1. 高度为h的AVL树的最少结点数是多少？反之，有n个结点的AVL树最大高度是多少？最小高度是多少？

设根节点的高度为1，则高度为h的AVL树的最少结点数为：Nh=Nh-1+Nh-2+1; N1=1;N2=2;

有n个结点的AVL树的最大高度为：1.44\*log(*n*+2)-1；最小高度为：

2、

1.

（1）

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 78 |  | 15 | 03 |  | 57 | 45 | 20 | 31 |  | 23 | 36 | 12 |

搜索成功的平均搜索长度：(1+1+1+1+1+1+4+1+2+1)/10=7/5

搜索不成功的平均搜索长度为：(2+1+2+1+5+4+2+2+1+3+2+1)/13=2

（2）

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 78 |  | 15 | 03 |  | 57 | 45 | 20 | 31 | 36 | 23 |  | 12 |

RH(31)=(7\*31)%10+1=8

H2=(5+8)%13=0;

H3=(0+8)%13=8;

RH(36)=(7\*36)%10+1=3

H2=(10+3)%13=0;

H3=(0+3)%13=3;

H4=(3+3)%13=6;

H5=(6+3)%13=9;

搜索成功的平均搜索长度：(1+1+1+1+1+1+1+1+3+6)/10=17/10;

2.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| WEN | CAI | CAO |  |  |  |  | ZHAO |  | CHA | CHANG | LAN |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|  |  |  |  | WU |  | YUN | LIU |  |  | WANG |  |
| 24 | 25 |  |  |  |  |  |  |  |  |  |  |
| YANG | LONG |  |  |  |  |  |  |  |  |  |  |

采用每个姓氏的第一位加第二位的ASCII码除以26的余数

即 H(key)=(s[0]-‘A’+s[1]-‘A’)%26；

查找成功的平均搜索长度为：(1+1+2+1+1+2+1+1+1+1+1+1+1+1+1)/15=17/15