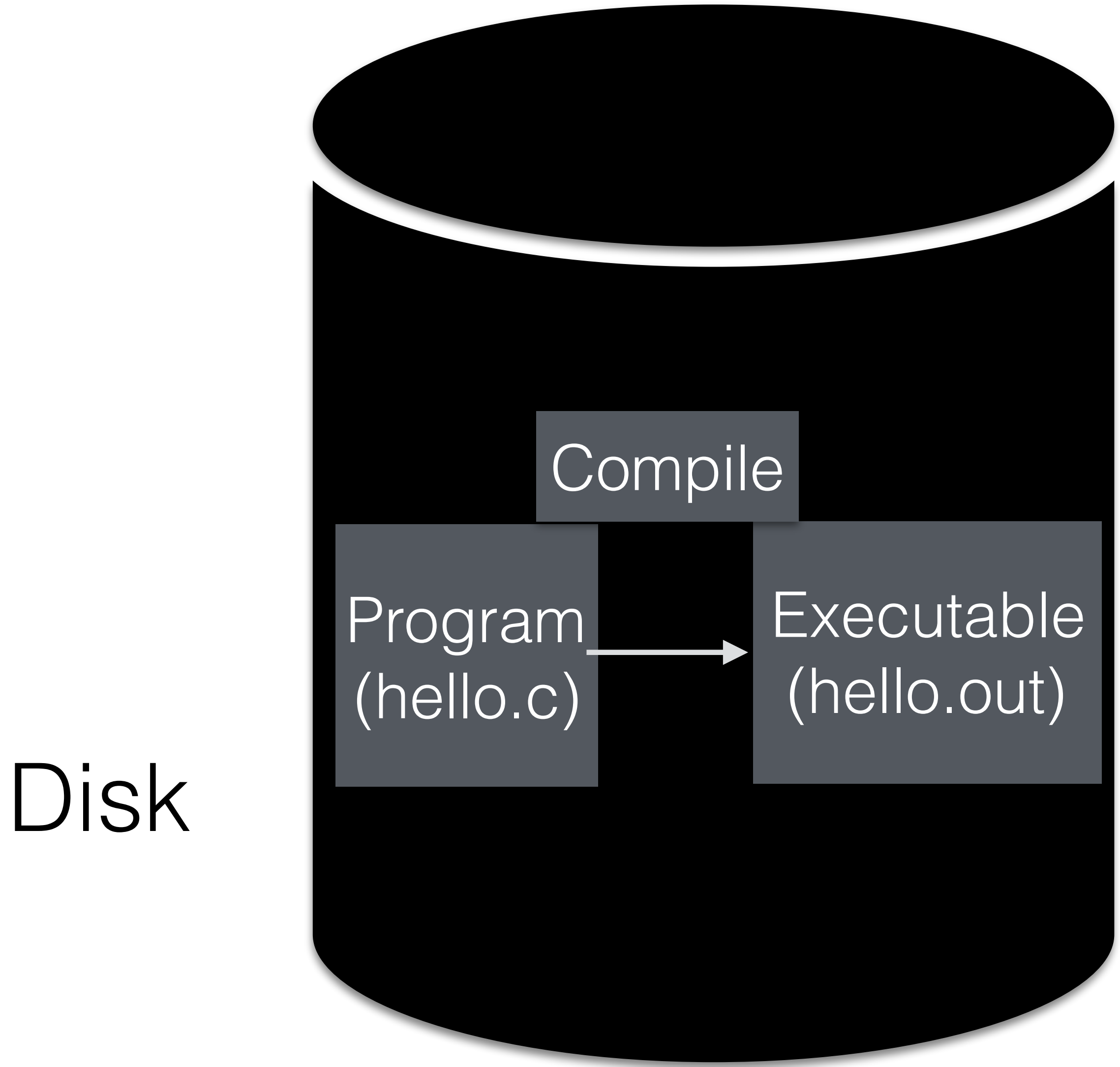

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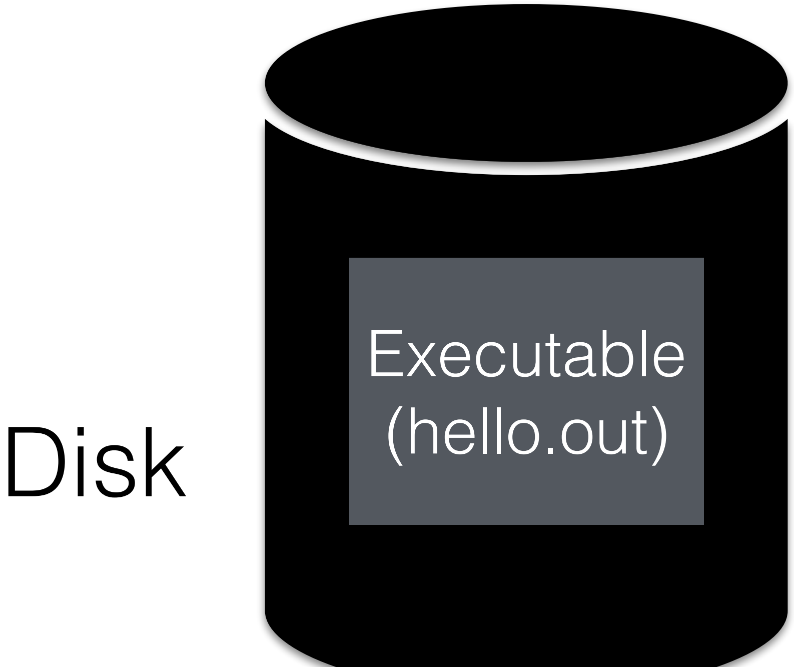

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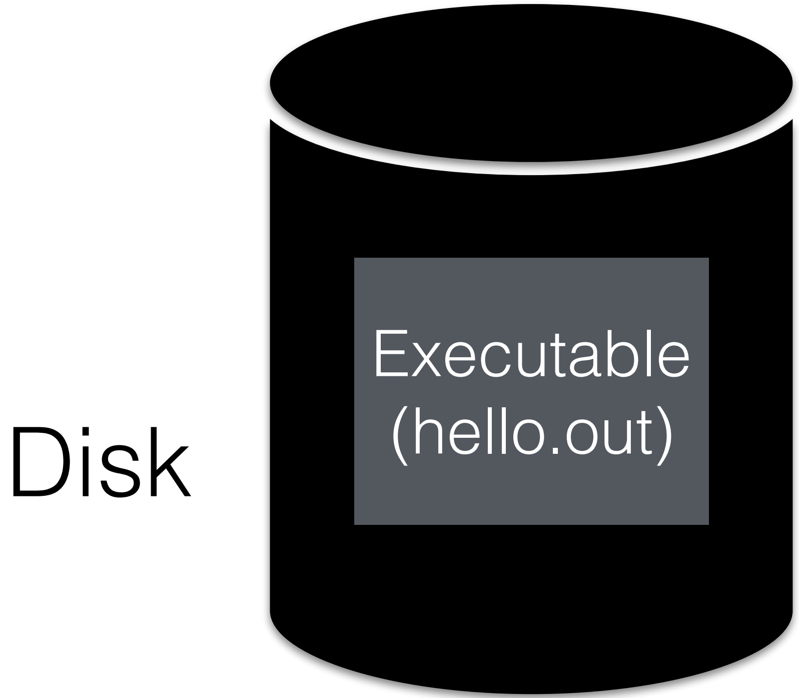

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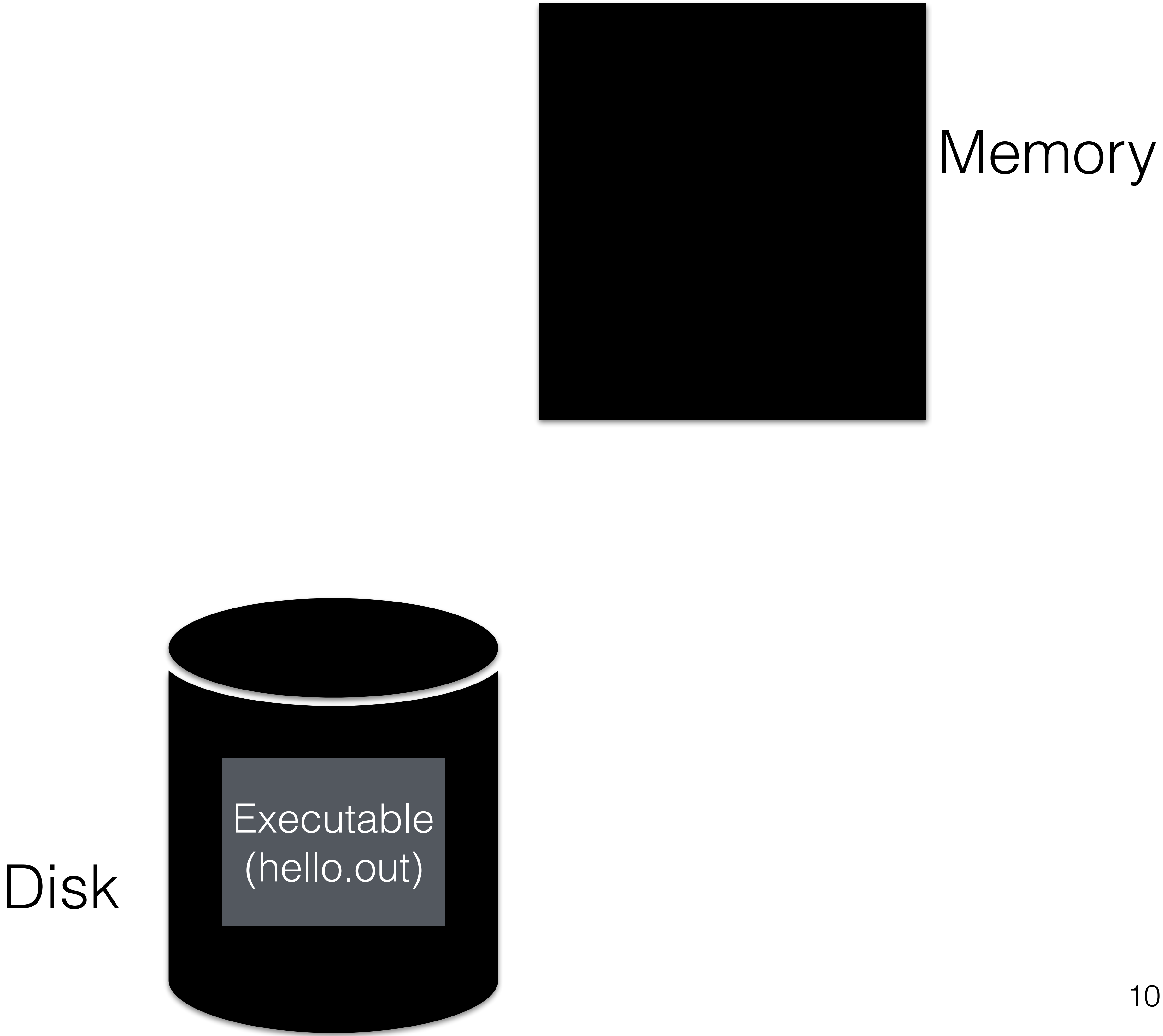

Memory

Disk

Executable
(hello.out)

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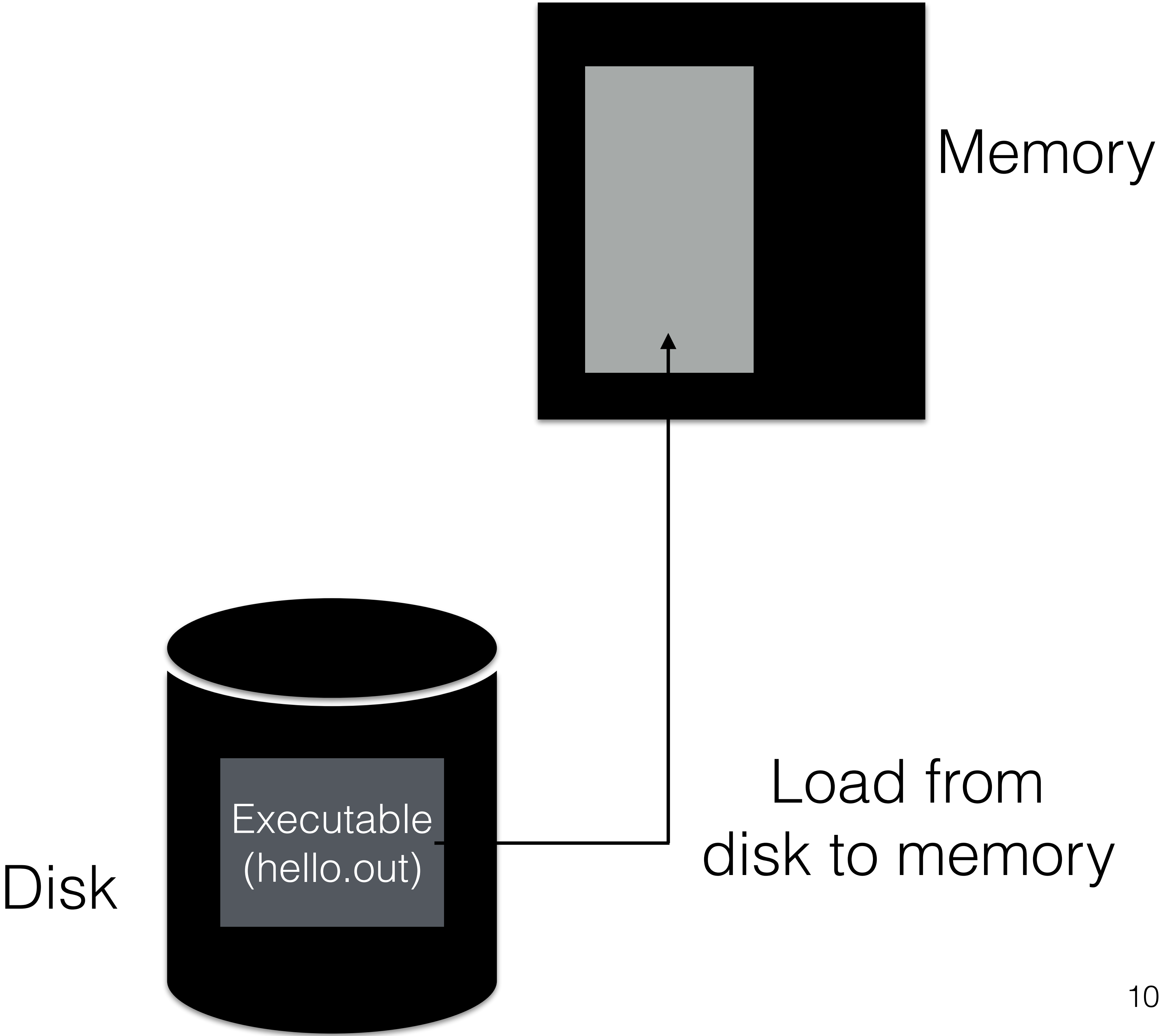

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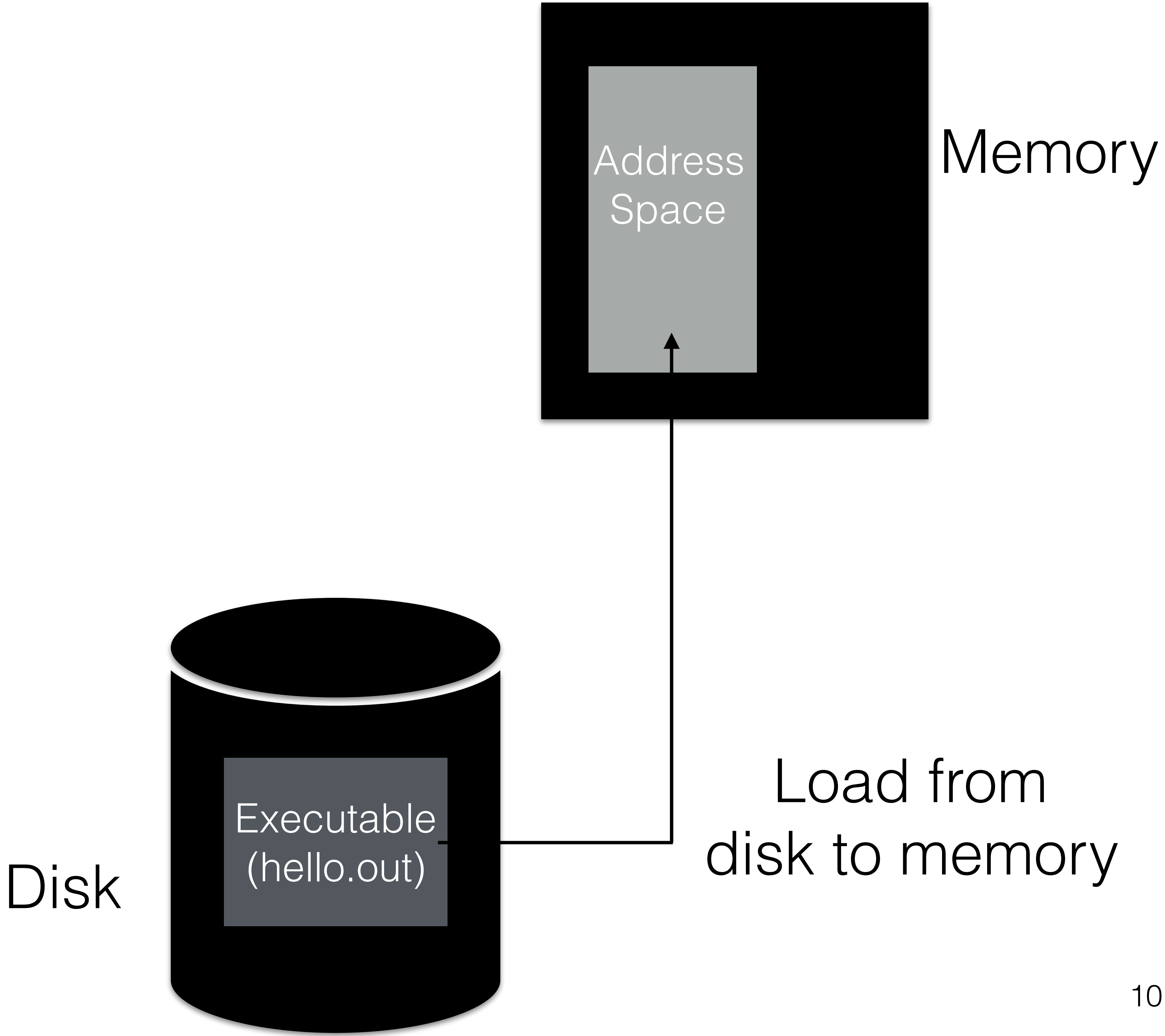

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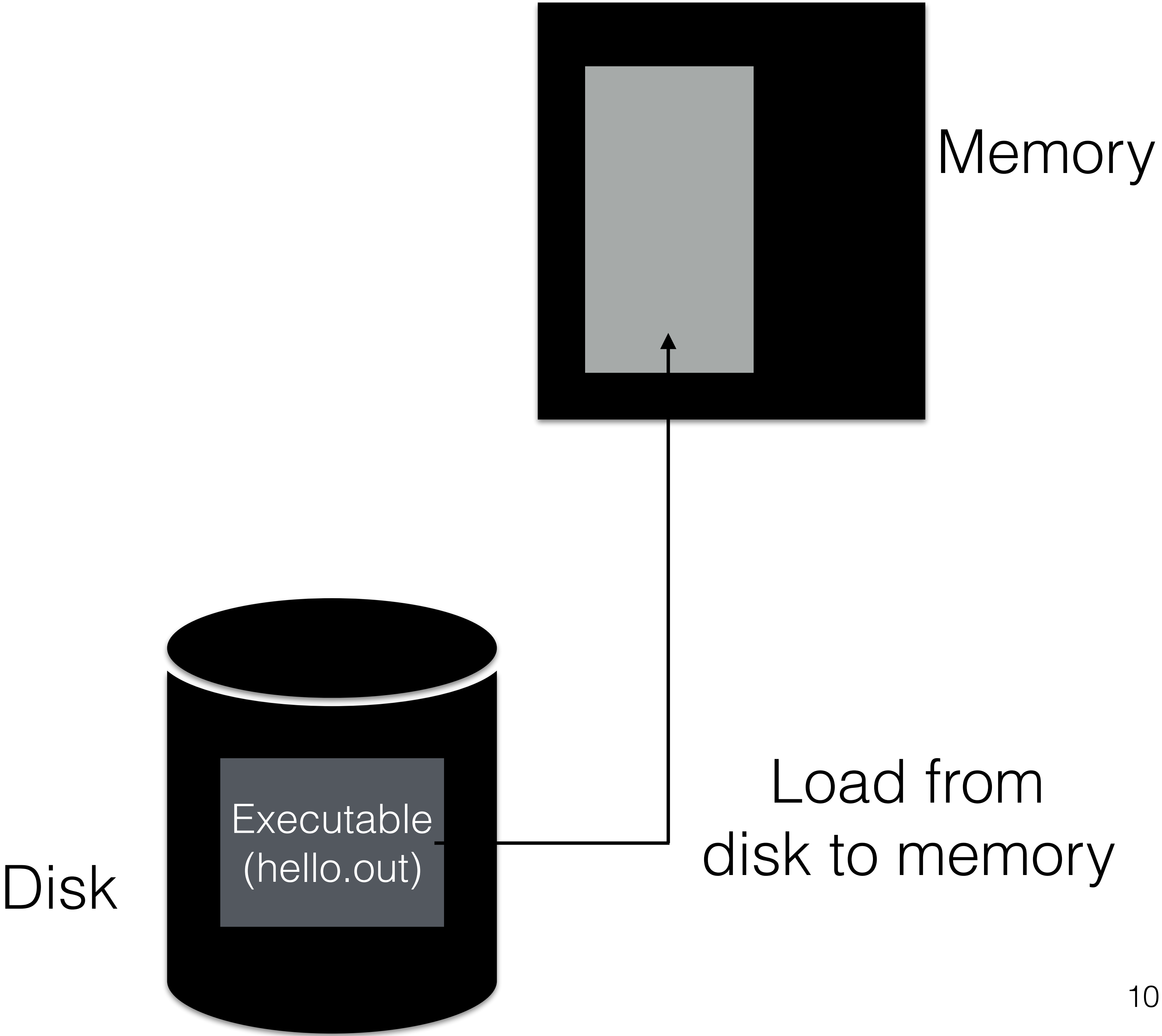

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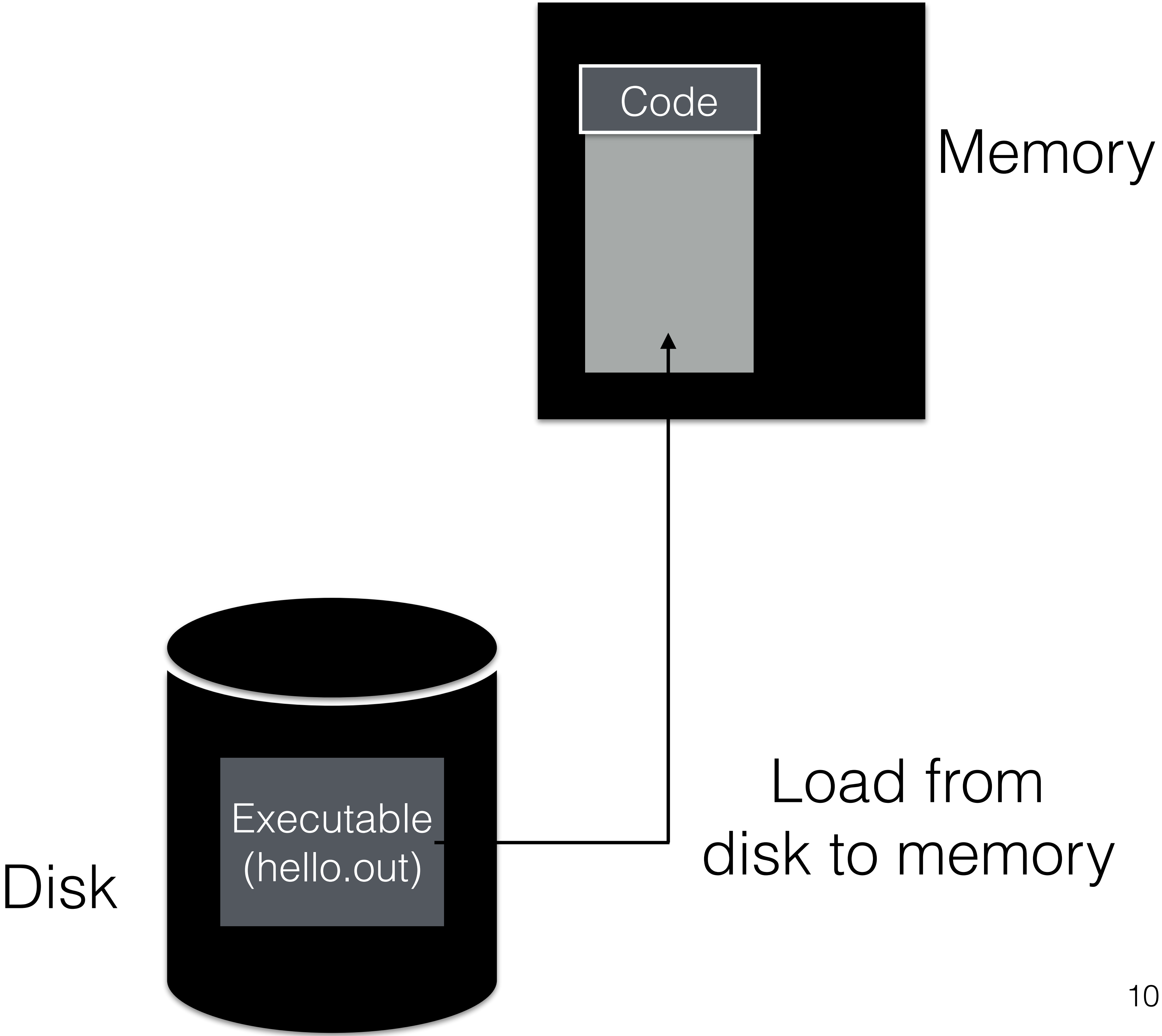

Load from disk to memory

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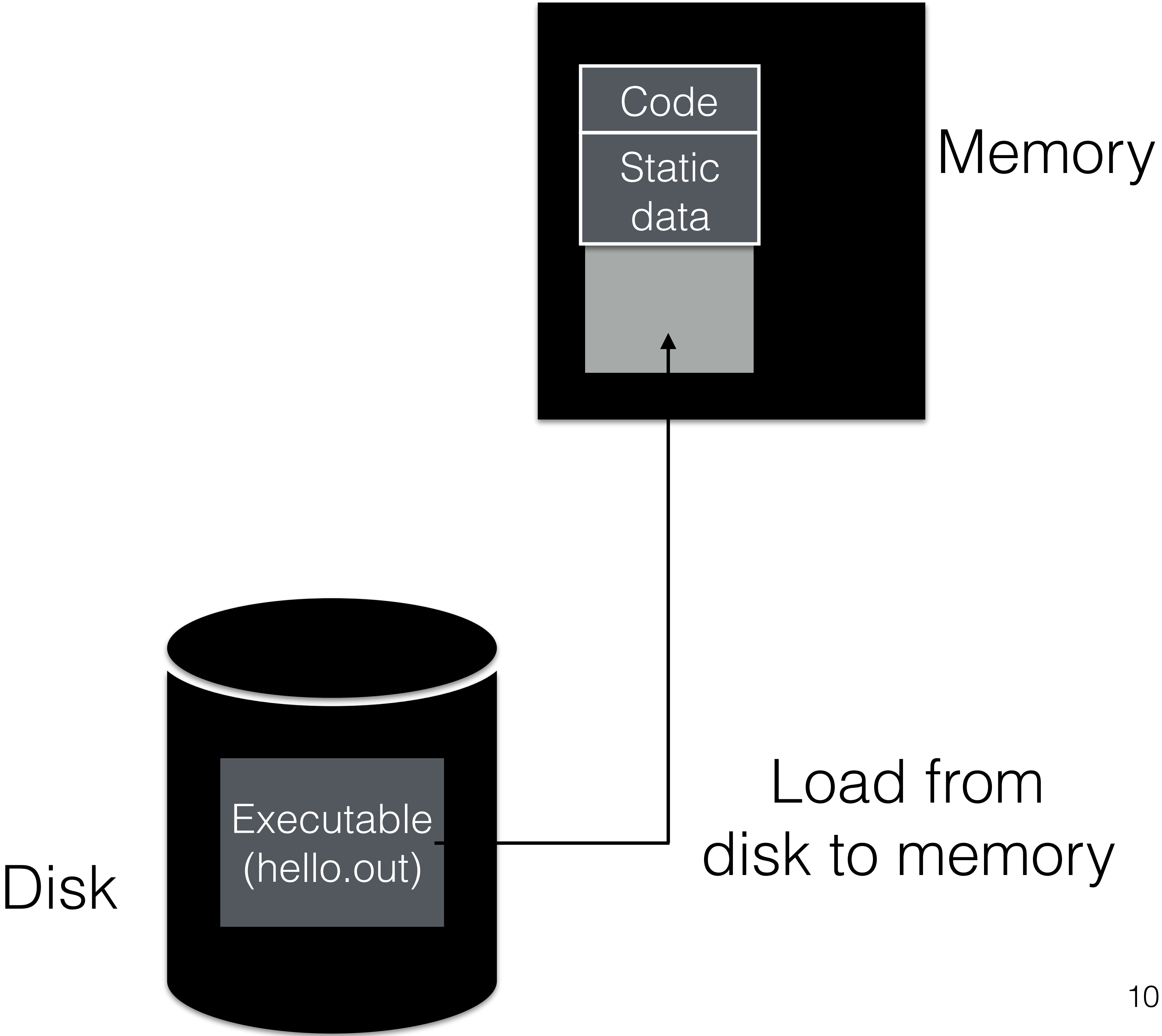

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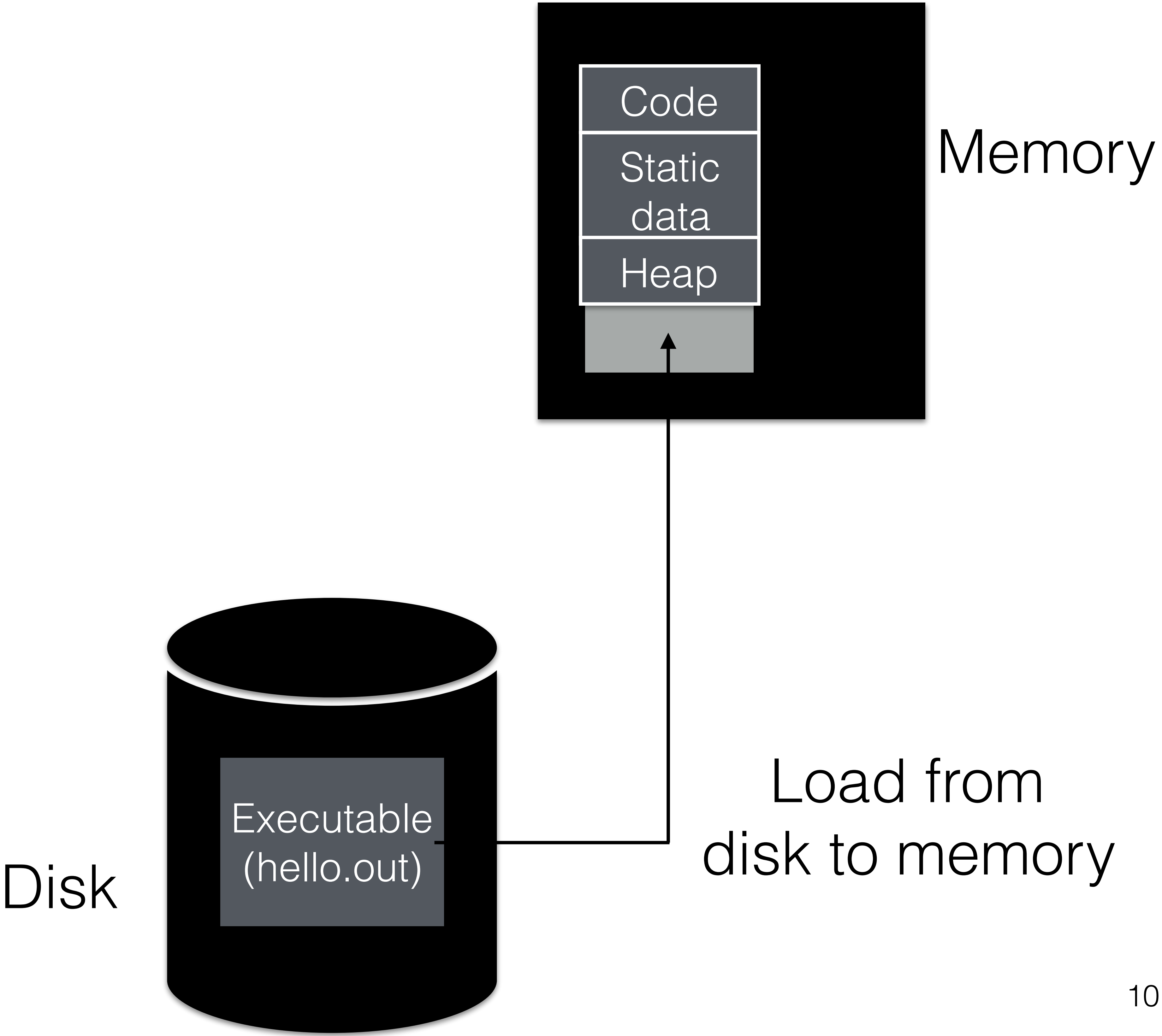

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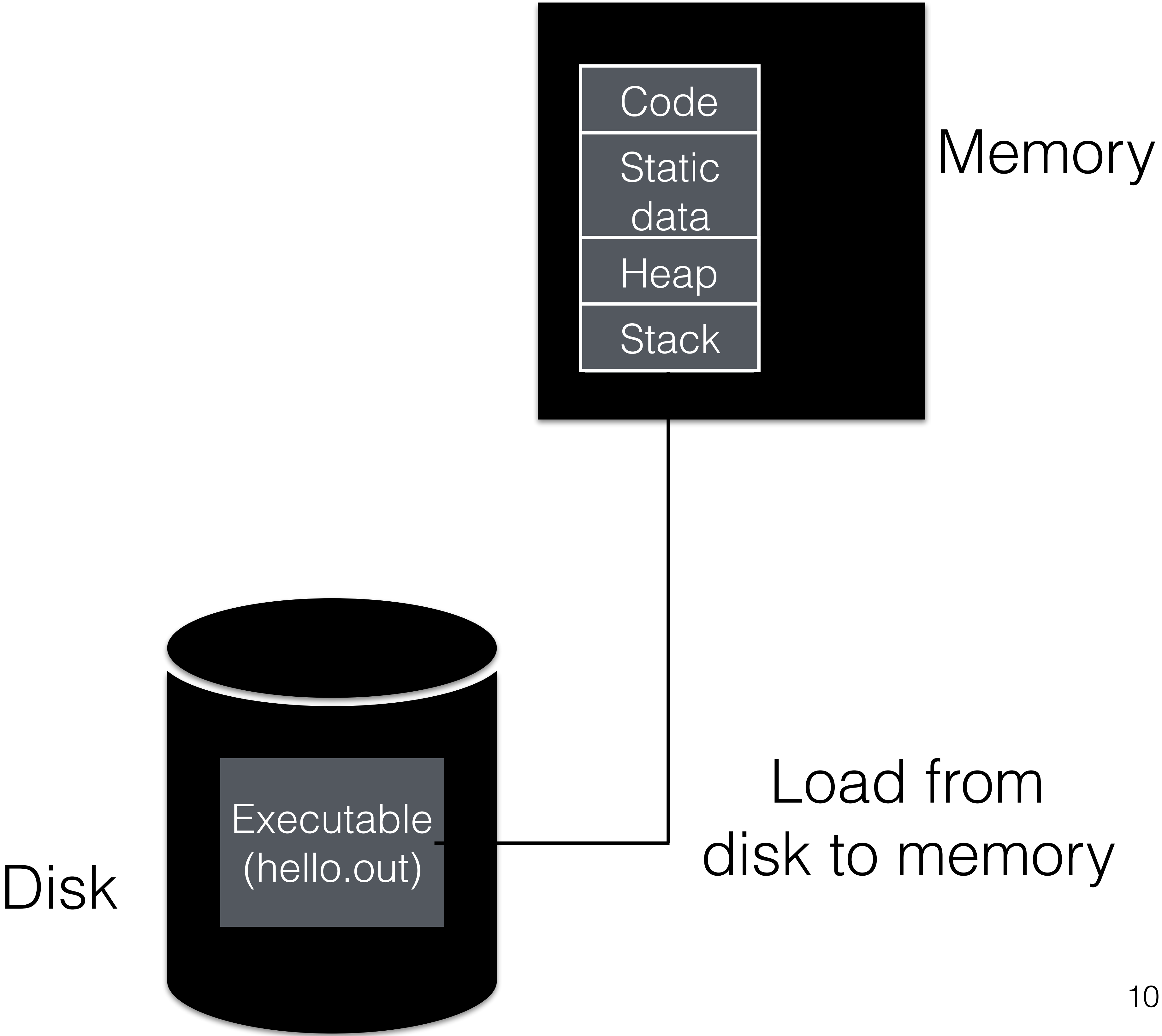

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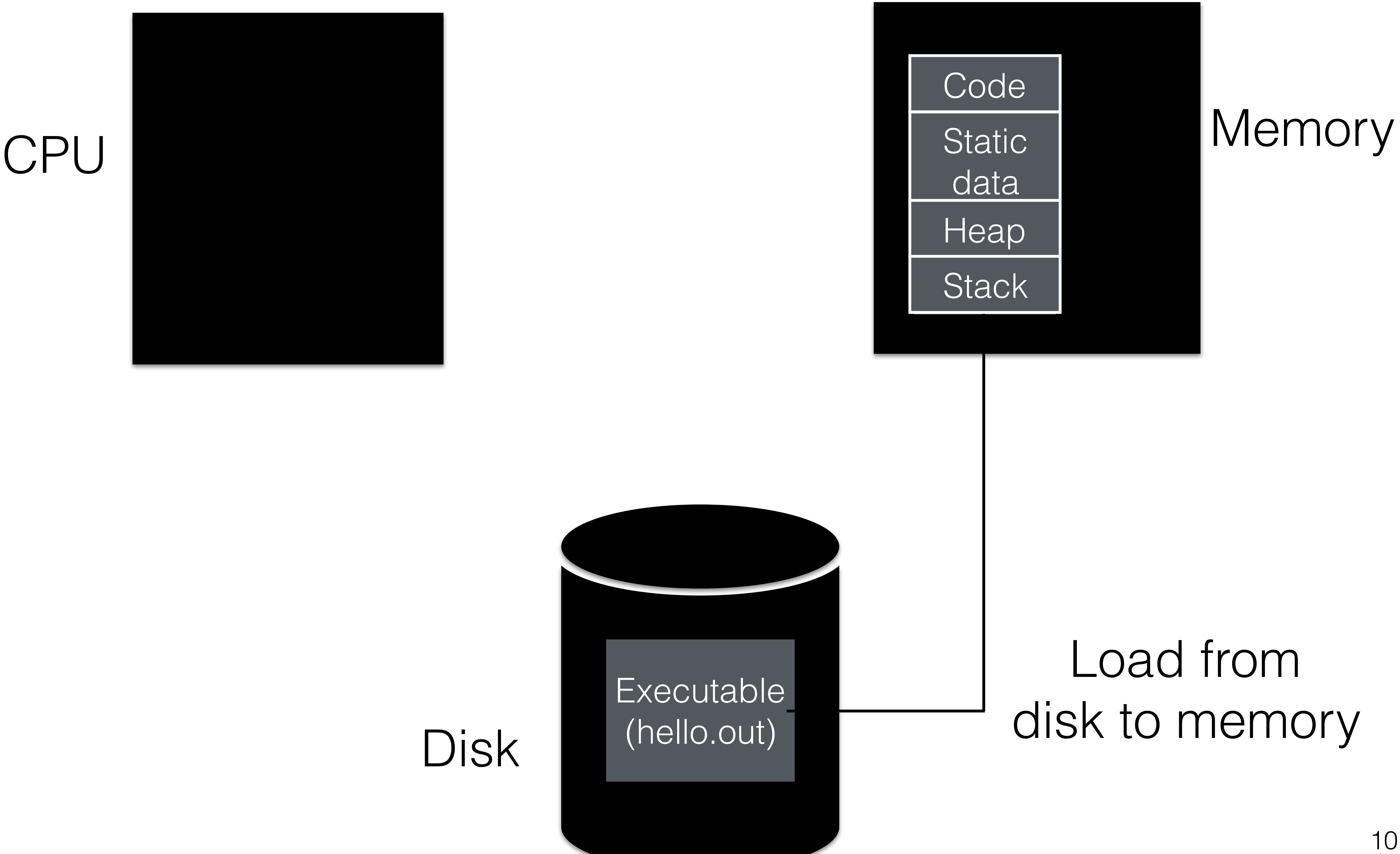

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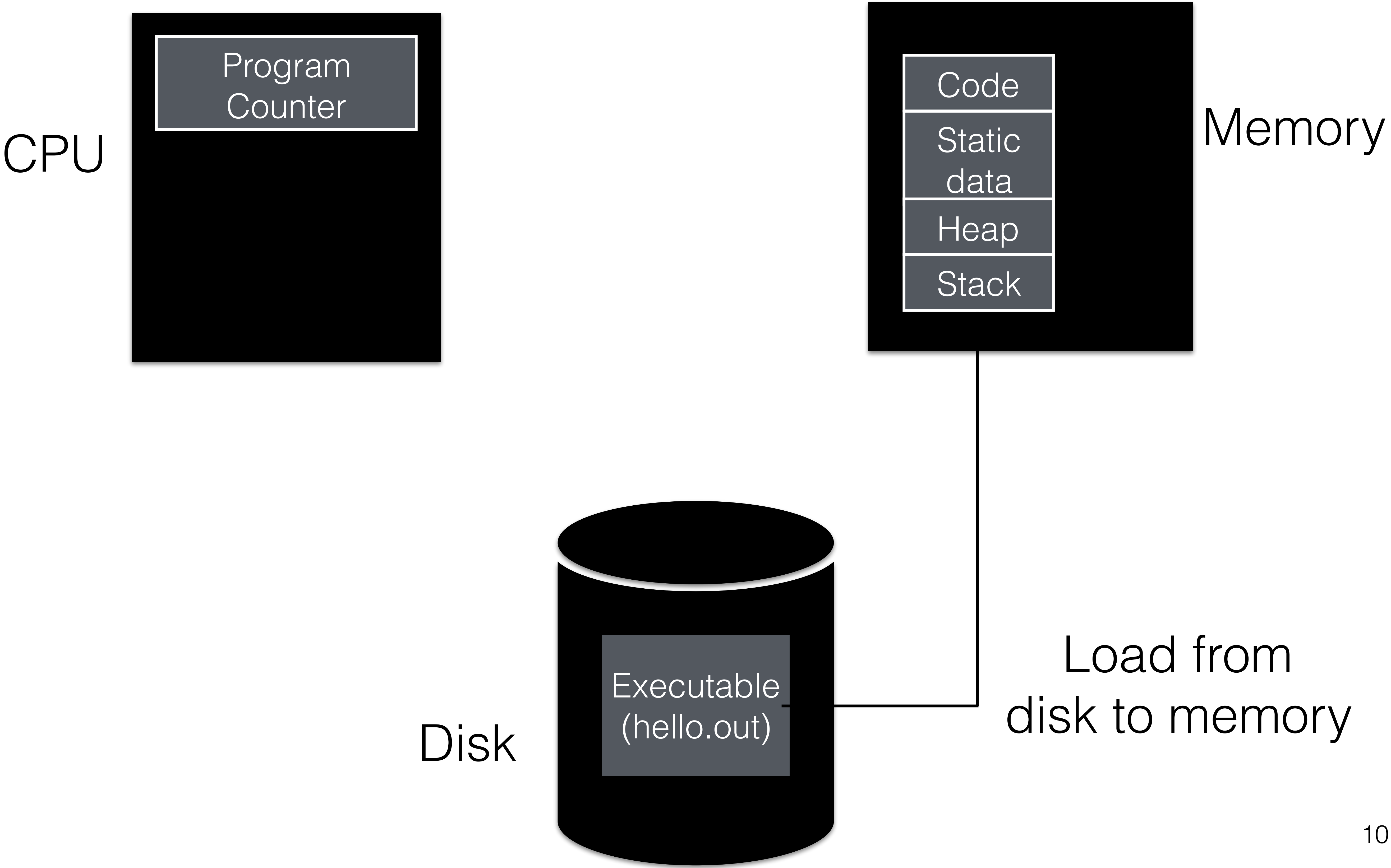

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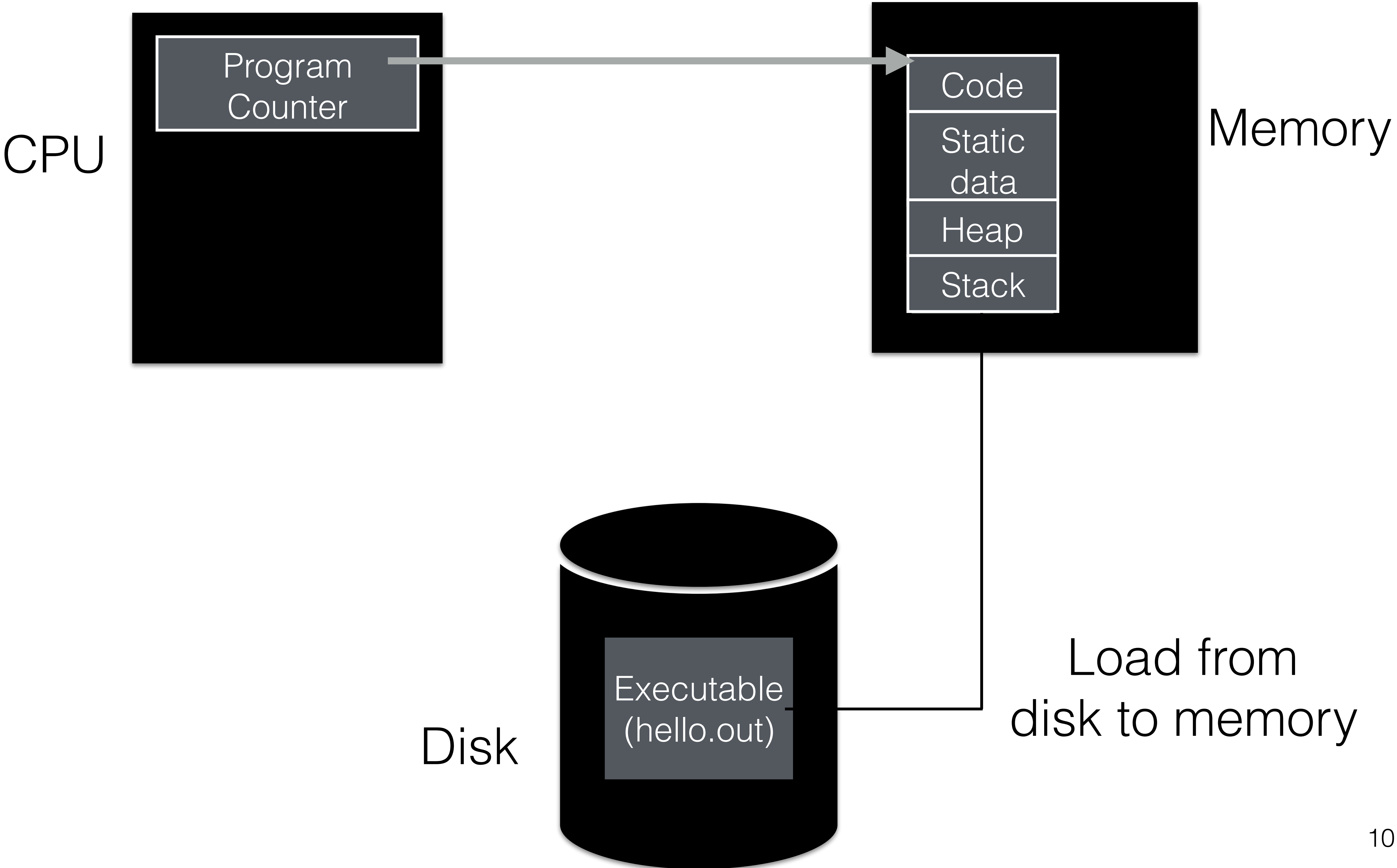

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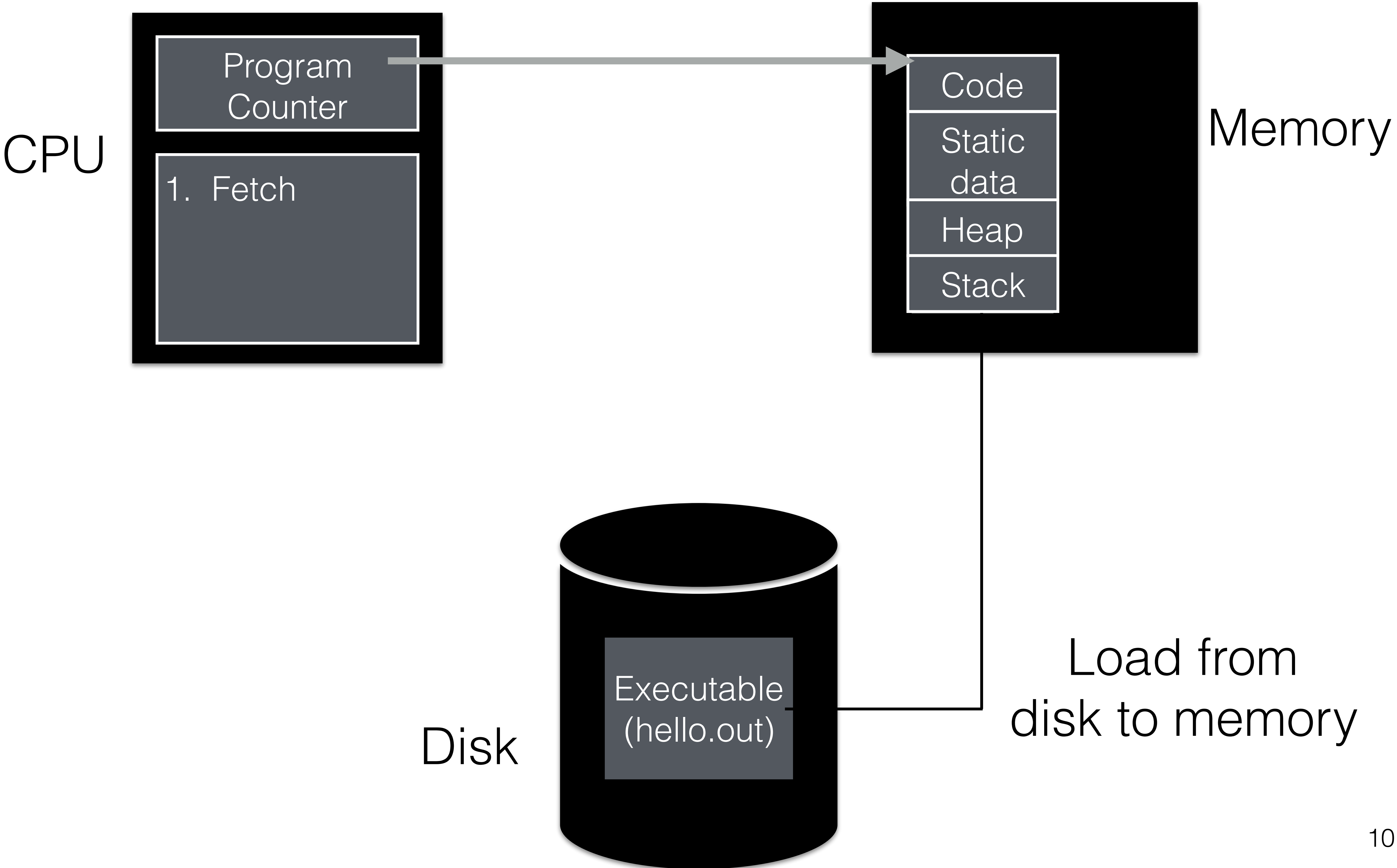

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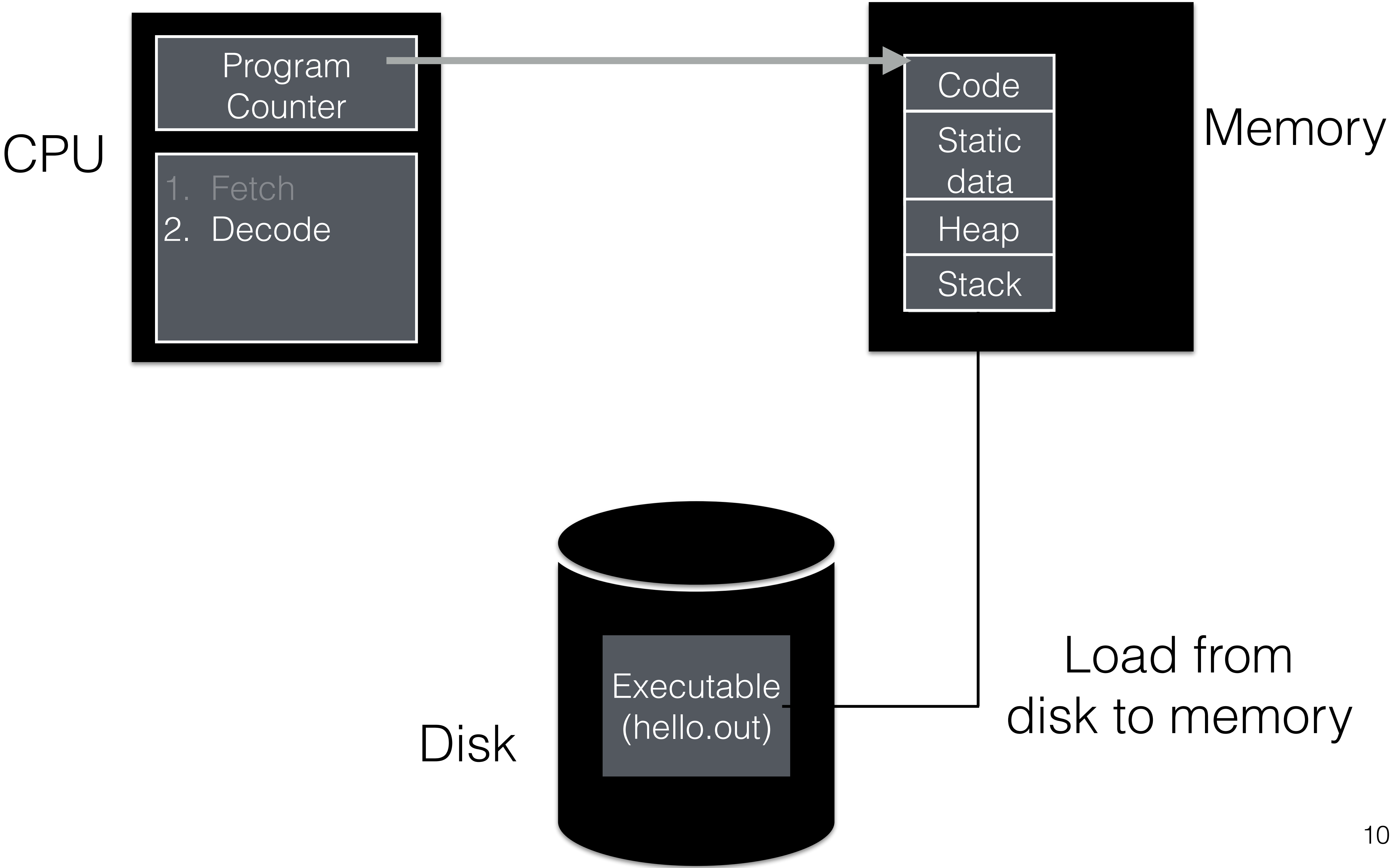

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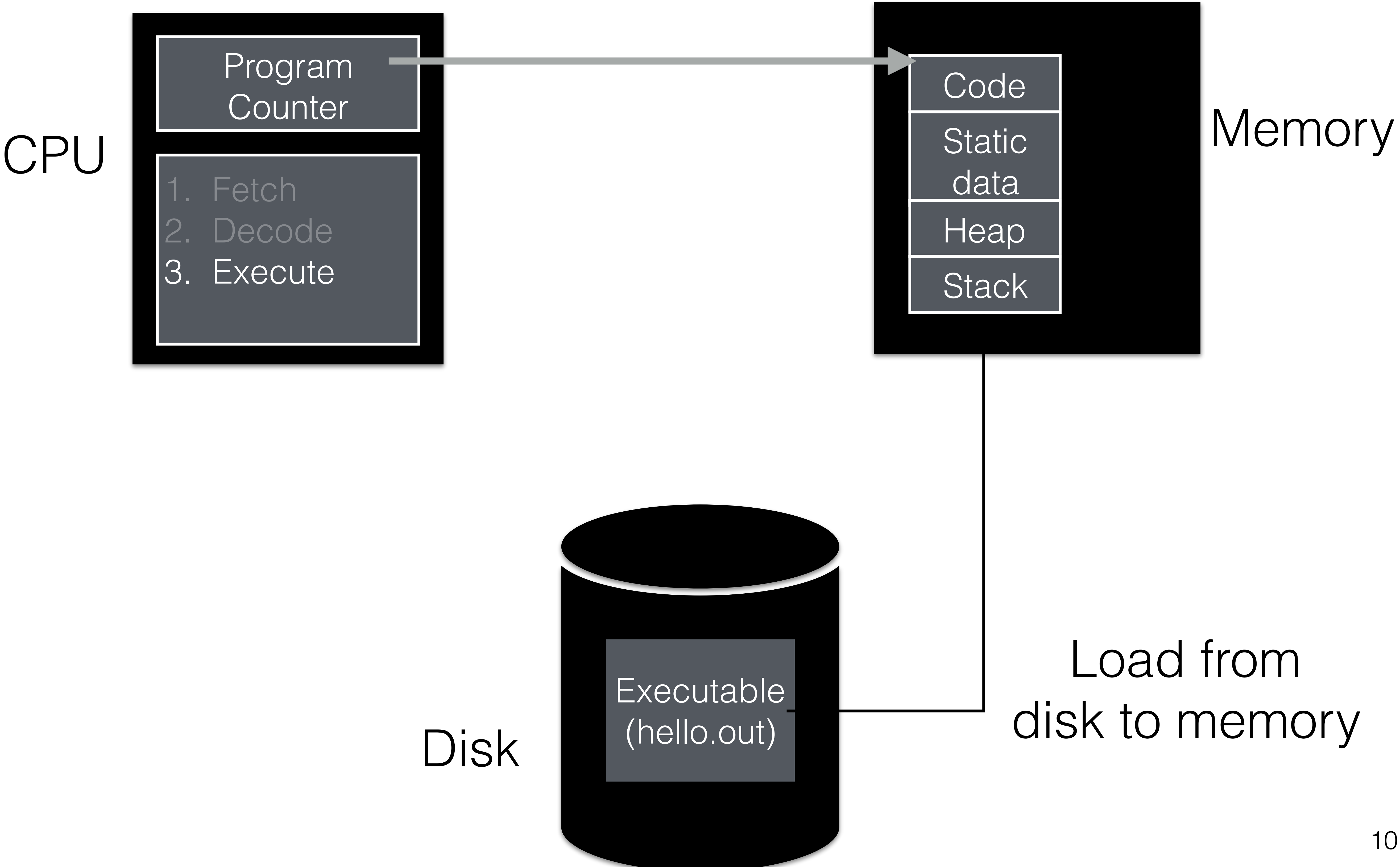

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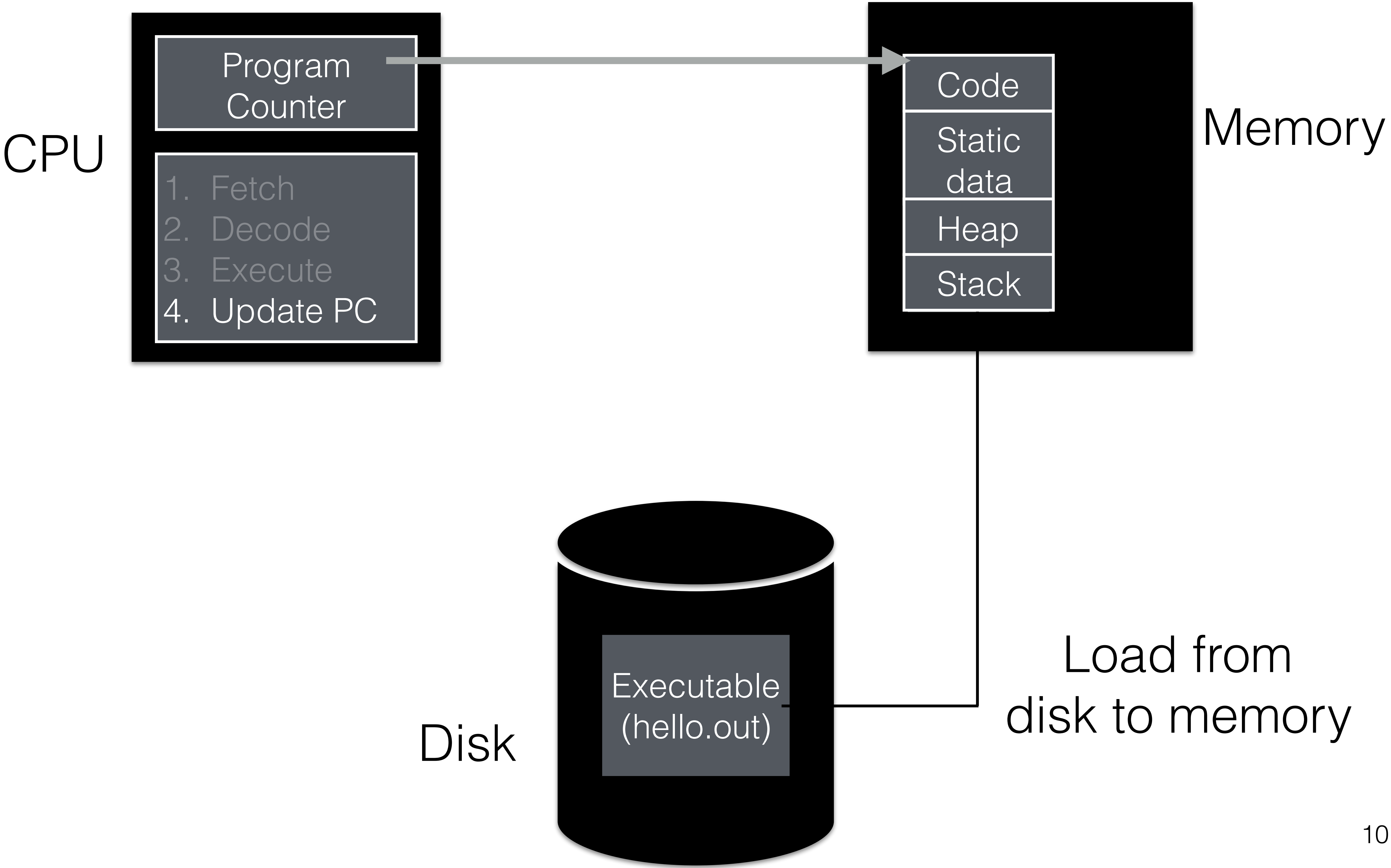

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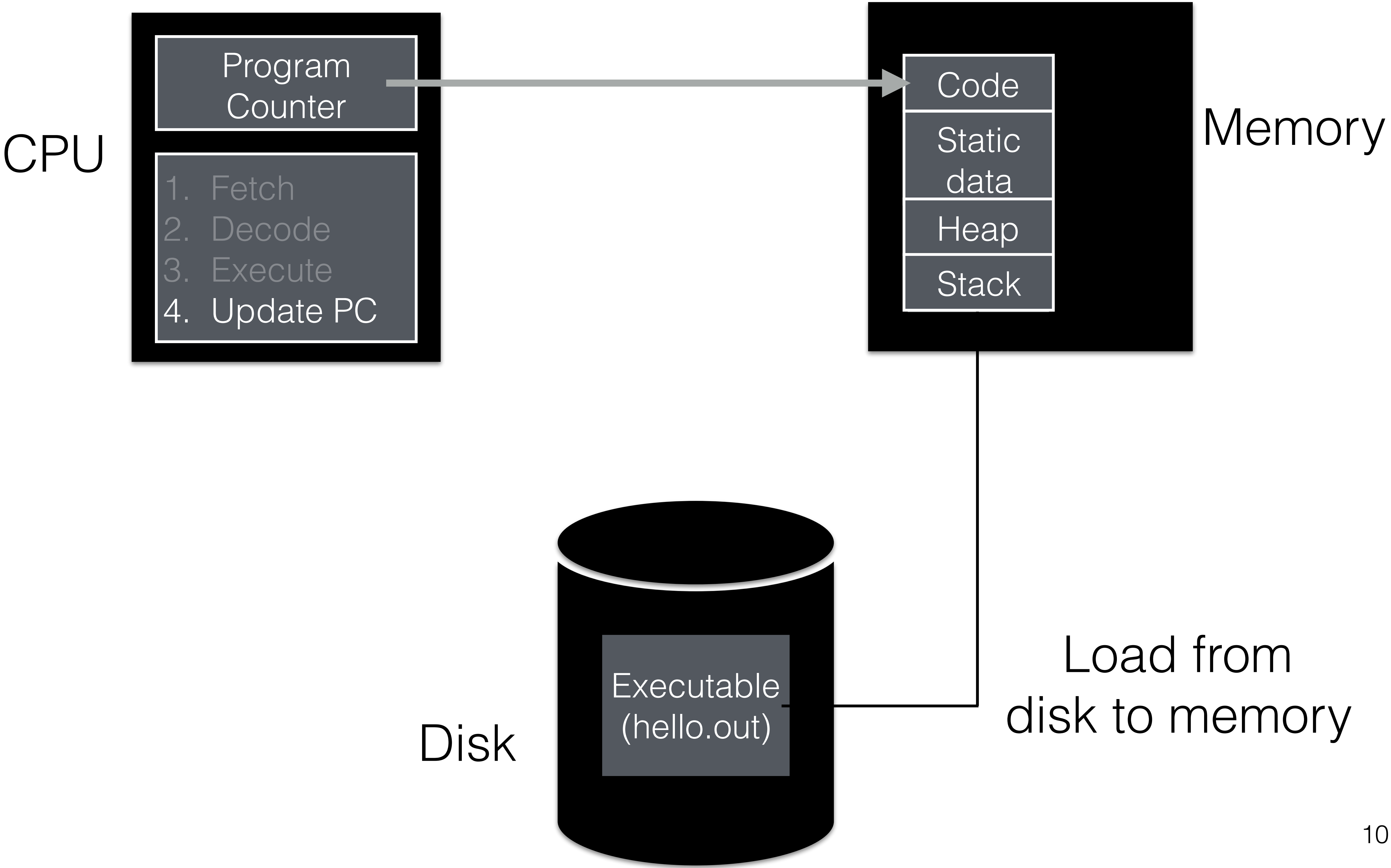

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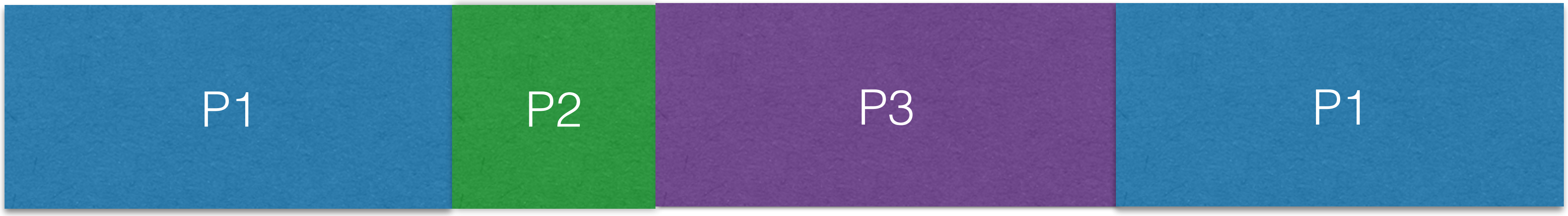

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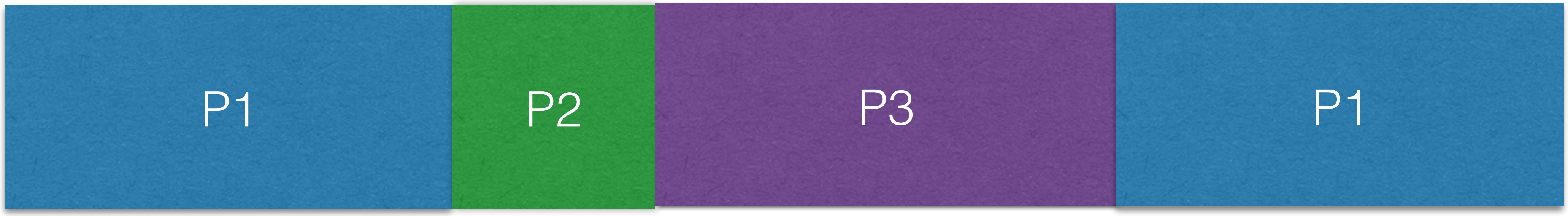

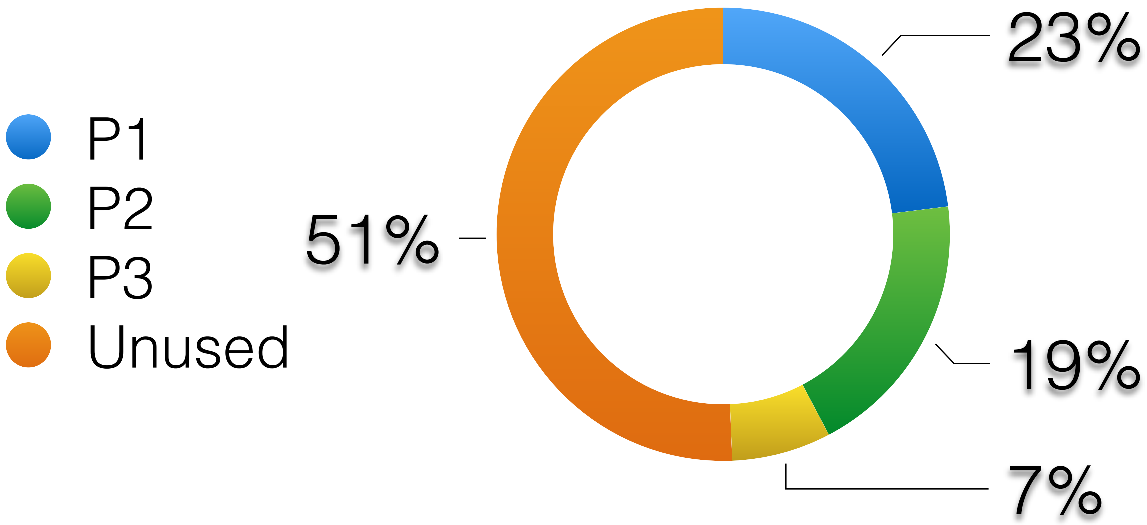

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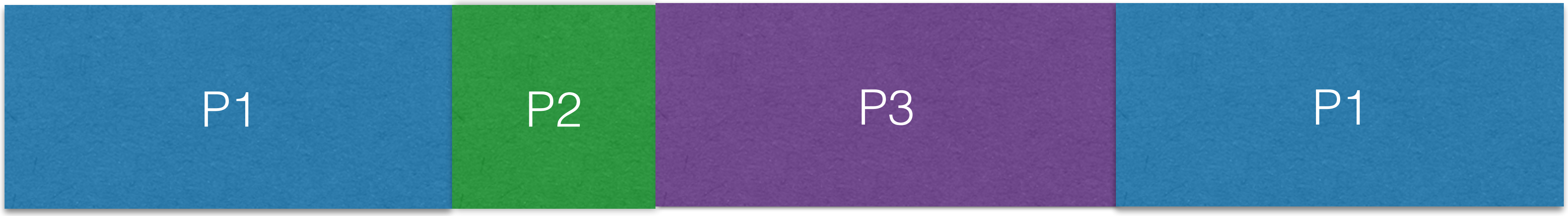

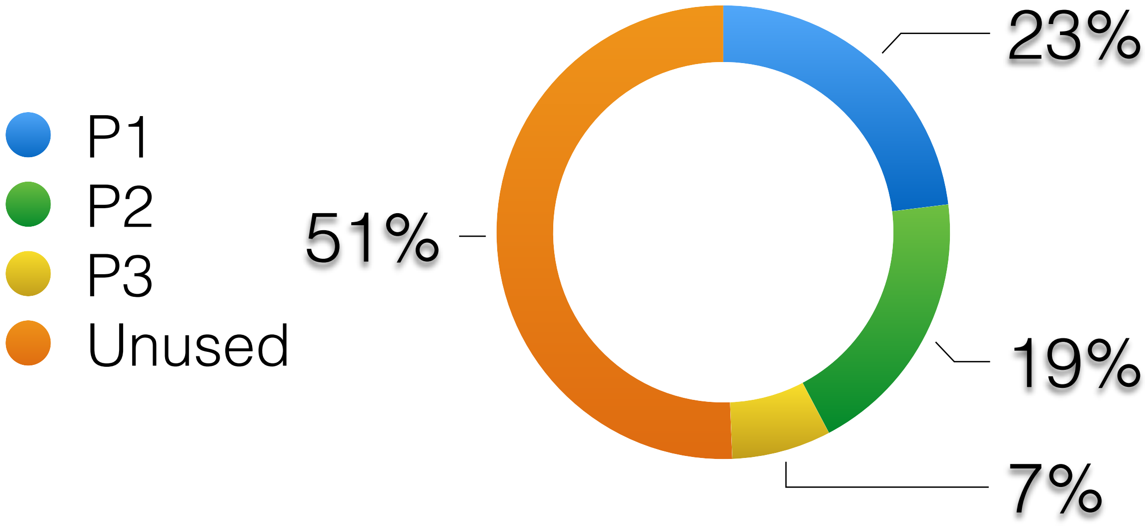

Space sharing for memory

# CPU Virtualisation II

P1

Running

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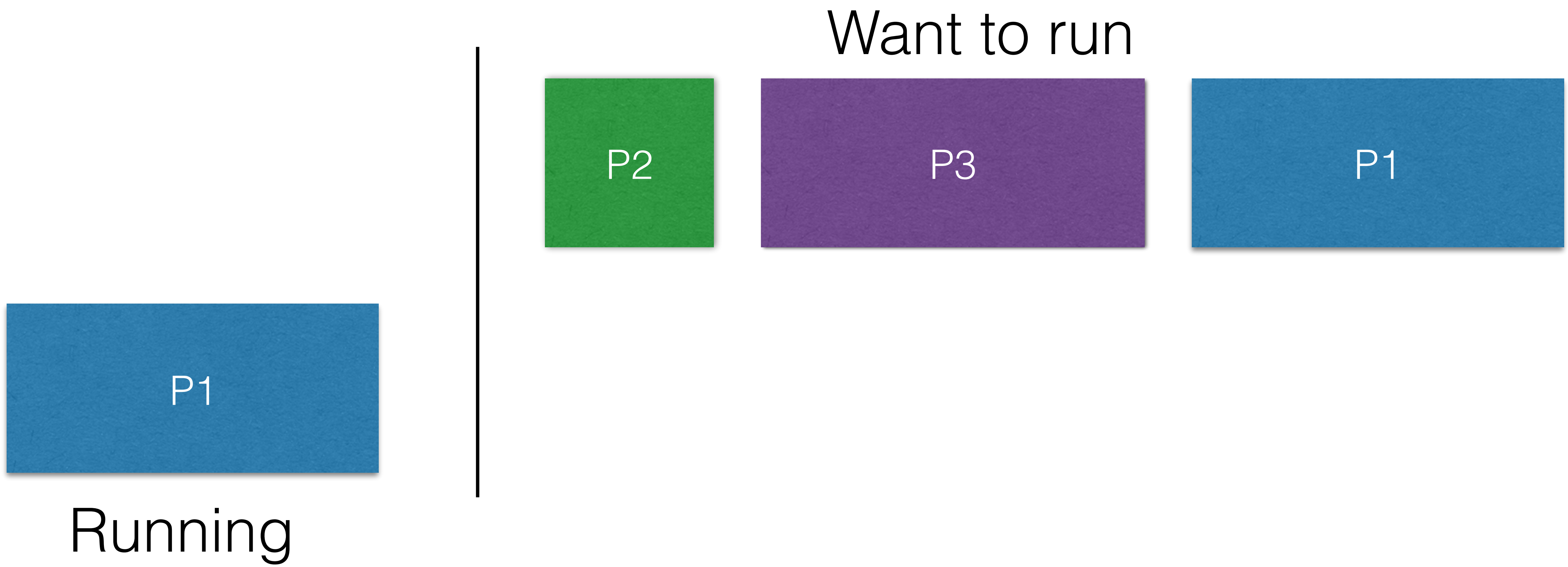

Want to run

P2

P3

P1

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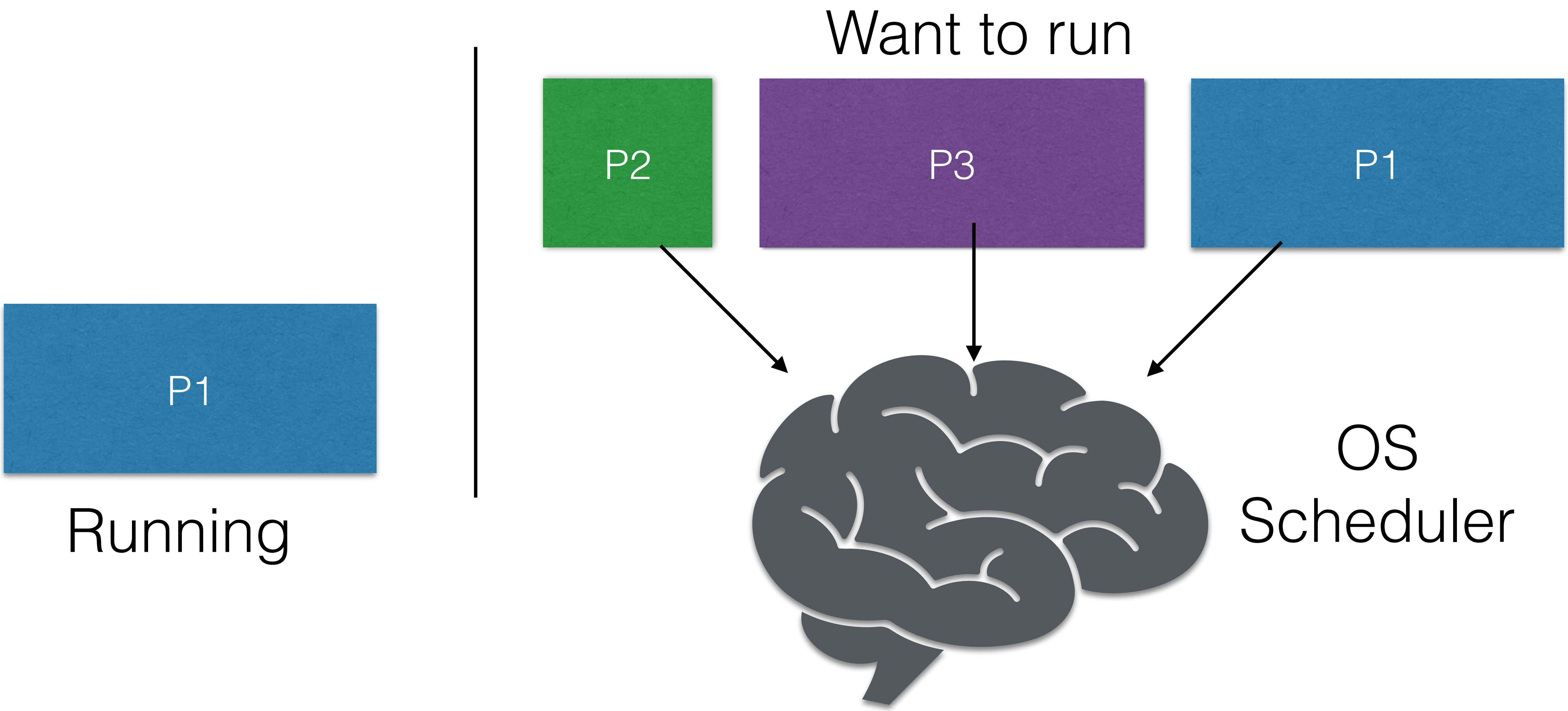

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OS Scheduler

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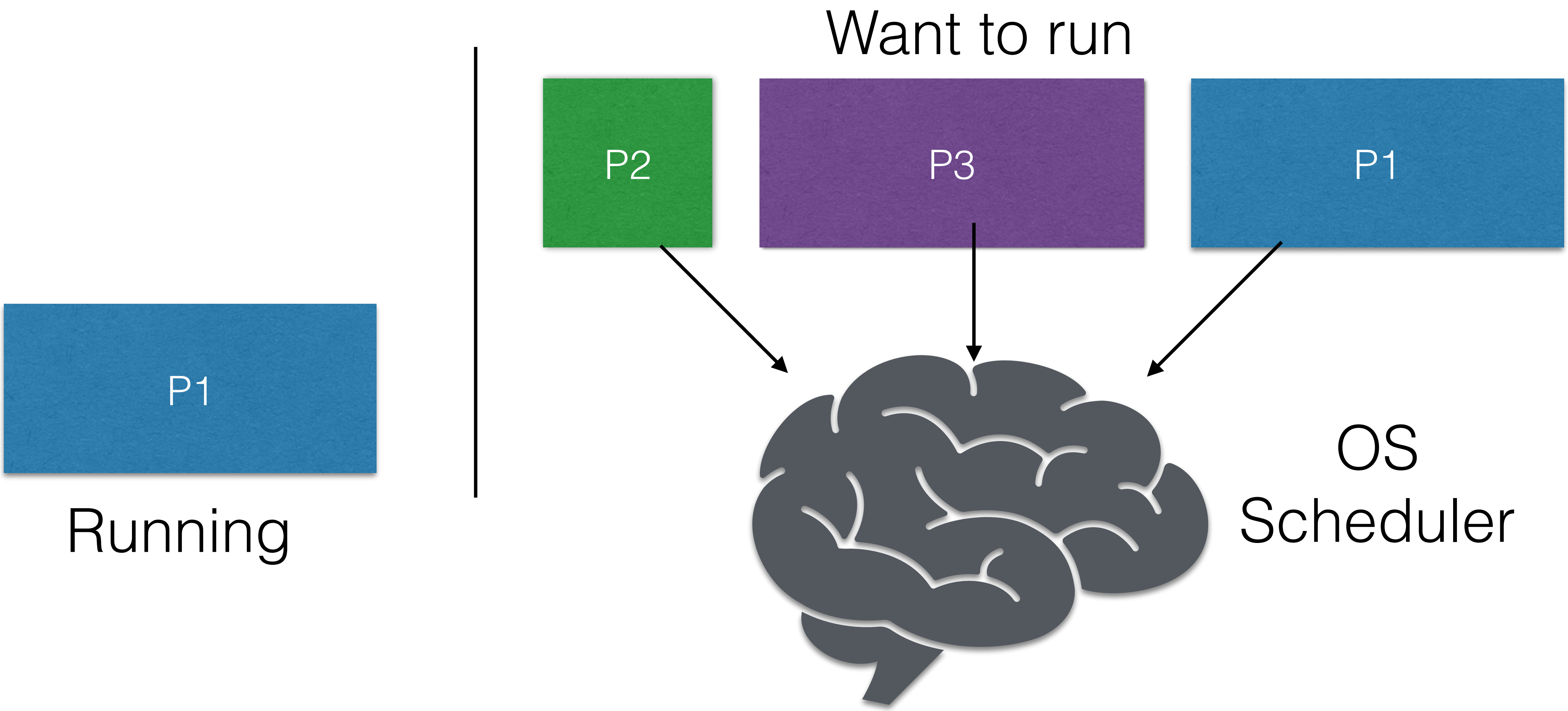

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Next P = f(run time, metric, type of process, …)

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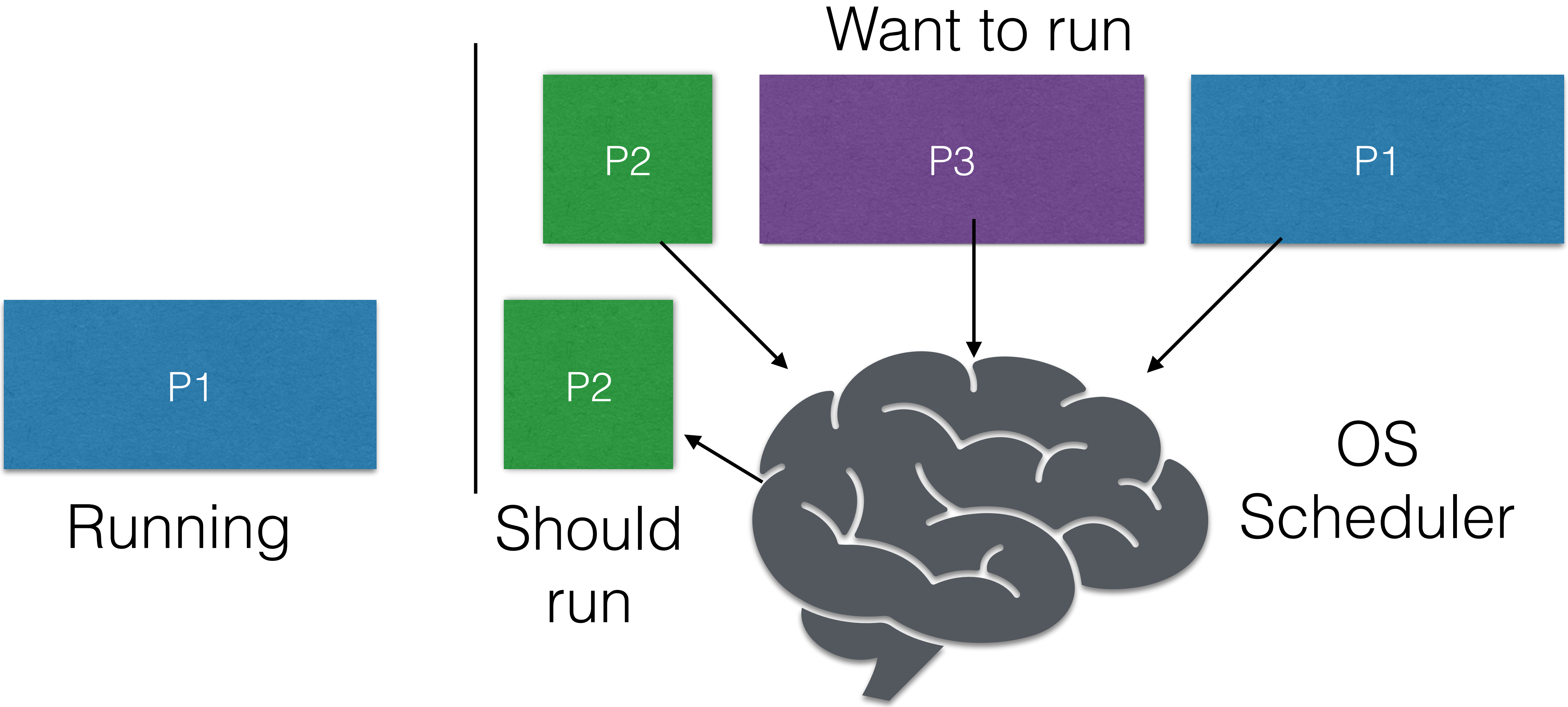

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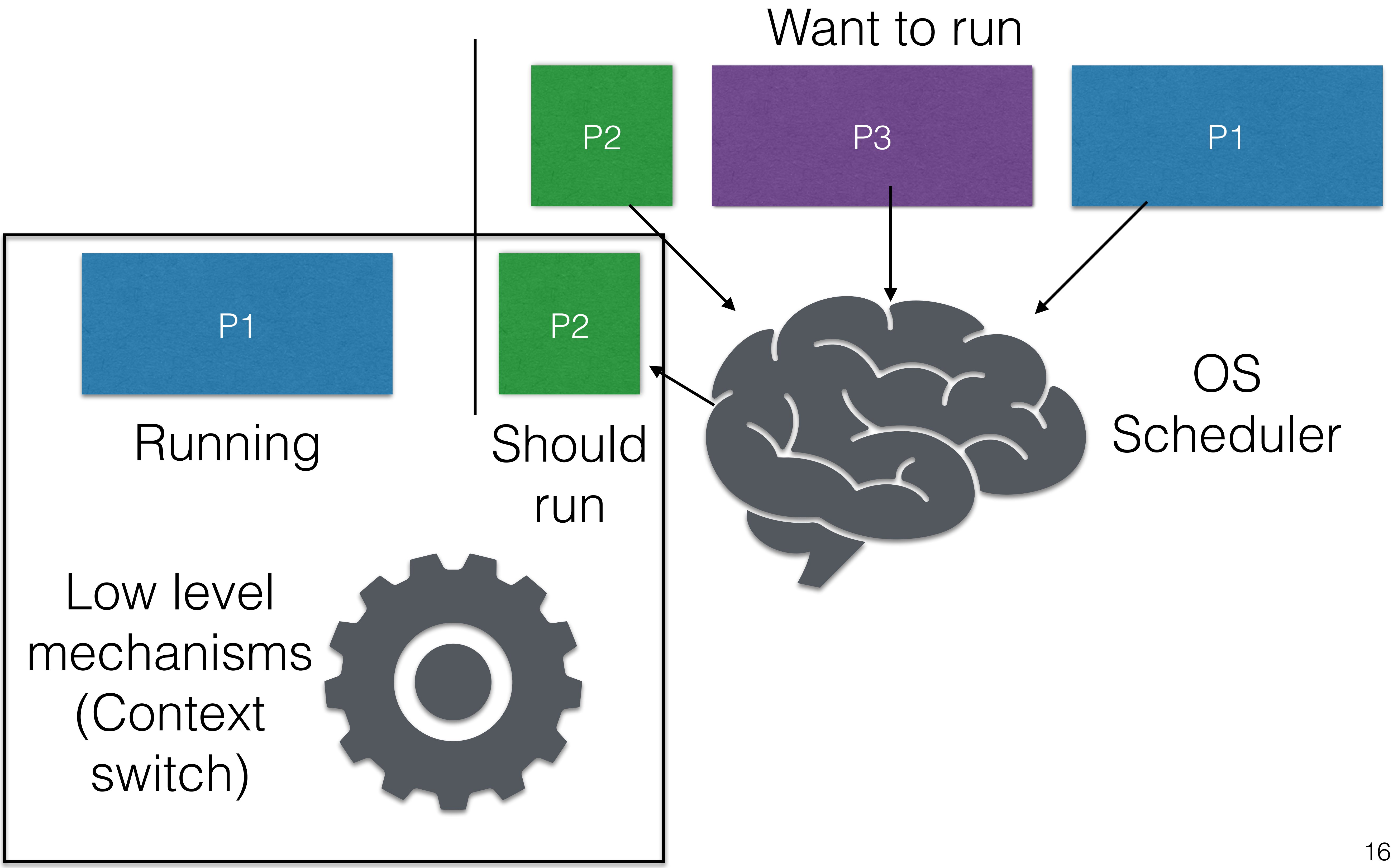

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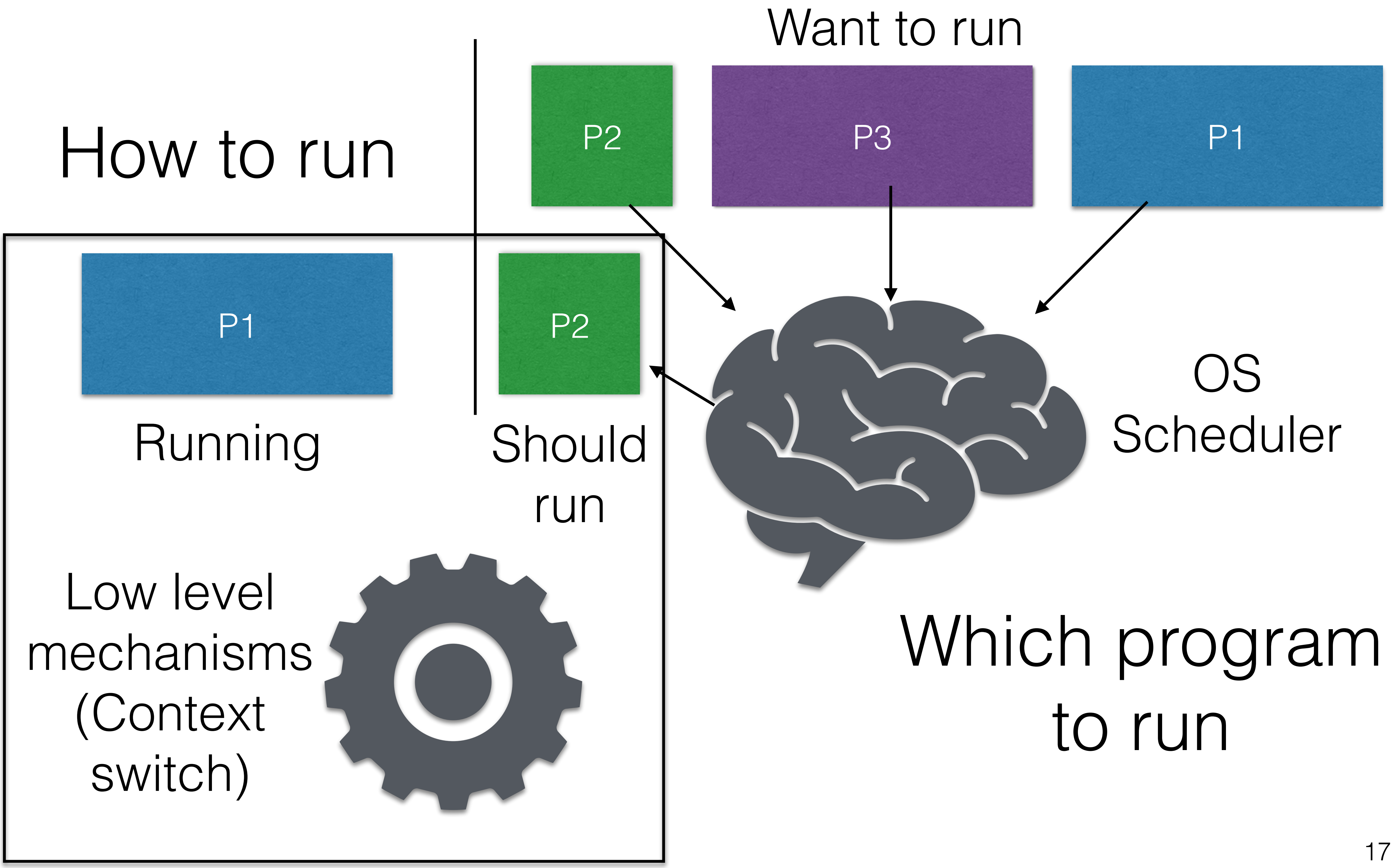

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P3

P1

How to run

P1

Running

P2

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Low level mechanisms (Context switch)

OS Scheduler

Which program to run

# Process API

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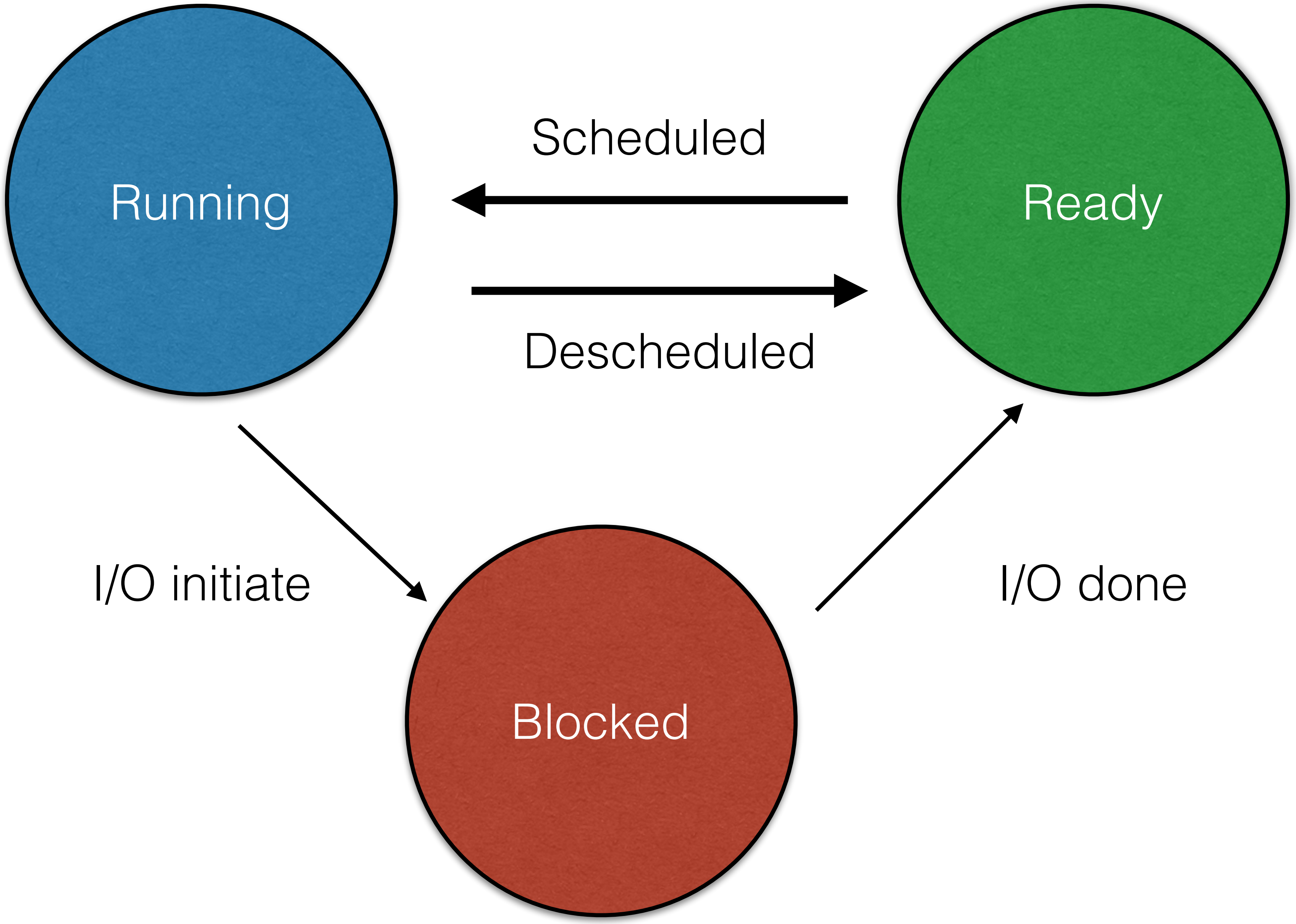

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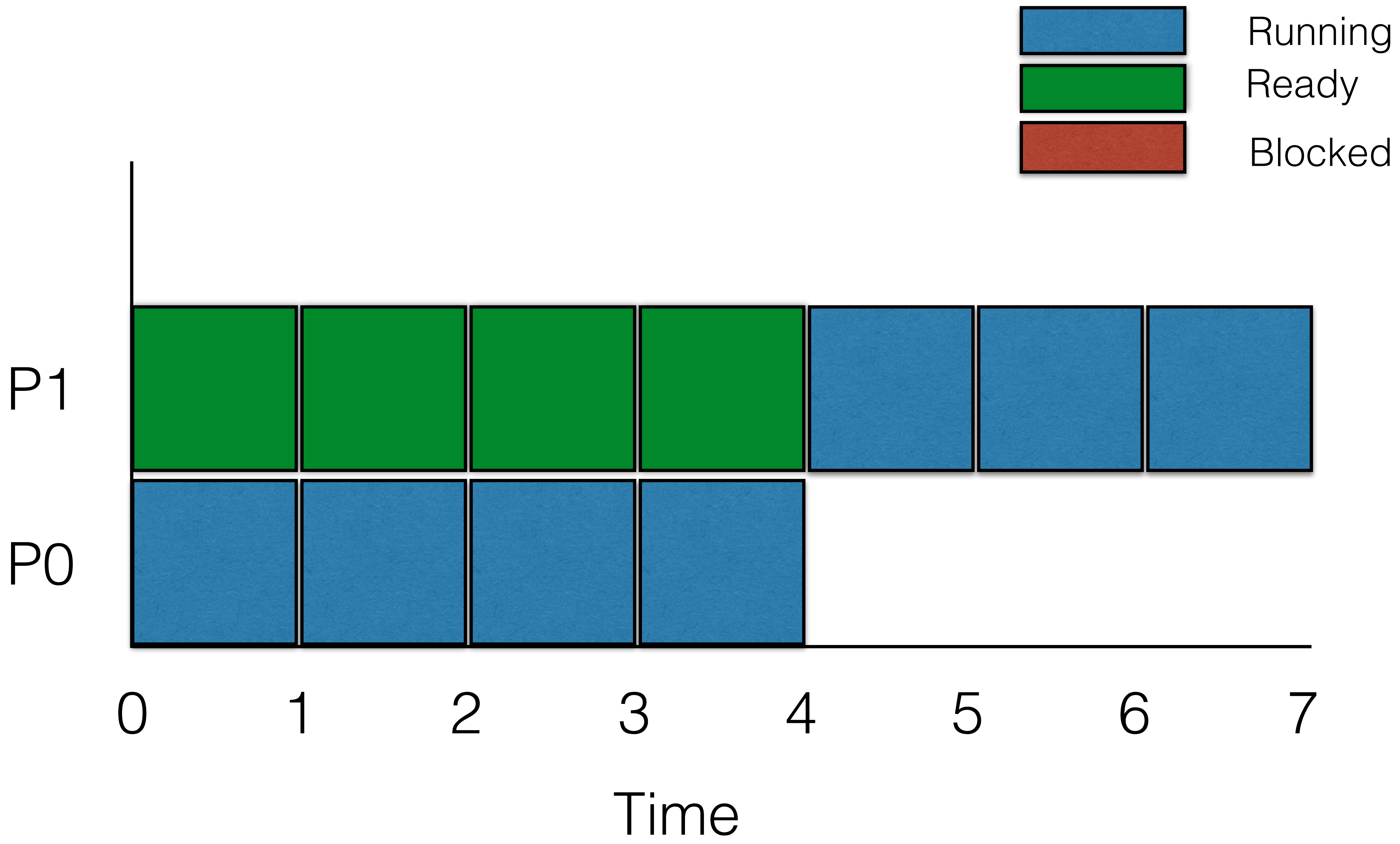

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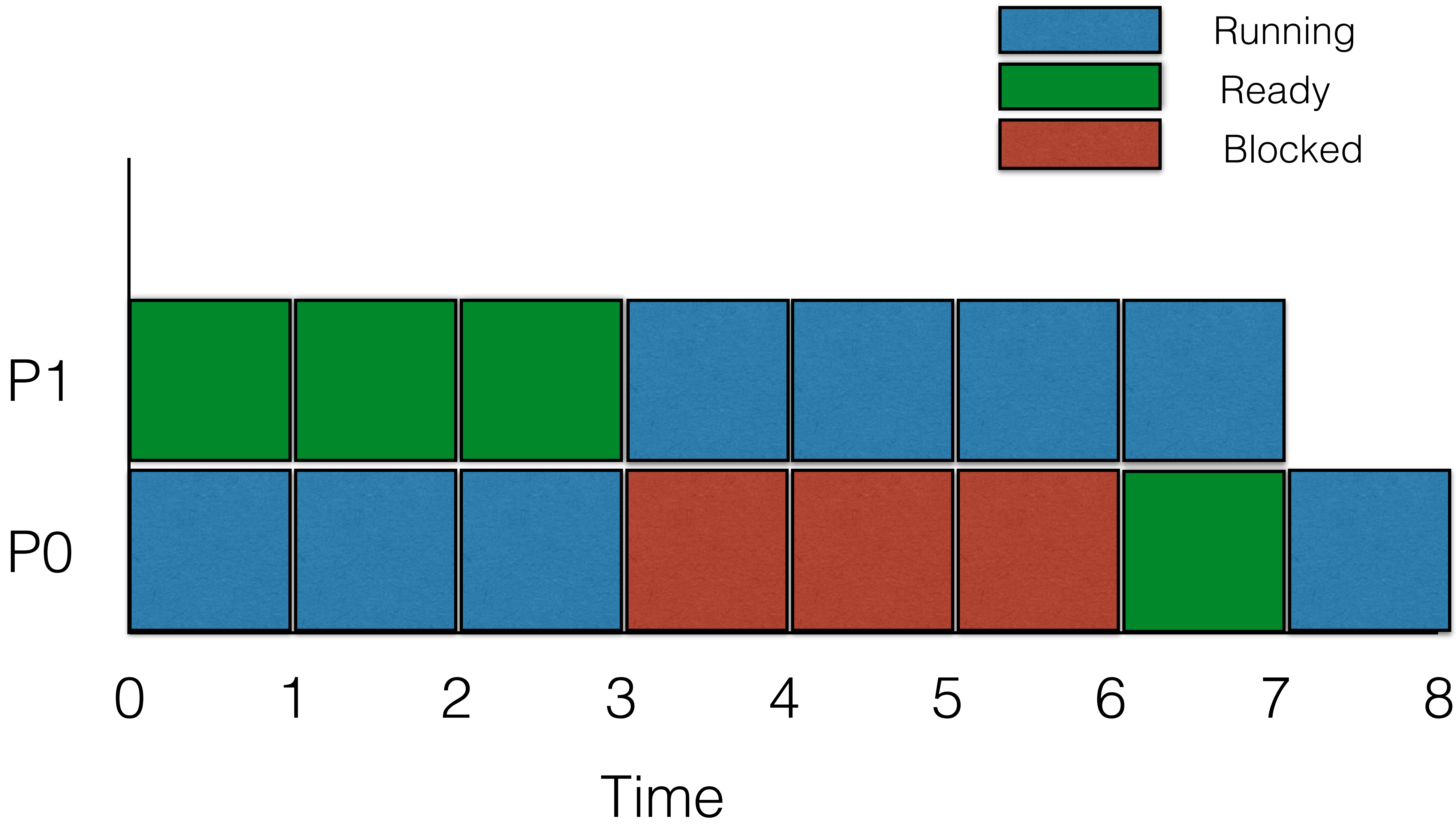
Running
Ready
Blocked
P1
P0
Time