If $73_x + 50_x = 103_x$ then what is base x?

Answer: 12

Using the definition of what it means to write a number in a given base, this means $(7x^1 + 3x^0) + (5x^1 + 0x^0) = 1x^2 + 0x^1 + 3x^0$. Simplifying, we have $12x + 3 = x^2 + 3$, so $12x = x^2$. Thus, either $x = 0$ or $x = 12$. By the definition we used earlier, number bases must be positive integers, so the answer is $x = 12$.

Suppose 18-bit instructions are copied to a CPU's instruction register, and suppose that each instruction dedicates the first 7 bits for the "opcode", with the remaining bits for specifying a memory location. What is the total number of possible memory locations that could be referenced by these instructions?

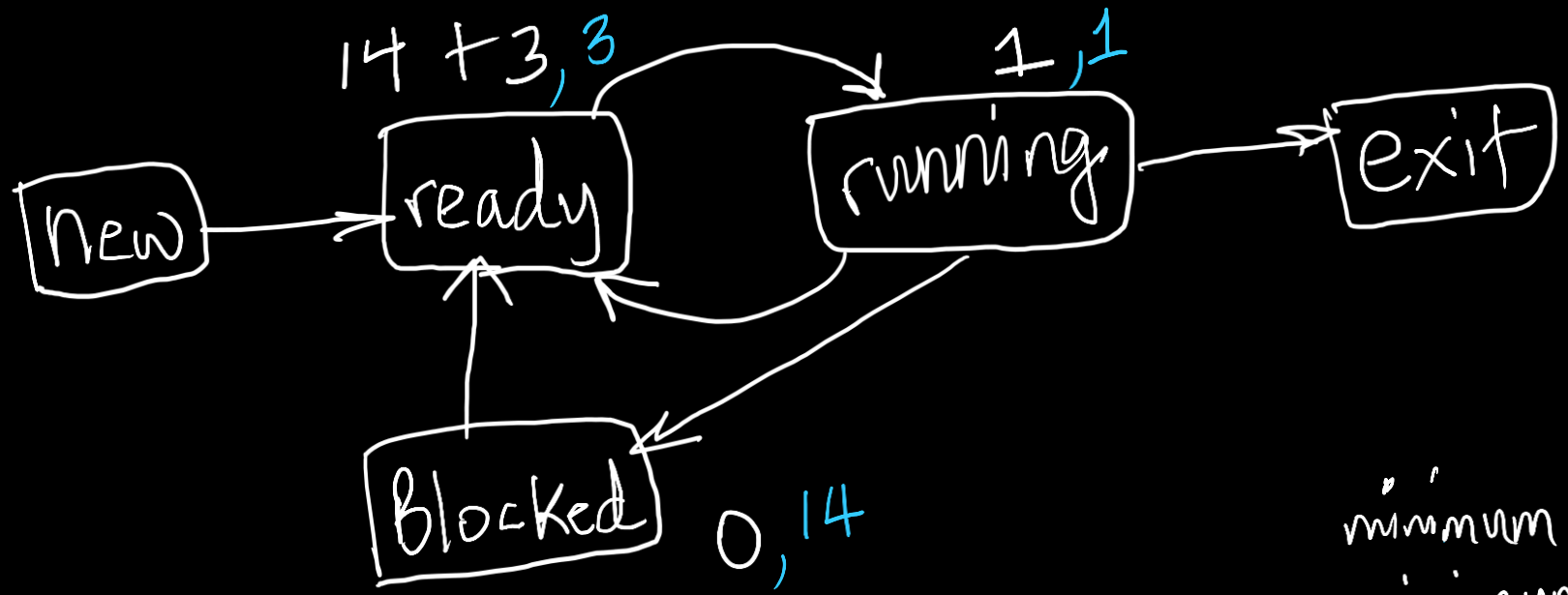
Answer: 2048

Since, in an instruction, 7 bits out of 18 bits are used for the "opcode", this means 18 - 7 = 11 bits are used for the address. So, there are "2 to the power 11" (i.e. 2048) possible memory locations that could be referenced by the instructions.

Assume the 5 state process model. Suppose 18 processes have been admitted from the "new" state and are all executing on a system with a single CPU, where 14 of these processes make I/O requests. Assume that at any given time, one of these processes is assigned to the CPU. Based only on this information, before any of these processes terminate, **what is the minimum number of processes that can be in the:**

1) ready state; 3

2) blocked state? 0



18 processes

14 make I/O req,

4 are CPU bound.

minimum in ready state = 3

minimum in blocked state = 0

[In this question bold text indicates Unix commands]

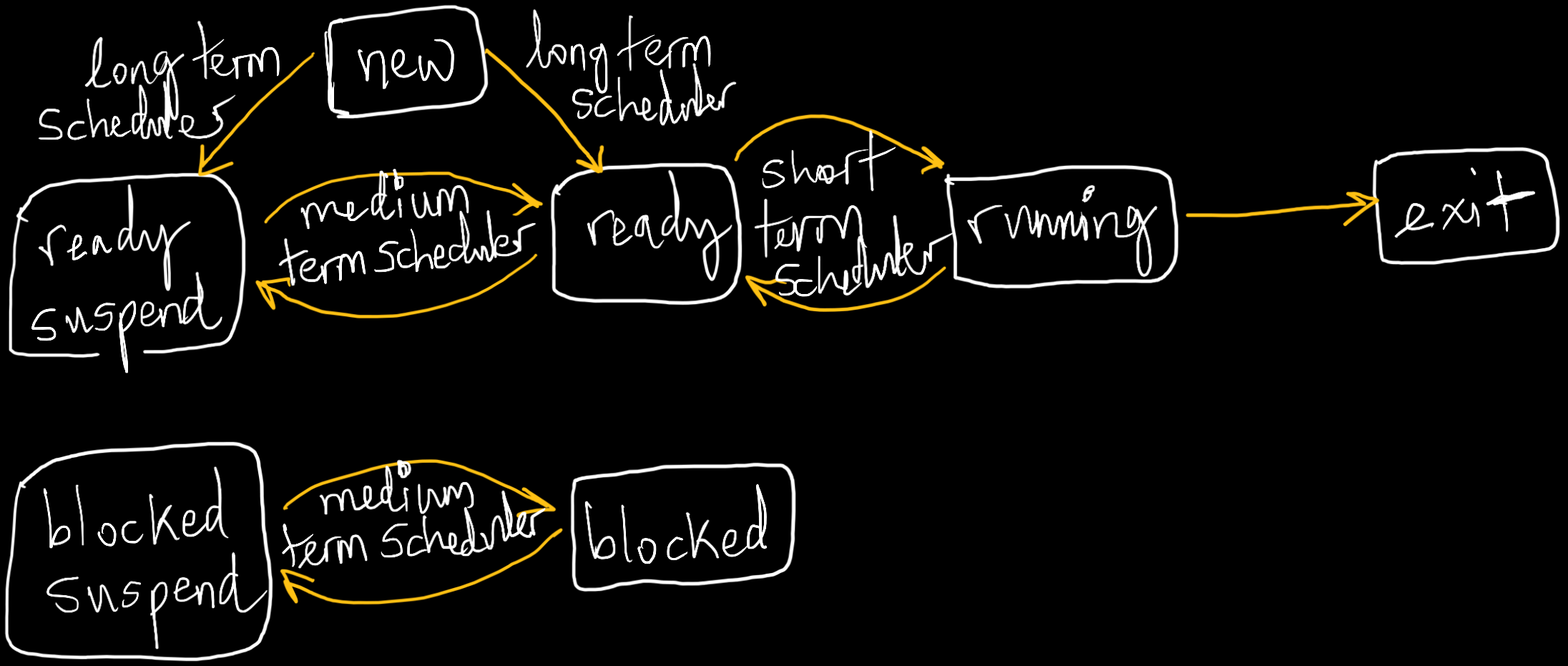
A process is an executing program. The Unix commands **man, echo** and **ls** are programs.
When the compound command **man man ; man echo ; echo $$; ls -al** is successfully executed in a Unix shell, how many processes are created?

Answer: 4

If **foo** is a command, the **man** command will display **foo**'s manual in a Unix shell by executing **man foo** from the shell's command prompt. So, for example, executing **man man** in a shell runs a program -- i.e. creates a process -- that displays the manual for **man**. The **echo** command will print the string it is given -- in this case, the process id (stored in the variable $) for the foreground shell process. And, **ls** lists the files and directories in the present working directory, while "**;**" is simply a delimiter to separate commands at the command prompt.

Therefore, issuing **man man** at the prompt creates a process, then **man echo** creates another process, **echo** creates a 3rd process and **ls -al** creates a fourth process.

See the "Introduction to Linux shells and commands" instructions from tutorial 1 for **man** and **ls.** See "Working with Linux processes" in tutorial 2 for **echo** and delimiting commands at the command prompt using **;**.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new
long term Scheduler
ready suspend
medium term Scheduler
ready
short term Scheduler
running
exit
blocked suspend
medium term Scheduler
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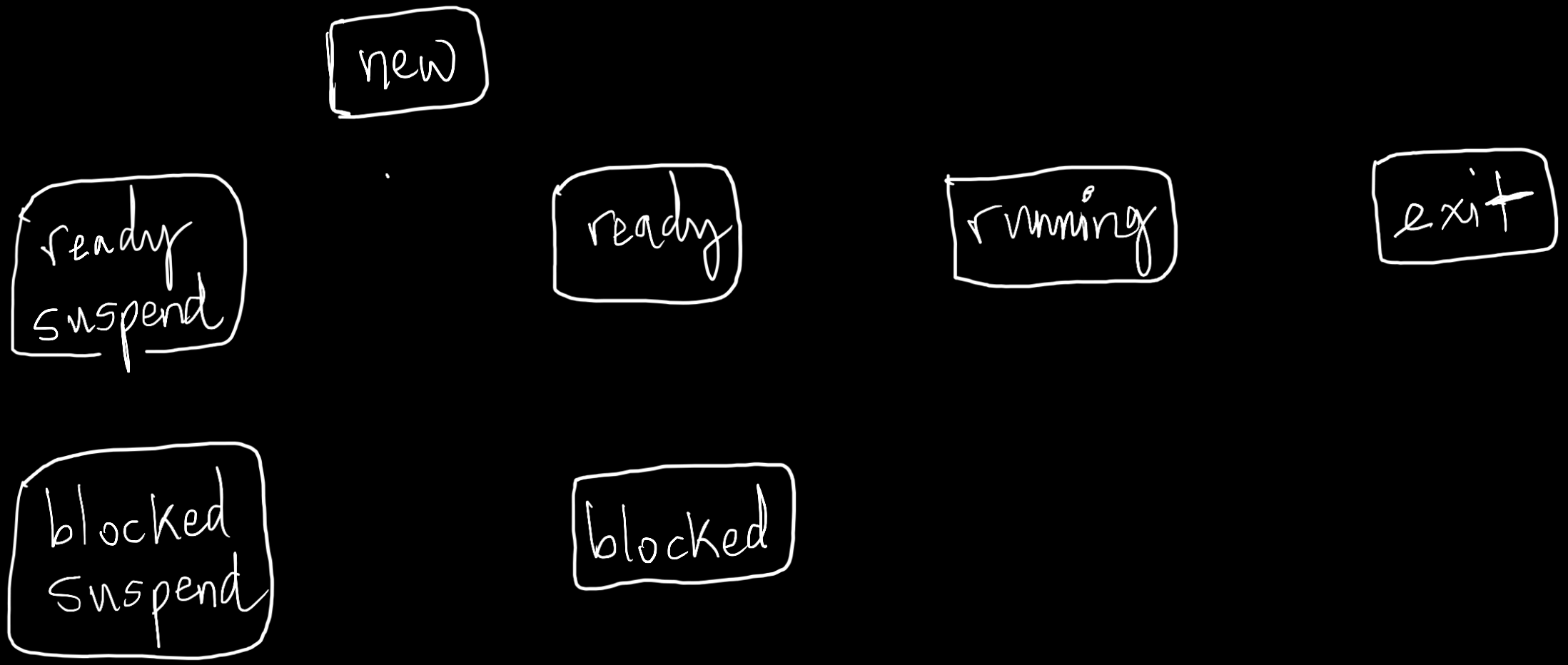
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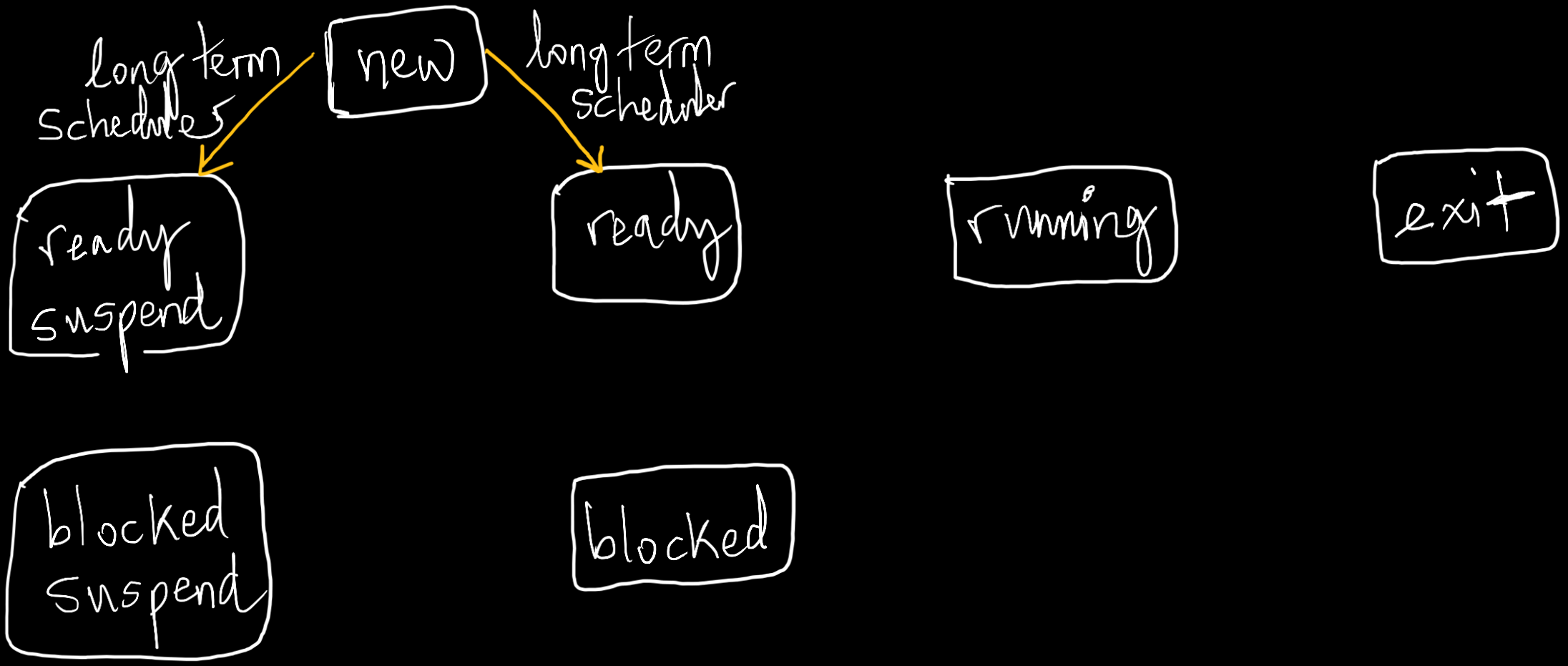
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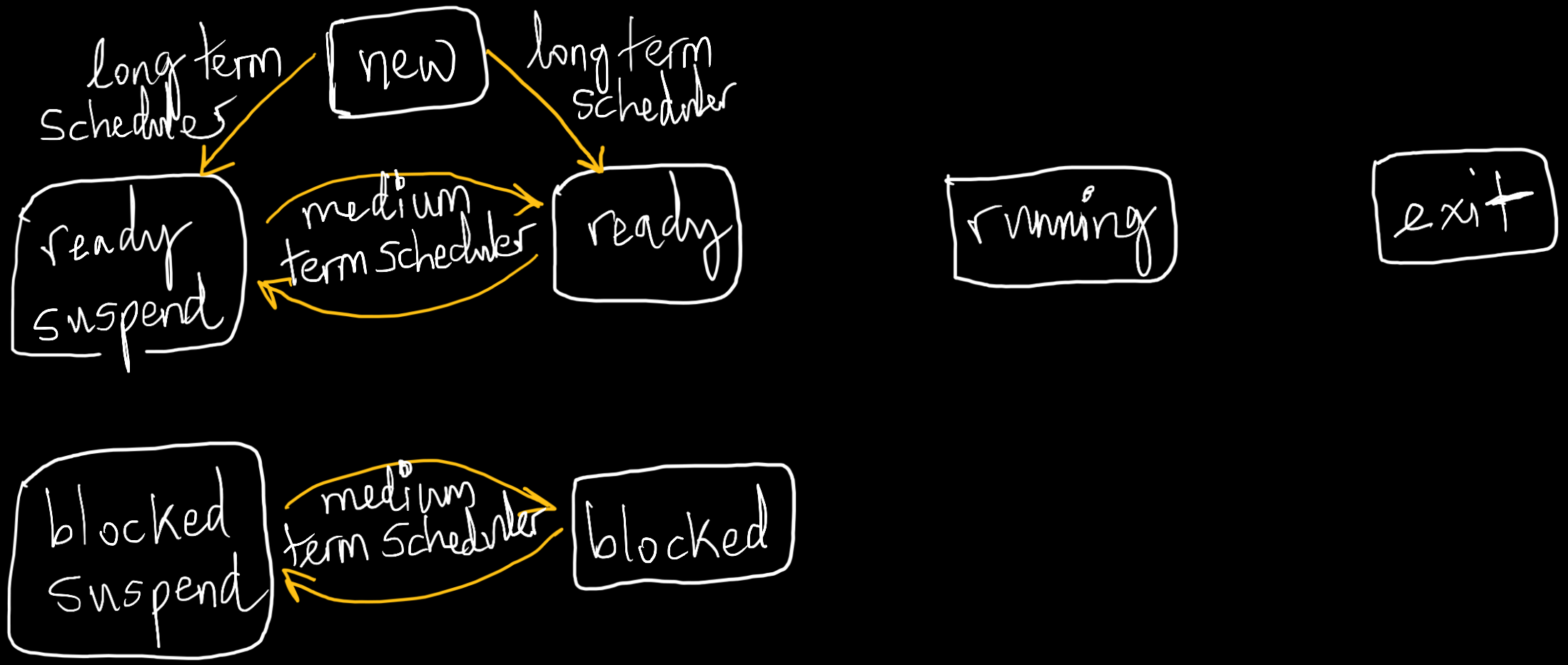
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medium term Scheduler
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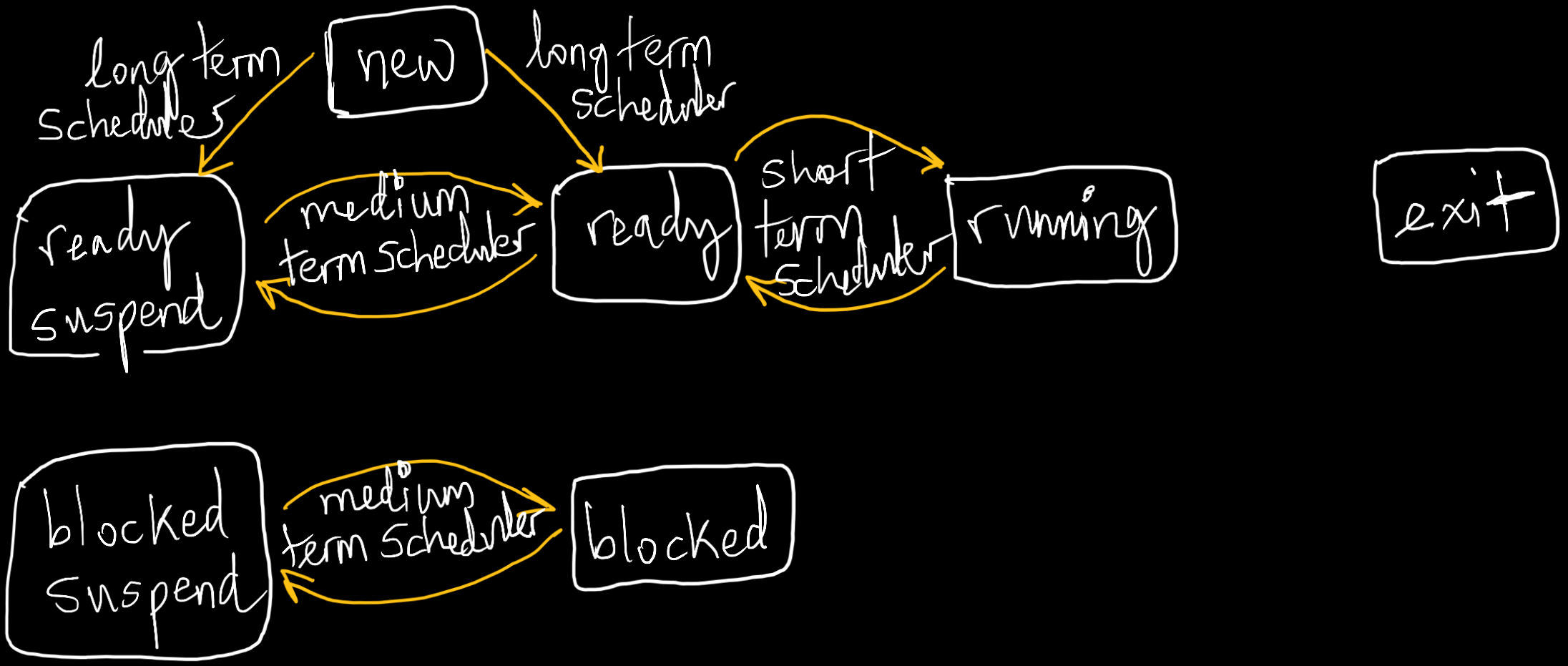
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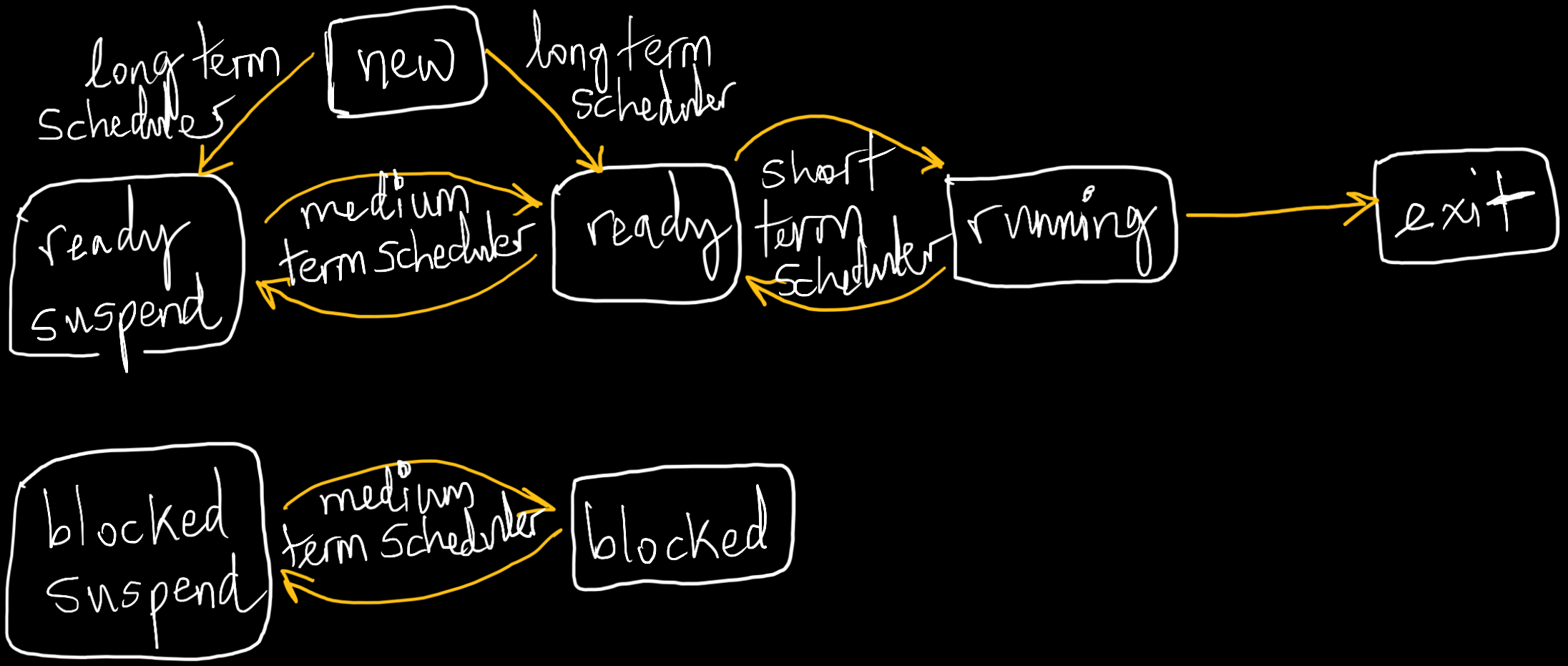
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