# **HW4** Report

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## Q7.3:

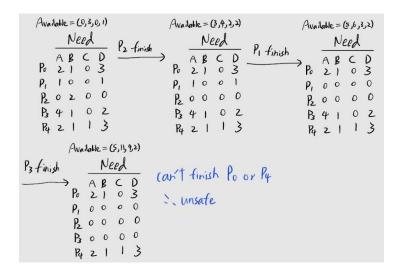
The CPU scheduler determines the execution order of the two threads. If it allows **do\_work\_one** to acquire **first\_mutex** and **do\_work\_two** to acquire **second\_mutex** before either thread can acquire the other mutex, then a deadlock will occur since both threads are blocked waiting for each other.

### Q7.6:

- a. Increase Available (new resources added): If the system was in safe state before, adding new resources means more resources are free for allocation, making the system remain in the safe state and become safer.
- b. Decrease **Available** (resource permanently removed from system): Removing resources may cause the system to go into unsafe state.
- c. Increase **Max** for one process (the process needs or wants more resources than allowed): Increasing Max for one process means the process may requires more resources to complete, so it may cause the system to go into unsafe state.
- d. Decrease Max for one process (the process decides it does not need that many resources): If the system was in safe state before, decreasing Max for one process means its demand for resources decreases, making the system remain in the safe state and become safer.
- **e.** Increase the number of processes: Increasing the number of processes will increase the demand for resources and may cause the system to go into unsafe state.
- f. Decrease the number of processes: If the system was in safe state before, decreasing the number of processes will decrease the demand for resources, making the system remain in the safe state and become safer.

# Q7.12:

a. Available = (0, 3, 0, 1)



b. Available = (1, 0, 0, 2)

Available = 
$$(1,0,0,0,2)$$

Available =  $(3,2,1,2)$ 

Available =  $(3,2,1,2)$ 

Available =  $(3,2,1,2)$ 

Available =  $(3,2,3,3)$ 

Available =  $(3,2,1,2)$ 

Available =  $(3,2,3,3)$ 

Available =  $(3,3,3,3)$ 

Available =  $(3,3,$