1、若待排序的数组*a*如下，且并行快排算法最终得到一个完全二叉树，试说明此次排序的执行过程。

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *i* | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| *a* | 3 | 9 | 5 | 8 | 0 | 1 | 4 |
| *LC* |  |  |  |  |  |  |  |
| *RC* |  |  |  |  |  |  |  |
| *f* |  |  |  |  |  |  |  |

构造树的第1层后：

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *i* | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| *a* | 3 | 9 | 5 | 8 | 0 | 1 | 4 |
| *LC* | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| *RC* | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| *f* | 6 | 6 | 6 | 6 | 6 | 6 | 6 |

构造树的第2层后：

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *i* | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| *a* | 3 | 9 | 5 | 8 | 0 | 1 | 4 |
| *LC* | 7 | 7 | 7 | 7 | 7 | 7 | 5 |
| *RC* | 7 | 7 | 7 | 7 | 7 | 7 | 3 |
| *f* | 5 | 3 | 3 | 6 | 5 | 6 | 6 |

构造树的第3层后：

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| *i* | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| *a* | 3 | 9 | 5 | 8 | 0 | 1 | 4 |
| *LC* | 7 | 7 | 7 | 2 | 7 | 4 | 5 |
| *RC* | 7 | 7 | 7 | 1 | 7 | 0 | 3 |
| *f* | 5 | 3 | 3 | 6 | 5 | 6 | 6 |

2、若待排序的数组*a*=(16,10,6,4,14,8,5,13,11,18,17,12,9,2,3,7,1,15)，处理器数*p*=3，试说明PSRS排序算法的执行过程。

均匀划分：16,10,6,4,14,8 5,13,11,18,17,12 9,2,3,7,1,15

局部排序：4,6,8,10,14,16 5,11,12,13,17,18 1,2,3,7,9,15

正则采样：4,8,14 5,12,17 1,3,9

样本排序：1,3,4,5,8,9,12,14,17

选择主元：5,12

主元划分：4 | 6,8,10 | 14,16 5 | 11,12 | 13,17,18 1,2,3 | 7,9 | 15

归并排序：1,2,3,4,5 6,7,8,9,10,11,12 13,14,15,16,17,18

3、若*p*=，分析PSRS排序算法的平均时间复杂度和加速比。

局部排序：O(log)

正则采样：O()

样本排序：O(log)

选择主元：O()

主元划分：O(log)

归并排序：O(log)

总的平均时间复杂度为O(log)，加速比为O()。