Hw4 Report

Q1-7.1

(a)

- **mutual exclusion:** only one car can occupy an intersection at a time.
- **hold and wait:** cars can hold an intersection while waiting in a line for access to the next intersection.
- **circular wait:** there are four lines of cars, each line is waiting for the line in front of them, thus form a circular as it shown on the figure.
- **no preemption:** cars can't be removed from where they are in the traffic flow, the only way is to move forward.

(b)

- No car can hold an intersection and wait for access to the next intersection, which means that no car can stay in the intersectionD

Q2-7.3

The CPU scheduler plays as the short-term scheduler, which will select a process from the ready queue and give the control of CPU to that selected process.

Deadlock will occur when either thread_one or thread_two is able to acquire only one lock before the other thread acquires the second lock.

On the other hand, if either thread_one or thread_two is able to acquire both locks before the other thread is schedule, then deadlock will not occur.

Q3-7.13

(a)

$Available =< 3, 3, 2, 1 >$

$Need = P_0 < 2, 2, 1, 1 >$

$P_1 < 2, 1, 3, 1 >$

$P_2 < 0, 2, 1, 3 >$

$P_3 < 0, 1, 1, 2 >$

$P_4 < 2, 2, 3, 3 >$

- Pick P_0 first, since it is the only one that <= Available

  After P_0 is finished, $Available =< 3,3,2,1 > + < 2,0,0,1 >=< 5,3,2,2 >$
- Then pick P_3, after P_0 is finished, $Available =< 5,3,2,2 > + < 3,1,2,1 >=< 6,6,3,4 >$
- Like wise, pick P_4, and then P_1, and then P_2

$Safe\ sequence =< P_0, P_3, P_4, P_1, P_2 >$

(b)

- Step 1: $Request = (1,1,0,0) \leq Need = (2,1,3,1)$
- Step 2: $Request = (1,1,0,0) \leq Available = (3,3,2,1)$
- We can find a $Safe\ sequence =< P_0, P_3, P_4, P_1, P_2 >$ after we pretend that this request has been fulfilled.

  The request can be granted immediately.

(c)

- Step 1: $Request = (0,0,2,0) \leq Need = (2,2,3,3)$
- Step 1: $Request = (0,0,2,0) \leq Available = (3,3,2,1)$
- We can not find a $safe\ sequence$ after we pretend that this request has been fulfilled, since $Available = (3,3,0,1)$

  $Need = P_0 < 2,2,1,1 >$

  $P_1 < 2,1,3,1 >$

  $P_2 < 0,2,1,3 >$

  $P_3 < 0,1,1,2 >$

  $P_4 < 2,2,1,3 >$

  $Available < Need$, none of the $Need$ can be selected.

  The request can't be granted immediately.