1.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 最大进程 | | | 已分配 | | | 需求 | | |
|  | A | B | C | A | B | C | A | B | C |
| P1 | 5 | 5 | 9 | 2 | 1 | 2 | 3 | 4 | 7 |
| 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 |

A,B,C可利用的资源还剩2，3，3

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 工作进程 | | | 已分配 | | | 总计 | | |
|  | A | B | C | A | B | C | A | B | C |
| P4 | 2 | 3 | 3 | 2 | 0 | 4 | 4 | 3 | 7 |
| P2 | 4 | 3 | 7 | 4 | 0 | 2 | 8 | 3 | 9 |
| P3 | 8 | 3 | 9 | 4 | 0 | 5 | 12 | 3 | 14 |
| P5 | 12 | 3 | 14 | 3 | 1 | 4 | 15 | 4 | 18 |
| P1 | 15 | 4 | 18 | 2 | 1 | 2 | 17 | 5 | 20 |

To时刻处于安全状态，安全序列为：P4，P2，P3，P5，P1。

2. To时刻：

Request2(0,3,4)<=need2(1,3,4)-------成立

Request2(0,3,4)<=available(2,3,3)-------不成立

由于进程p2request量大于available量，即不能完成资源分配

3. Request4(2,0,1)<=need4(2,2,1)-------成立

Request4(2,0,1)<=available(2,3,3)-------成立

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 最大进程 | | | 已分配 | | | 需求 | | |
|  | A | B | C | A | B | C | A | B | C |
| P1 | 5 | 5 | 9 | 2 | 1 | 2 | 3 | 4 | 7 |
| 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 |

A,B,C可利用的资源还剩0，3，2

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 工作进程 | | | 已分配 | | | 总计 | | |
|  | A | B | C | A | B | C | A | B | C |
| P4 | 0 | 3 | 2 | 4 | 0 | 5 | 4 | 3 | 7 |
| P5 | 4 | 3 | 7 | 3 | 1 | 4 | 7 | 4 | 11 |
| P1 | 7 | 4 | 11 | 2 | 1 | 2 | 9 | 5 | 13 |
| P2 | 9 | 5 | 13 | 4 | 0 | 2 | 13 | 5 | 15 |
| P3 | 13 | 5 | 15 | 4 | 0 | 5 | 17 | 5 | 20 |

此时处于安全状态，所以能够实施资源分配

4. Request1(0,2,0)<=need1(3,4,7)-------成立

Request1(0,2,0)<=available(0,3,2)-------成立

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 最大进程 | | | 已分配 | | | 需求 | | |
|  | A | B | C | A | B | C | A | B | C |
| P1 | 5 | 5 | 9 | 2 | 3 | 2 | 3 | 2 | 7 |
| 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 | 1 | 2 | 2 | 4 |
| P5 | 4 | 2 | 4 | 3 | 1 | 4 | 1 | 1 | 0 |

A,B,C可利用的资源还剩0，3，2

此时剩余的资源无法为任何进程分配，所以不能实施资源分配