

实验 7

一.实验内容

针对同班同学信息设计一个通讯录,学生信息有姓名,性别,学号,电话号码等.以学生姓名(汉语拼音形式)为关键字设计哈希表,待填入的哈希函数,用线性探测法或者拉链法处理冲突;在查找过程中给出比较的次数.

二.数据结构

实验中,我使用线性探测法利用结构体数据构造哈希表,其中哈希函数为(名字拼音的末尾的字母表序号*10+开头的字母序号) mod Table_SIZE.并且初始化每个元素的 name 为#表示无效的数据.对于比较多的数据输入,使用文件读取的方式读取根目录下的 data 文件自动构造哈希表.

三:测试数据

开始运行:

```
jx0JX ~/Desktop/Project/SmallExperiment/HashTable <master*>
└─> ./a.out
Start test
Please select your operation
1.insert 2.queryByName 3.delete 4.showAllStudent 5.Using data.txt to init 6.getSize 7.exit
学
```

插入:

```
Start test
Please select your operation
1.insert 2.queryByName 3.delete 4.showAllStudent 5.Using data.txt to init 6.getSize 7.exit
1
Please input the total student number :1
No.1:
Name:
Tom
Student id:
15331212
Male or Female
m
Student tell number:
13719548556
insert Tom succeed
Insert end
Please select your operation
1.insert 2.queryByName 3.delete 4.showAllStudent 5.Using data.txt to init 6.getSize 7.exit
```

删除:

```
Insert end
Please select your operation
1.insert 2.queryByName 3.delete 4.showAllStudent 5.Using data.txt to init 6.getSize 7.exit
3
Please input the student's name:Tom
Delete succeed
Please select your operation
1.insert 2.queryByName 3.delete 4.showAllStudent 5.Using data.txt to init 6.getSize 7.exit
```

查找: 先插入刚删掉的 tom

```
Please select your operation
1.insert 2.queryByName 3.delete 4.showAllStudent 5.Using data.txt to init 6.getSize 7.exit
2
Please input the student's name:
Tom
The student's information is shown as:
Tom 15331212 m 13584599556
This query cost 1 times compare
Please select your operation
1.insert 2.queryByName 3.delete 4.showAllStudent 5.Using data.txt to init 6.getSize 7.exit
```

显示:

```
Please select your operation
1.insert 2.queryByName 3.delete 4.showAllStudent 5.Using data.txt to init 6.getSize 7.exit
4
The student's information is shown as
1: Tom 15331212 m 13584599556
Please select your operation
```

文件读取:

```
1.insert 2.queryByName 3.delete 4.showAllStudent 5.Using data.txt to init 6.getSize 7.exit
t
5
Start get data from file
File close
Please select your operation
```

显示表大小:

```
Please select your operation
1.insert 2.queryByName 3.delete 4.showAllStudent 5.Using data.txt to init 6.getSize 7.exit
6
The total student number is 81
```

查找:

```
1.insert 2.queryByName 3.delete 4.showAllStudent 5.Using data.txt to init 6.getSize 7.exit
2
Please input the student's name:
renjixin
No this student
Please select your operation
```

```
1.insert 2.queryByName 3.delete 4.showAllStudent 5.Using data.txt to init 6.getSize 7.exit
2
Please input the student's name:
jiaxin
The student's information is shown as:
jiaxin 1234654 f 13647588640
This query cost 1 times compare
Please select your operation
```

显示所有:

```
jiaxin 1234654 f 13647588640
This query cost 1 times compare
Please select your operation
1.insert 2.queryByName 3.delete 4.showAllStudent 5.Using data.txt to init 6.getSize 7.exit
4
The student's information is shown as
1: anjiahua 41564684 f 13647588640
2: bagutongutytytyu 113465 f 13647588640
3: chengjiaka 131350 m 136111458440
4: dingjiayu 1155330 m 136111458440
5: yaojiali 15468768 f 13647588640
6: zhaojiashui 54654897654 f 13647588640
7: guguzhongu 120303148 m 136111458440
8: huguzhongtoiu 87946601 f 13647588640
9: guzhongygtk 4165048789 m 136111458440
10: ngguzhonghj 10140789 m 136111458440
11: dxidfanggungghmk 46540848940 f 13647588640
12: vxigguzhggj 104740747 m 136111458440
```

```

68: renhajian 132798932 m 136111458440
69: renjiachang 0123459 m 136111458440
70: renjiawang 10313465 m 136111458440
71: uxsadngguzhong 106547089 f 13647588640
72: kxianggungsafhgr 1408789708 f 13647588640
73: wenjiakuantyg 1121320 m 136111458440
74: xiangguzhonug 2132121023021 f 13647588640
75: xiangguzyln 107497487 m 136111458440
76: yxiangguzhong 10645487 f 13647588640
77: wxiangguzhunggh 46540801 m 136111458440
78: xuiangguzhongfh 105454 f 13647588640
79: ouyaojiahai 4657487 m 136111458440
80: ppxiangguzhongas 165046540 m 136111458440
81: jiaxinytut 1103110 m 136111458440
Please select your operation
1.insert 2.queryByName 3.delete 4.showAllStudent 5.Using data.txt to init 6.getSize 7.ex

```

退出

```

78: xuiangguzhongfh 105454 f 13647588640
79: ouyaojiahai 4657487 m 136111458440
80: ppxiangguzhongas 165046540 m 136111458440
81: jiaxinytut 1103110 m 136111458440
Please select your operation
1.insert 2.queryByName 3.delete 4.showAllStudent 5.Using data.txt to init 6.getSize 7.exit
7
test end
jx0JX ~/Desktop/Project/SmallExperiment/HashTable <master*>

```

文件结构:

```

tree
.
├── a.out
├── data.txt
├── hashTable.cpp
├── main.cpp
└── 实验7.docx

0 directories, 5 files

```

实验总结:

通过这次实验更加透彻的理解了哈希函数和哈希查找所遵循的规则,了解了冲突的产生和解决,对哈希有了初步的了解.