(1)

T0时刻资源分配情况：

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 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 |  |

T0时刻的安全序列：

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Work | Need | Allocation | Work+Allocation | Finish |
| P5 | 2,3,3 | 1,1,0 | 3,1,4 | 5,4,7 | True |
| P4 | 5,4,7 | 2,2,1 | 2,0,4 | 7,4,11 | True |
| P3 | 7,4,11 | 0,0,6 | 4,0,5 | 11,4,16 | True |
| P2 | 11,4,16 | 1,3,4 | 4,0,2 | 15,4,18 | True |
| P1 | 15,4,18 | 3,4,7 | 2,1,2 | 17,5,20 | True |

由所进行的安全性检查得知，可以找到一个安全序列{P5,P4,P3,P2,P1}，系统是安全状态。

(2)

P2：Request2 (0,3,4)

① Request2 (0,3,4)≤Need2(1,3,4);

② Request2 (0,3,4)＞Available(2,3,3);

尚无足够C资源进行分配，所以不能分配。

(3)

P4: Request4(2,0,1)

① Request4(2,0,1)≤Need4(2,2,1);

② Request4(2,0,1)≤Available(2,3,3);

Available(2,3,3)- Request4(2,0,1)= Request4(0,3,2);

Allocation4(2,0,4)+ Request4(2,0,1)= Allocation4(4,0,5);

Need4(2,2,1)- Request4(2,0,1)= Need4(0,2,0);

为P4分配资源后的有关资源数据：

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

使用安全性检测算法得到:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 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 |

由所进行的安全性检查得知，可以找到一个安全序列{P4,P5,P1,P2,P3}，系统是安全状态,P4可以分配。

(4)

P1：Request1(0,2,0)

① Request1(0,2,0)≤Need1(3,4,7);

② Request1(0,2,0)≤Available(0,3,2);

Available(0,3,2)- Request1(0,2,0)=Available(0,1,2);

Need1(3,4,7)- Request1(0,2,0)= Need1(3,2,7);

Allocation1(2,1,2)+ Request1(0,2,0)= Allocation1(2,3,2);

为P1分配资源后的有关资源数据：

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

由于Available(0,1,2)不能满足任何进程，所以不能分配。