Ex-1: Properties of Scheduler

JOBS

0,B,1,10

1,B,2,10

2,C,1,4

10,A,1,4

11,A,2,4

...

SCHEDULER

Quantum = 0

Level			
Type	1st	2nd	3nd
L1,A			
L2,B	0,B,1,10		
L3,C			

A > B > C   Priority of FIFO's

CPU

0,B,1,10
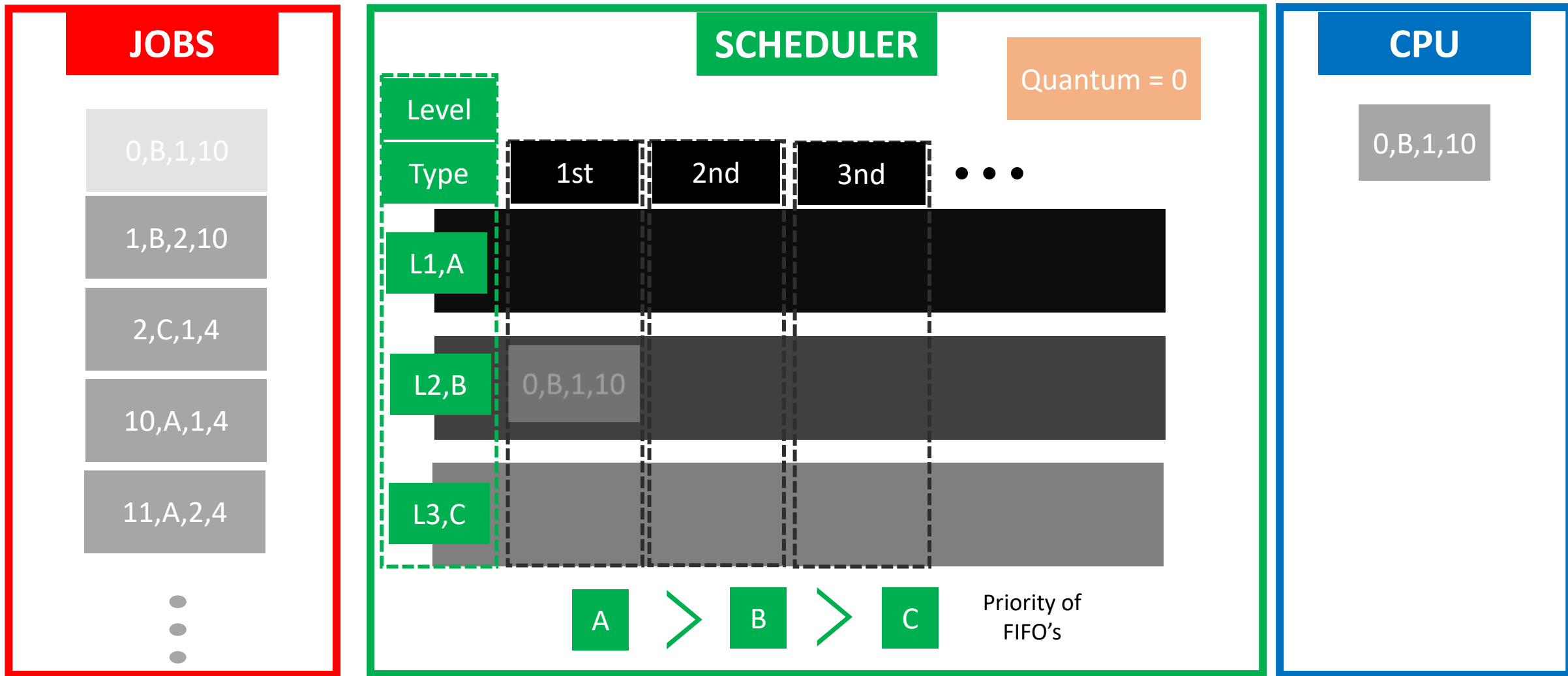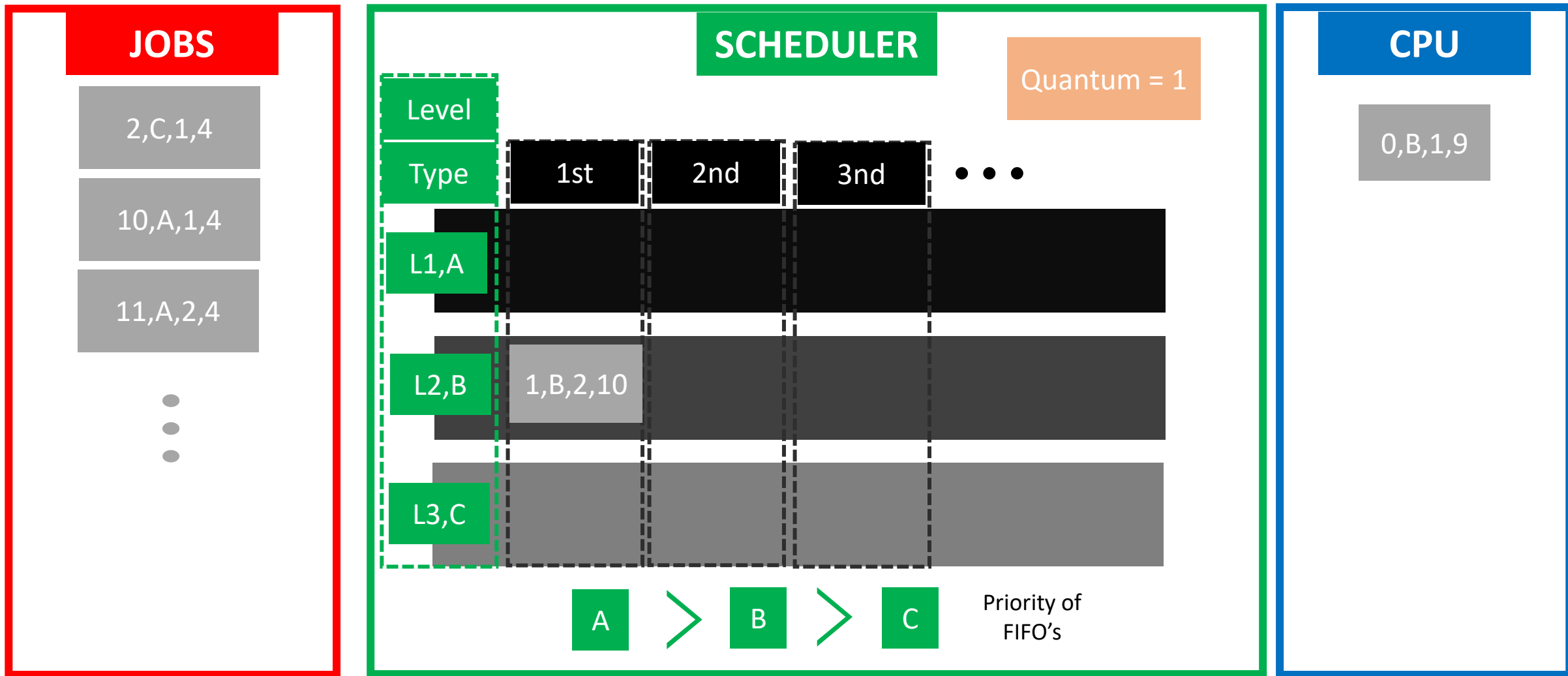
1. Job B1 arrives.
2. Since no other process is executed in the CPU and the scheduler FIFOs are empty, process **B1** utilizes the CPU.
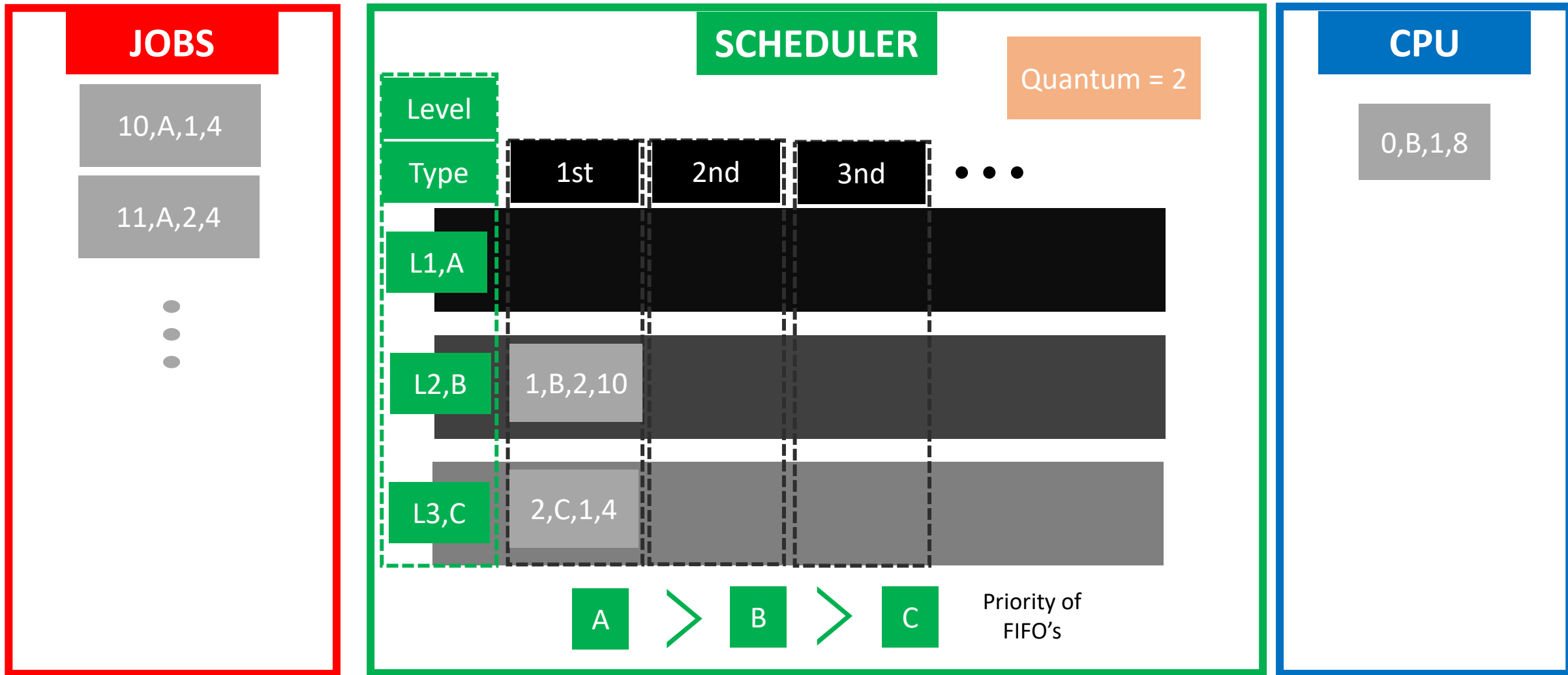
TIME: 0

Quantum time (Q) of each level equal to

$$Q = l$$

$l : level\ of\ the\ FIFO$

Q: Represents the maximum time a process utilizes from a CPU.

JOBS

2,C,1,4

10,A,1,4

11,A,2,4

SCHEDULER

Quantum = 1

Level				
Type	1st	2nd	3nd	• • •
L1,A				
L2,B	1,B,2,10			
L3,C				

A > B > C   Priority of FIFO's
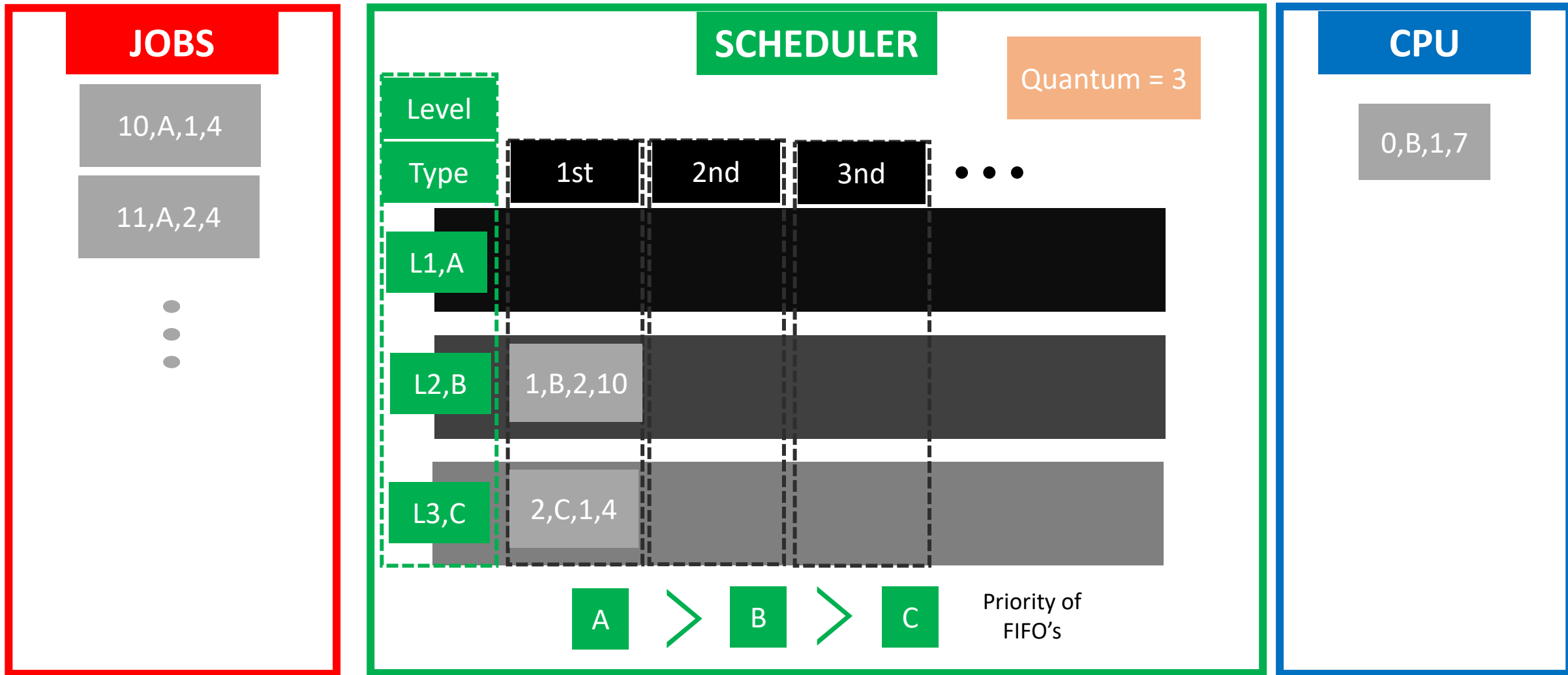
CPU

0,B,1,9

1. Job **B2** arrives.
2. Since process **B1** is executed in the CPU and the scheduler FIFOs are empty, process **B1** utilizes the CPU.
3. Process time of **B1** decreases to 9.
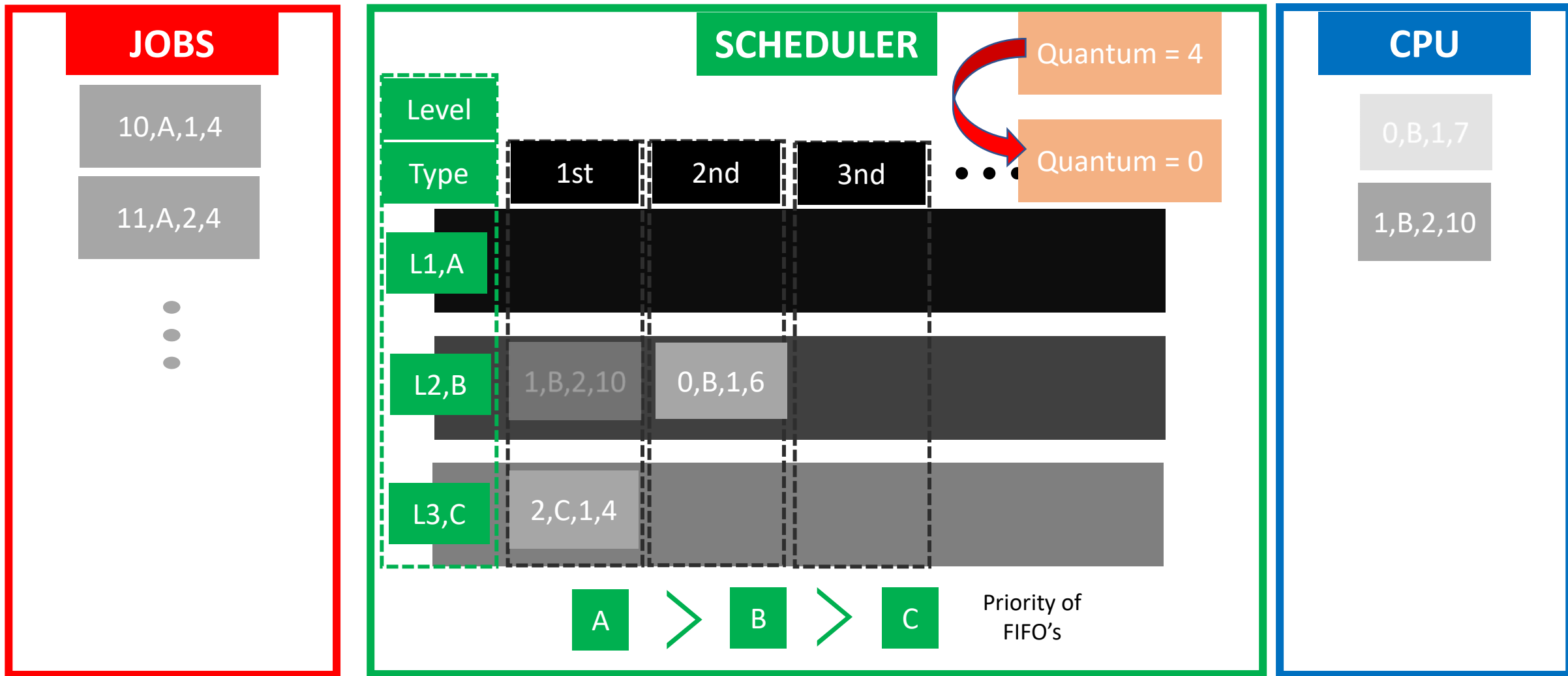4. **Quantum** is increased by one.

TIME: 1

JOBS

10,A,1,4

11,A,2,4

SCHEDULER

Quantum = 2

Level		1st	2nd	3nd	• • •
Type					
L1,A					
L2,B	1,B,2,10				
L3,C	2,C,1,4				

A > B > C Priority of FIFO's

CPU

0,B,1,8

1. Job **C1** arrives.
2. Since process **B1** is executed in the CPU and the priority of **C1** is lower than the **B1, B1** continues to utilize the CPU.
3. Process time of **B1** is decreased by one.
4. **Quantum** is increased by one.

TIME: 2

JOBS

10,A,1,4

11,A,2,4

SCHEDULER

Quantum = 4

Quantum = 0

Level			
Type	1st	2nd	3nd
L1,A			
L2,B	1,B,2,10	0,B,1,6	
L3,C	2,C,1,4		

A > B > C   Priority of FIFO's
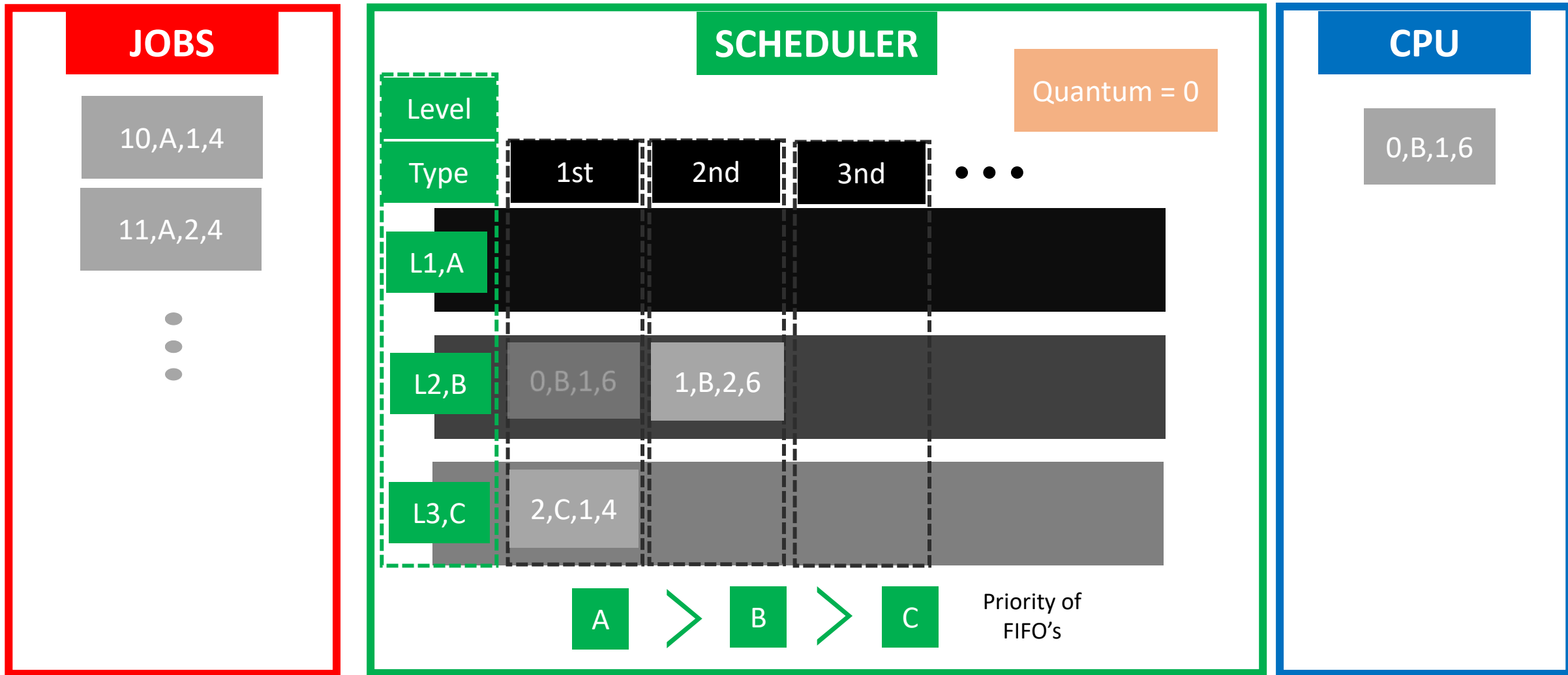
CPU

0,B,1,7

1,B,2,10

TIME: 4

1. There is no arriving process.
2. Process time of **B1** is decreased by one.
3. **Quantum** is increased by one. It reaches to the value of 4, which is limit of **B** type of process. So **B1** is put back to **FIFO L2.**
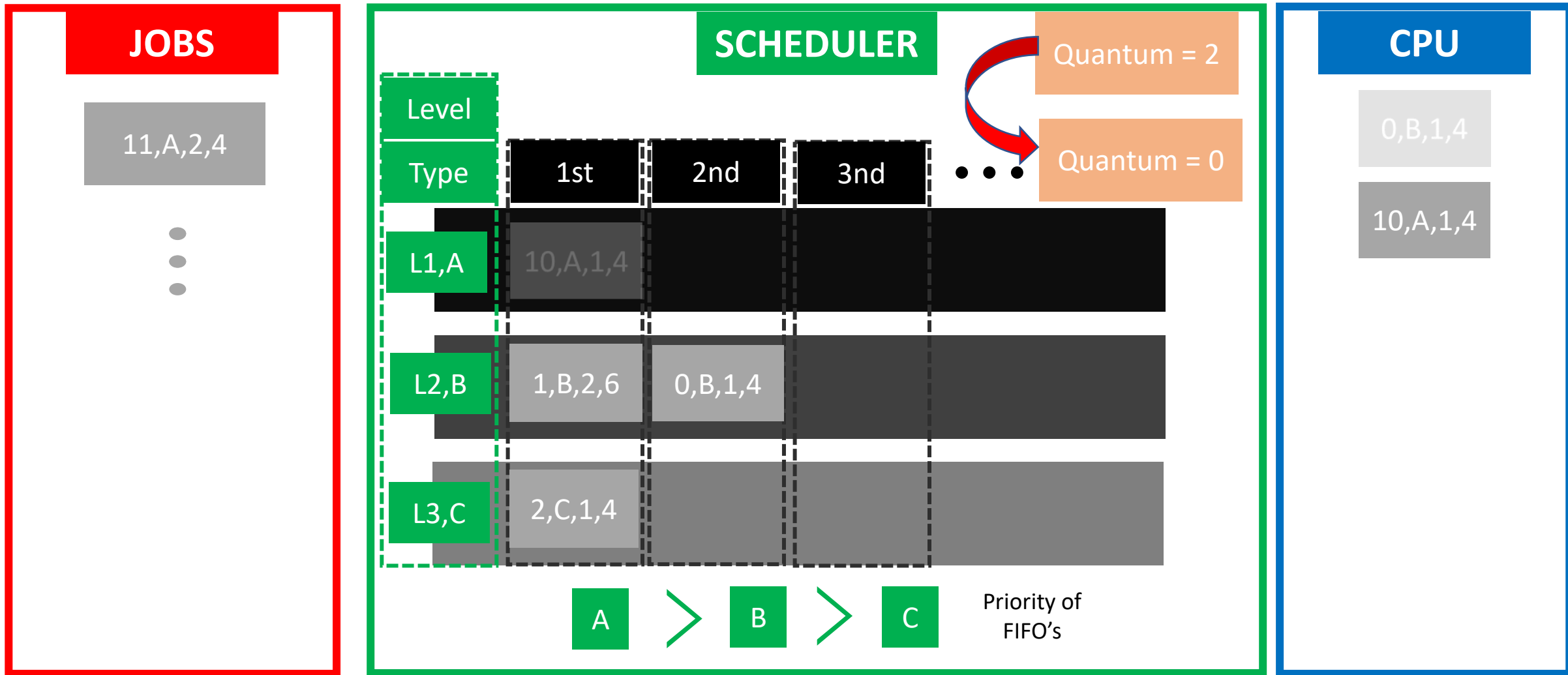
4. Scheduler sends **B2** to CPU.
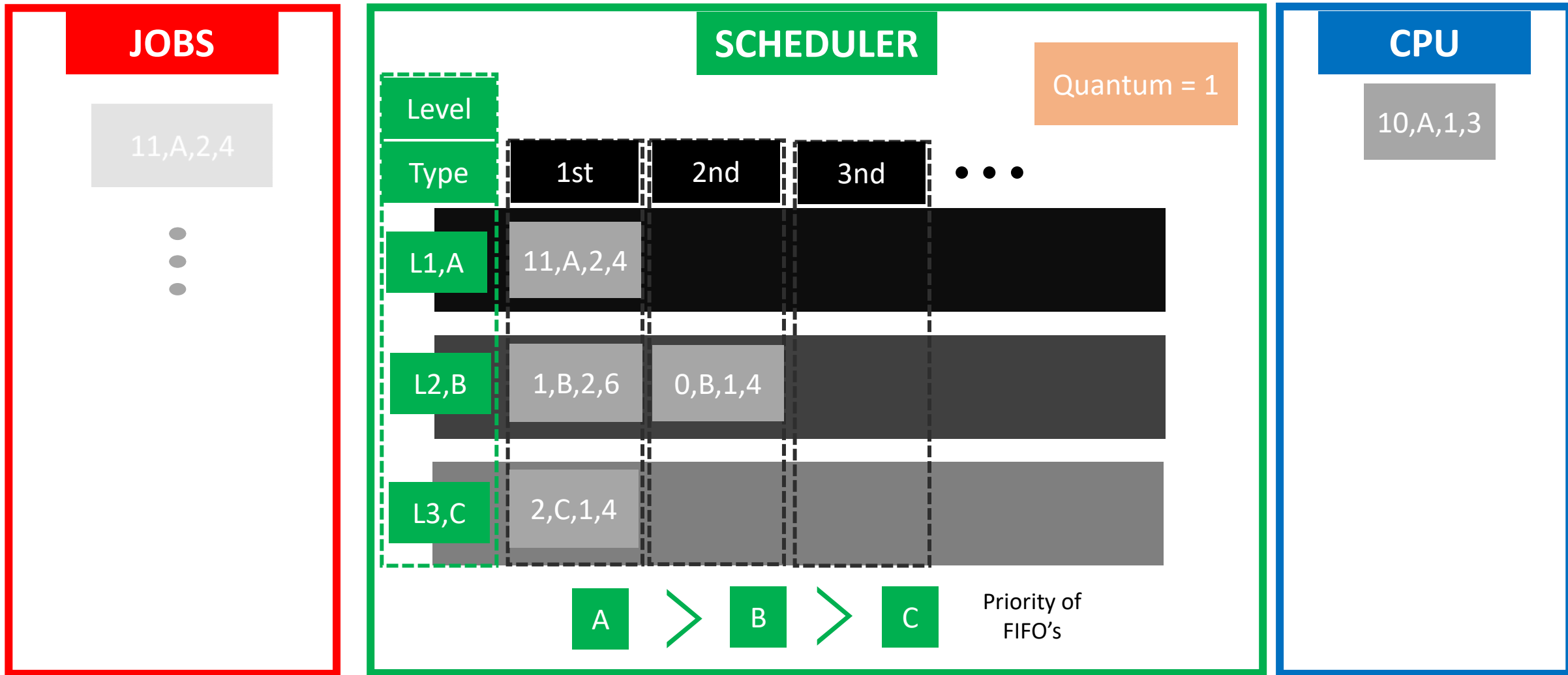5. Since the new process starts, **Quantum** becomes zero.

1. Process **B2** utilizes CPU until time step 8.
2. **Quantum** reaches the value of 4, which is the limit of the **B** type of process. So it is put back to **FIFO L2.**
3. Since the new process starts, **Quantum** becomes zero.

JOBS

11,A,2,4

SCHEDULER

Quantum = 2

Quantum = 0

Level				
Type	1st	2nd	3nd	•••
L1,A	10,A,1,4			
L2,B	1,B,2,6	0,B,1,4		
L3,C	2,C,1,4			

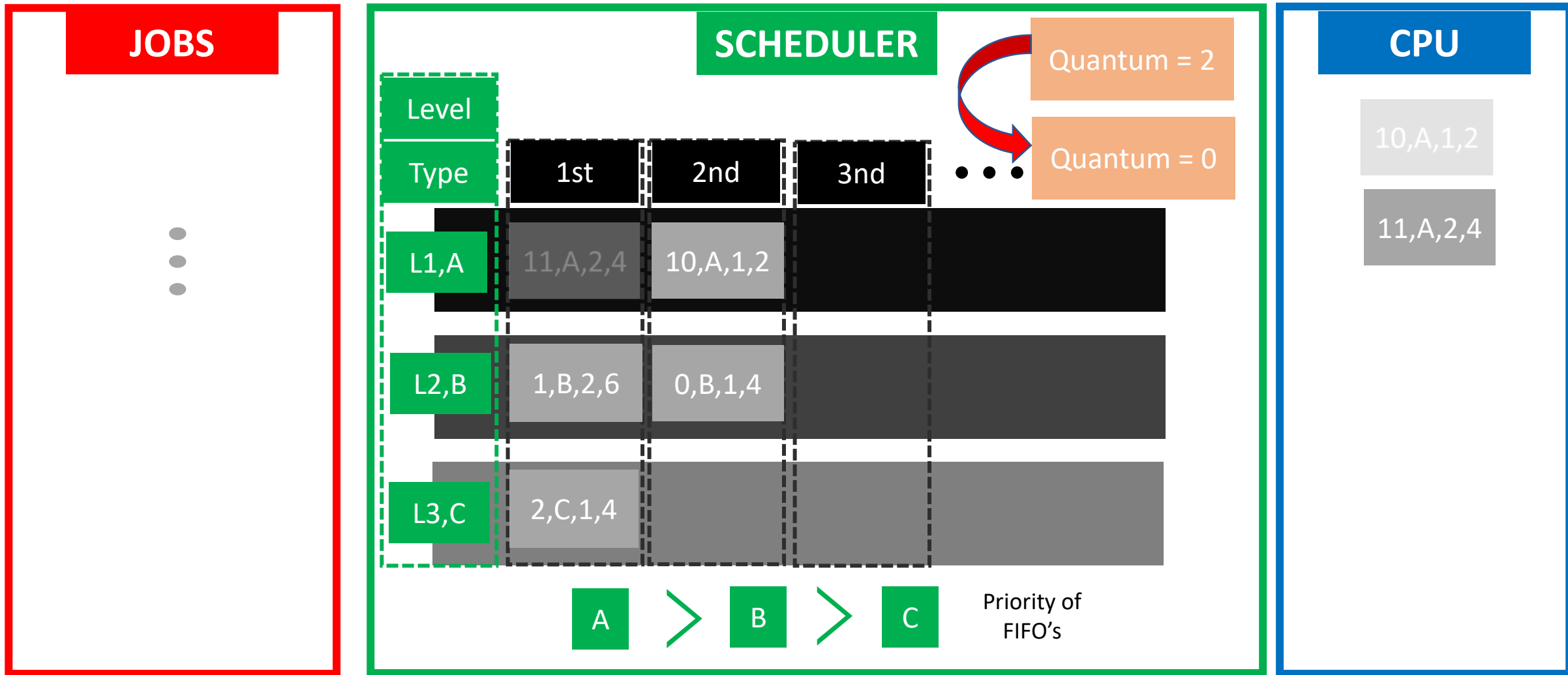A > B > C   Priority of FIFO's

CPU

0,B,1,4

10,A,1,4

1. Job **A1** arrives.
2. Its priority is higher than the running process **B1**. **A1** is sent to CPU. **B1** put back to FIFO
3. Since the new process starts, **Quantum** becomes zero.

TIME: 10

JOBS

11,A,2,4

SCHEDULER

Quantum = 1

CPU

10,A,1,3

Level				
Type	1st	2nd	3nd	• • •
L1,A	11,A,2,4			
L2,B	1,B,2,6	0,B,1,4		
L3,C	2,C,1,4			

A > B > C   Priority of FIFO's

1. Job **A2** arrives.
2. **A2** has the same priority with running process **A1.** So **A2** is put into **FIFO L1.**
3. Process time of **A1** is decreased by one.
4. **Quantum** is increased by one.

TIME: 11

JOBS

SCHEDULER

Quantum = 2

Quantum = 0

CPU

Level				
Type	1st	2nd	3nd	
L1,A	11,A,2,4	10,A,1,2		
L2,B	1,B,2,6	0,B,1,4		
L3,C	2,C,1,4			

10,A,1,2

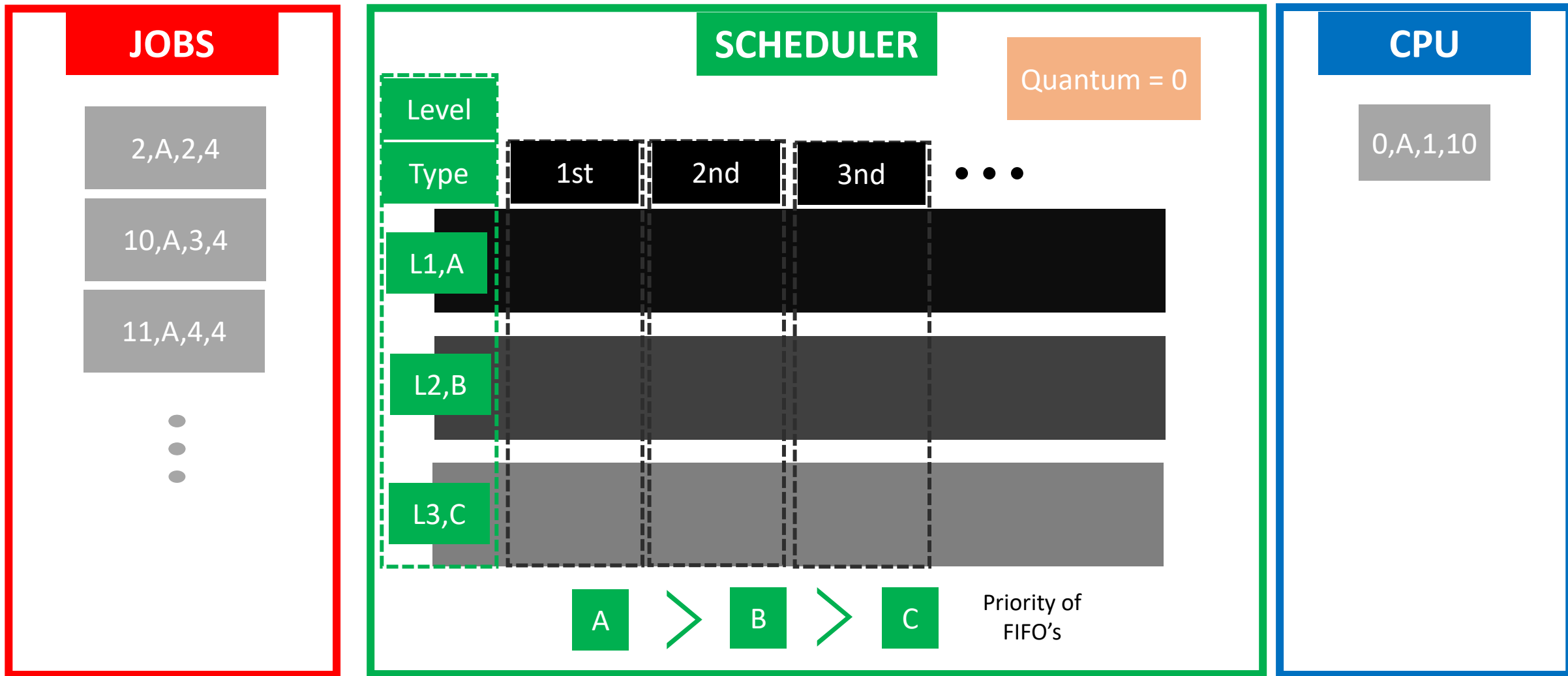11,A,2,4

A > B > C   Priority of FIFO's

TIME: 12

1. No job arrived.
2. Process time of **A1** is decreased by one.
3. **Quantum** is increased by one and reaches the limit value of process type A. So **A1** is put back to **FIFO L1.**

4. Scheduler sends **A2** to CPU since it is the first process in the list.
5. Since the new process starts, **Quantum** becomes zero.

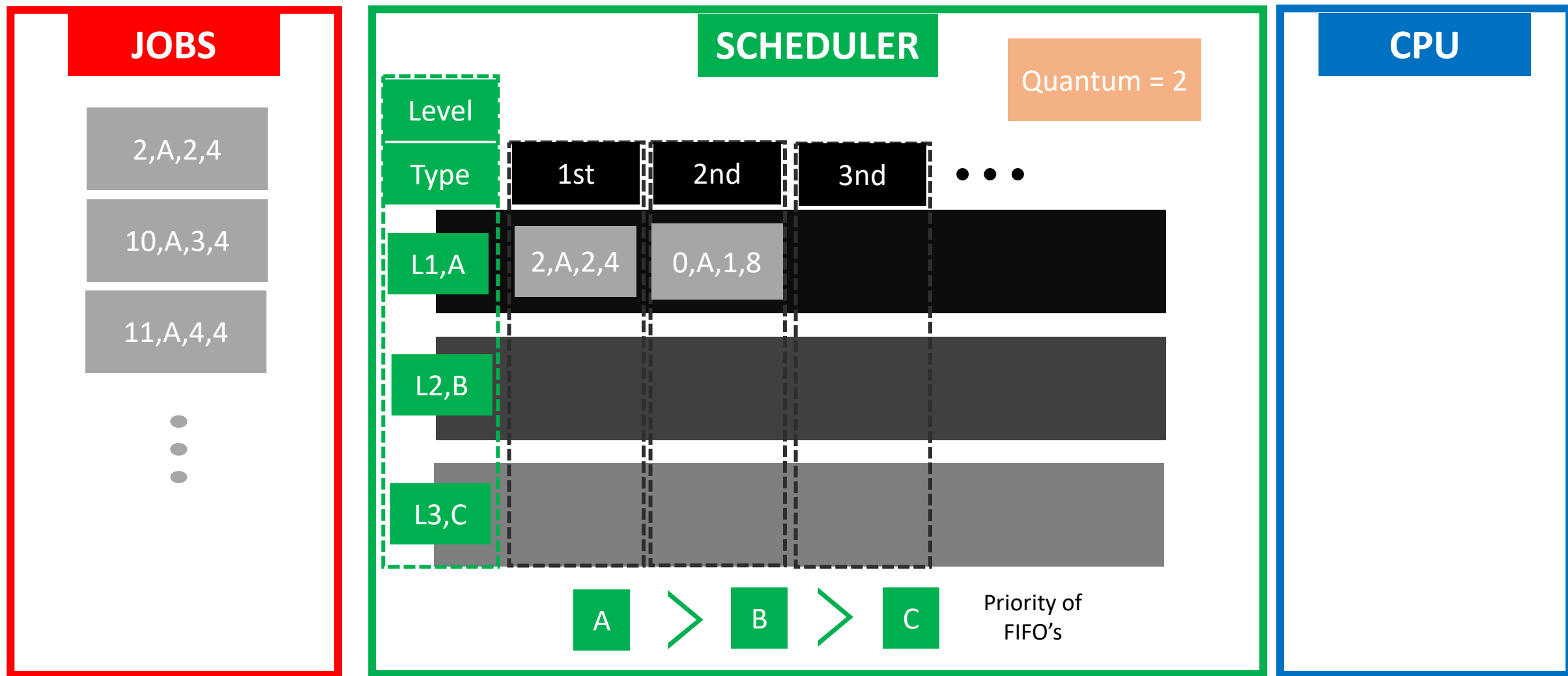# Ex-2: Two Process Arrive Scheduler in Same Time

JOBS

2,A,2,4

10,A,3,4

11,A,4,4

SCHEDULER

Quantum = 0

Level			
Type	1st	2nd	3nd
L1,A			
L2,B			
L3,C			

A > B > C   Priority of FIFO's

CPU

0,A,1,10

1. Job A1 arrives.
2. Since no other process is executed in the CPU and the scheduler FIFOs are empty, process **A1** utilizes the CPU.

TIME: 2

Quantum time (Q) of each level equal to

$$Q = l$$

$l : level\ of\ the\ FIFO$

Q: Represents the maximum time a process utilizes from a CPU.

JOBS

2,A,2,4

10,A,3,4

11,A,4,4

SCHEDULER

Quantum = 2

Level			
Type	1st	2nd	3nd
L1,A	2,A,2,4	0,A,1,8	
L2,B			
L3,C			

A > B > C   Priority of FIFO's

CPU

TIME: 2

1. Job **A2** arrives.
2. Process time of **A1** decreased to **8**.
3. **Quantum** reaches the value of 2, the limit of **A** type of process. So **A1** is put back to **FIFO L1**.

4. **A2** and **A1** should enter the scheduler at the same time. In such a situation, the priority belongs to the new-arriving jobs(process) **A2**.