**第一次作业**

1.死锁定义：在一组进程发生死锁的情况下，这组死锁进程中的每一个进程，都在等等待另一个死锁进程所占有的资源。或者说每个进程等待的时间是该组中其他进程释放所占有的资源。但由于所有这些进程都无法运行，因此它们谁也不释放资源，致使没有任何一个进程可被唤醒。这样这组进程只能无期限地等待下去。如果一组进程中的每一个进程都在等待仅有该组进程中的其它进程才能引发的事件，那么这组进程是死锁的。（出自教材P107）

2.饥饿定义：等待时间给进程推进和响应带来明显影响称为进程饥饿。当饥饿到一定程度的进程在等待到即使完成也无实际意义的时候称为饥饿死亡。（出自百度百科）

死锁就像一群人买去买奶茶，一杯奶茶30元，每个人的钱都不够30块，大家都不想舍弃自己手中的钱给别人，就形成了死锁。

饥饿就像一群难民去抢补给，有的人总是分不到，就得一直等着，等时间长了就饥饿了。

2.（1）

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Max | | | Allocation | | | Need | | | Available | | |
| P1 | 5 | 5 | 9 | 2 | 1 | 2 | 3 | 4 | 7 | 2 | 3 | 3 |
| P2 | 5 | 3 | 6 | 4 | 0 | 2 | 1 | 3 | 4 |  |  |  |
| P3 | 4 | 0 | 11 | 4 | 0 | 5 | 0 | 0 | 6 |  |  |  |
| P4 | 4 | 2 | 5 | 2 | 0 | 4 | 2 | 2 | 1 |  |  |  |
| P5 | 4 | 2 | 4 | 3 | 1 | 4 | 1 | 1 | 0 |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Work | Need | Allocation | Work+Allocation | Finish |
| P4 | 2 3 3 | 2 2 1 | 2 0 4 | 4 3 7 | true |
| P2 | 4 3 7 | 1 3 4 | 4 0 2 | 8 3 9 | true |
| P3 | 8 3 9 | 0 0 6 | 4 0 5 | 12 3 14 | true |
| P5 | 12 3 14 | 1 1 0 | 3 1 4 | 15 4 18 | true |
| P1 | 15 4 18 | 3 4 7 | 2 1 2 | 17 5 20 | true |

T0 安全状态 安全序列{P4,P5,P1,P2,P3}

可利用资源{2,3,3}

(2)T0时刻 P2 Request（0,3,4）

∵Request（0,3,4）<Need (1,3,4)

Request（0,3,4）>Available(2,3,3)

∴不能分配

（3）P4 Request（2,0,1）

∵Request（2,0,1）<Need (2,2,1)

Request（2,0,1）<Available(2,3,3)

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Max | | | Allocation | | | Need | | | Available | | |
| P1 | 5 | 5 | 9 | 2 | 1 | 2 | 3 | 4 | 7 | 0 | 3 | 2 |
| P2 | 5 | 3 | 6 | 4 | 0 | 2 | 1 | 3 | 4 |  |  |  |
| P3 | 4 | 0 | 11 | 4 | 0 | 5 | 0 | 0 | 6 |  |  |  |
| P4 | 4 | 2 | 5 | 4 | 0 | 5 | 0 | 2 | 0 |  |  |  |
| P5 | 4 | 2 | 4 | 3 | 1 | 4 | 1 | 1 | 0 |  |  |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Work | | | Need | | | Allocation | | | Work+Allocation | | | Finish |
| P4 | 0 | 3 | 2 | 0 | 2 | 0 | 4 | 0 | 5 | 4 | 3 | 7 | TRUE |
| P5 | 4 | 3 | 7 | 1 | 1 | 0 | 3 | 1 | 4 | 7 | 4 | 11 | TRUE |
| P1 | 7 | 4 | 11 | 3 | 4 | 7 | 2 | 1 | 2 | 9 | 5 | 13 | TRUE |
| P2 | 9 | 5 | 13 | 1 | 3 | 4 | 4 | 0 | 2 | 13 | 5 | 15 | TRUE |
| P3 | 13 | 5 | 15 | 0 | 0 | 6 | 4 | 0 | 5 | 17 | 5 | 20 | TRUE |

安全序列{P4，P5，P1，P2，P3}

∴可以将资源分配给P4

（4）P1 Request(0,2,0)

∵ Request(0,2,0) < Need(3,4,7)

Request(0,2,0) > Available(0,3,2)

∴不能分配