温州大学计算机与人工智能学院
程序设计基础(2023-2024-1)　实验报告

实验名称		学生信息排序			
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实验地点	南5B105	实验时间	2023-10-22,16:23:59	指导老师	虞铭财

一、问题编号：

2001

地址：http://10.132.254.54/problem/2001/

二、问题描述：

请设计一个简单的学生成绩管理系统，要求系统实现以下功能：
插入一个学生的信息： Insert id name sex year month day x y z，其中的参数分别为
学号、姓名、性别、出生日期（年、月、日）、三门课的成绩，成绩为浮点数。

List 输出所有学生信息。

查找学生信息：
Find id 查找学号为id的学生信息。

Change id newname, newsex,newyear,newmonth,newday,newx, newy, newz
把学号为id的学生信息修改为
newname,newsex,newyear,newmonth,newday,newx, newy, newz（学号保持不变）

删除学生信息 Delete id 删除学号为id的学生信息

按学号从小到大排序　 Sort byid
按出生日期从小到大排序 Sort bybirthday
按总成绩从小到大排序　 Sort bysum

退出程序： Quit或者Exit

请注意：姓名的长度不超过20。

三、输入说明：

输入有多行，每行一条指令，指令格式如下：
Insert id name sex year month day x y z 其中的参数分别为学号、姓名、性别、
出生日期（年、月、日）三门课的成绩，成绩为浮点数。

List 输出所有学生信息。

Find id 查找学号为 id 的学生信息。

Change id newname, newsex,newyear,newmonth,newday,newx, newy, newz
把学号为id的学生信息修改为
newname, newsex,newyear,newmonth,newday,newx, newy, newz（学号保持不变）

Delete id 删除学号为id的学生信息

Sort byid 按学号从小到大排序并输出

Sort bybirthday 按出生日期从小到大排序

Sort bysum 按总成绩从小到大排序并输出

Quit或者Exit 输出"Good bye!"后结束程序。

四、输出说明：

输出有多行，对应命令的输出如下：
Insert id name sex year month day x y z 插入后在单独的一行中输出"Insert:"，
如果链表中不存在相同学号的学生信息，在第二行中显示学生信息，
格式： id name sex year month day x y z ave sum，分别为学号、姓名、性别、
出生日期（年、月、日）和三门课（语文、数学、英语）的成绩，平均成绩和总成绩，
数据之间用一个空格分开，成绩保留1位小数。 否则，输出"Failed"

List 输出"List:"后，按最近一次排序的顺序输出所有学生的信息，格式与插入学生信息后输出的格式相同。

Find id 第一行显示"Find:"，第二行显示格式如下： 如果找到学号为id的学生，
则在单独一行中显示学生信息，格式如List。否则在单独一行显示"Failed"。

Change id newname, newsex,newyear,newmonth,newday,newx, newy, newz
第一行显示"Change:"。如果链表中不存在学号为id的学生，显示"Failed"。
否则修改该学生信息并在单独一行中显示该生信息，显示格式如List命令。

Delete id 第一行显示"Delete:"。如果链表中不存在学号为id的学生，显示"Failed"。
否则删除该学生信息并在单独一行中显示"Deleted"

Sort byid 按学号从小到大排序并输出   输出格式与List相同
Sort bybirthday 按出生日期从小到大排序   输出格式与List相同
Sort bysum   按总成绩从小到大排序并输出   输出格式与List相同。

Quit或者Exit 在单独一行中输出"Good bye!"后结束程序。

五、输入样列：

```
Insert 0911001 zhangsan F 1992 3 24 87 78 65
Insert 0911003 Lisi F 1992 5 3 77 72 55
Find 0911002
Find 0911003
Insert 0911001 zhangou M 1992 3 24 98 78 65
Insert 0911002 zhaoliu F 1993 8 8 97 90 55
Change 0911002 zhaoliu M 1990 9 9 90 91 92
Change 0911005 zhaoliu M 1990 9 9 90 91 92
Delete 0911001
Delete 0911006
Insert 0911005 Wangrong F 1990 12 12 68 56 100
Find 0911002
Sort byid
Sort bybirthday
Sort bysum
Quit
```

六、输出样列：

```
Insert:
0911001 zhangsan F 1992 3 24 87.0 78.0 65.0 76.7 230.0
Insert:
0911003 Lisi F 1992 5 3 77.0 72.0 55.0 68.0 204.0
Find:
Failed
Find:
0911003 Lisi F 1992 5 3 77.0 72.0 55.0 68.0 204.0
Insert:
Failed
Insert:
0911002 zhaoliu F 1993 8 8 97.0 90.0 55.0 80.7 242.0
Change:
0911002 zhaoliu M 1990 9 9 90.0 91.0 92.0 91.0 273.0
Change:
Failed
Delete:
Deleted
Delete:
Failed
Insert:
0911005 Wangrong F 1990 12 12 68.0 56.0 100.0 74.7 224.0
Find:
0911002 zhaoliu M 1990 9 9 90.0 91.0 92.0 91.0 273.0
Sort:
0911002 zhaoliu M 1990 9 9 90.0 91.0 92.0 91.0 273.0
0911003 Lisi F 1992 5 3 77.0 72.0 55.0 68.0 204.0
0911005 Wangrong F 1990 12 12 68.0 56.0 100.0 74.7 224.0
Sort:
0911002 zhaoliu M 1990 9 9 90.0 91.0 92.0 91.0 273.0
0911005 Wangrong F 1990 12 12 68.0 56.0 100.0 74.7 224.0
0911003 Lisi F 1992 5 3 77.0 72.0 55.0 68.0 204.0
Sort:
0911003 Lisi F 1992 5 3 77.0 72.0 55.0 68.0 204.0
0911005 Wangrong F 1990 12 12 68.0 56.0 100.0 74.7 224.0
0911002 zhaoliu M 1990 9 9 90.0 91.0 92.0 91.0 273.0
Good bye!
```

七、解答内容：

所用语言：

源代码：

```c
#include <stdio.h>
#include <string.h>

int main(void)
{
    char num[100][20];
    char name[100][20];
    char sex[100][5];
    int year[100];
    int month[100];
    int day[100];
    double x[100];
    double y[100];
    double z[100];
    double avg[100];
    double sum[100];
    int p = 0;

    char insert[] = "Insert";
    char lst[] = "List";
    char quit[] = "Quit";
    char exit[] = "Exit";
    char find[] = "Find";
    char change[] = "Change";
    char del[] = "Delete";
    char sort_by_num[] = "byid";
    char sort_by_birthday[] = "bybirthday";
    char sort_by_sum[] = "bysum";
    char str[100];

    scanf("%s", str);
    while (strcmp(quit, str) != 0 && strcmp(exit, str) != 0)
    {
        if (strcmp(insert, str) == 0)
        {
            printf("Insert:\n");
            scanf("%s", num[p]);
            int flag = 1;
            for (int i = 0; i < p; i++)
            {
                if (strcmp(num[i], num[p]) == 0)
                {
                    flag = 0;
                    break;
                }
            }
            if (flag)
            {
                scanf(
                "%s %s %d %d %d %lf %lf %lf",
                name[p],
                sex[p],
                &year[p],
                &month[p],
                &day[p],
                &x[p],
                &y[p],
                &z[p]
                );

                sum[p] = x[p] + y[p] + z[p];
                avg[p] = sum[p] / 3.0;

                printf(
                    "%s %s %s %d %d %d %.1lf %.1lf %.1lf %.1lf %.1lf\n",
                    num[p],
                    name[p],
                    sex[p],
                    year[p],
                    month[p],
                    day[p],
                    x[p],
                    y[p],
                    z[p],
                    avg[p],
                    sum[p]
                );
                p++;
            }
            else
            {
                printf("Failed\n");
                scanf(
                    "%s %s %d %d %d %lf %lf %lf",
                    name[p],
                    sex[p],
                    &year[p],
                    &month[p],
                    &day[p],
```

```c
                         &x[p],
                         &y[p],
                         &z[p]
                    );
                }

            }
            else if (strcmp(lst, str) == 0)
            {
                printf("List:\n");
                for (int i = 0; i < p; i++)
                {
                    printf(
                        "%s %s %s %d %d %d %.1lf %.1lf %.1lf %.1lf %.1lf\n",
                        num[i],
                        name[i],
                        sex[i],
                        year[i],
                        month[i],
                        day[i],
                        x[i],
                        y[i],
                        z[i],
                        avg[i],
                        sum[i]
                    );
                }
            }
            else if (strcmp("Sort", str) == 0)
            {
                scanf("%s", str);
                if (strcmp(sort_by_num, str) == 0)
                {
                    printf("Sort:\n");

                    for (int i = 0; i < p - 1; i++)
                    {
                        for (int j = 0; j < p - 1 - i; j++)
                        {
                            if (strcmp(num[j], num[j + 1]) > 0)
                            {
                                char temp1[100];
                                strcpy(temp1, num[j]);
                                strcpy(num[j], num[j + 1]);
                                strcpy(num[j + 1], temp1);

                                strcpy(temp1, name[j]);
                                strcpy(name[j], name[j + 1]);
                                strcpy(name[j+1], temp1);

                                strcpy(temp1, sex[j]);
                                strcpy(sex[j], sex[j+1]);
                                strcpy(sex[j+1], temp1);

                                int temp2;
                                temp2 = year[j];
                                year[j] = year[j+1];
                                year[j+1] = temp2;

                                temp2 = month[j];
                                month[j] = month[j+1];
                                month[j+1] = temp2;

                                temp2 = day[j];
                                day[j] = day[j+1];
                                day[j+1] = temp2;

                                double temp3;
                                temp3 = x[j];
                                x[j] = x[j+1];
                                x[j+1] = temp3;

                                temp3 = y[j];
                                y[j] = y[j+1];
                                y[j+1] = temp3;

                                temp3 = z[j];
                                z[j] = z[j+1];
                                z[j+1] = temp3;

                                temp3 = sum[j];
                                sum[j] = sum[j+1];
                                sum[j+1] = temp3;

                                temp3 = avg[j];
                                avg[j] = avg[j+1];
                                avg[j+1] = temp3;
                            }
                        }
                    }
```

```
181.                    for (int i = 0; i < p; i++)
182.                    {
183.                        printf(
184.                            "%s %s %s %d %d %d %.1lf %.1lf %.1lf %.1lf %.1lf\n",
185.                            num[i],
186.                            name[i],
187.                            sex[i],
188.                            year[i],
189.                            month[i],
190.                            day[i],
191.                            x[i],
192.                            y[i],
193.                            z[i],
194.                            avg[i],
195.                            sum[i]
196.                        );
197.                    }
198.                }
199.                else if (strcmp(sort_by_birthday, str) == 0)
200.                {
201.                    printf("Sort:\n");
202.
203.                    for (int i = 0; i < p - 1; i++)
204.                    {
205.                        for (int j = 0; j < p - 1 - i; j++)
206.                        {
207.                            if (
208.                                year[j] > year[j+1] ||
209.                                (
210.                                    year[j] == year[j+1] &&
211.                                    month[j] > month[j+1]
212.                                ) ||
213.                                (
214.                                    year[j] == year[j+1] &&
215.                                    month[j] == month[j+1] &&
216.                                    day[j] > day[j+1]
217.                                )
218.                            )
219.                            {
220.                                char temp4[100];
221.                                strcpy(temp4, num[j]);
222.                                strcpy(num[j], num[j + 1]);
223.                                strcpy(num[j + 1], temp4);
224.
225.                                strcpy(temp4, name[j]);
226.                                strcpy(name[j], name[j + 1]);
227.                                strcpy(name[j+1], temp4);
228.
229.                                strcpy(temp4, sex[j]);
230.                                strcpy(sex[j], sex[j+1]);
231.                                strcpy(sex[j+1], temp4);
232.
233.                                int temp5;
234.                                temp5 = year[j];
235.                                year[j] = year[j+1];
236.                                year[j+1] = temp5;
237.
238.                                temp5 = month[j];
239.                                month[j] = month[j+1];
240.                                month[j+1] = temp5;
241.
242.                                temp5 = day[j];
243.                                day[j] = day[j+1];
244.                                day[j+1] = temp5;
245.
246.                                double temp6;
247.                                temp6 = x[j];
248.                                x[j] = x[j+1];
249.                                x[j+1] = temp6;
250.
251.                                temp6 = y[j];
252.                                y[j] = y[j+1];
253.                                y[j+1] = temp6;
254.
255.                                temp6 = z[j];
256.                                z[j] = z[j+1];
257.                                z[j+1] = temp6;
258.
259.                                temp6 = sum[j];
260.                                sum[j] = sum[j+1];
261.                                sum[j+1] = temp6;
262.
263.                                temp6 = avg[j];
264.                                avg[j] = avg[j+1];
265.                                avg[j+1] = temp6;
266.                            }
267.                        }
268.                    }
269.
270.                    for (int i = 0; i < p; i++)
271.                    {
```

```c
                        printf(
                            "%s %s %s %d %d %d %.1lf %.1lf %.1lf %.1lf %.1lf\n",
                            num[i],
                            name[i],
                            sex[i],
                            year[i],
                            month[i],
                            day[i],
                            x[i],
                            y[i],
                            z[i],
                            avg[i],
                            sum[i]
                        );
                    }
                }
                else if (strcmp(sort_by_sum, str) == 0)
                {
                    printf("Sort:\n");

                    for (int i = 0; i < p - 1; i++)
                    {
                        for (int j = 0; j < p - 1 - i; j++)
                        {
                            if (sum[j] > sum[j + 1])
                            {
                                char temp7[100];
                                strcpy(temp7, num[j]);
                                strcpy(num[j], num[j + 1]);
                                strcpy(num[j + 1], temp7);

                                strcpy(temp7, name[j]);
                                strcpy(name[j], name[j + 1]);
                                strcpy(name[j+1], temp7);

                                strcpy(temp7, sex[j]);
                                strcpy(sex[j], sex[j+1]);
                                strcpy(sex[j+1], temp7);

                                int temp8;
                                temp8 = year[j];
                                year[j] = year[j+1];
                                year[j+1] = temp8;

                                temp8 = month[j];
                                month[j] = month[j+1];
                                month[j+1] = temp8;

                                temp8 = day[j];
                                day[j] = day[j+1];
                                day[j+1] = temp8;

                                double temp9;
                                temp9 = x[j];
                                x[j] = x[j+1];
                                x[j+1] = temp9;

                                temp9 = y[j];
                                y[j] = y[j+1];
                                y[j+1] = temp9;

                                temp9 = z[j];
                                z[j] = z[j+1];
                                z[j+1] = temp9;

                                temp9 = sum[j];
                                sum[j] = sum[j+1];
                                sum[j+1] = temp9;

                                temp9 = avg[j];
                                avg[j] = avg[j+1];
                                avg[j+1] = temp9;
                            }
                        }
                    }

                    for (int i = 0; i < p; i++)
                    {
                        printf(
                            "%s %s %s %d %d %d %.1lf %.1lf %.1lf %.1lf %.1lf\n",
                            num[i],
                            name[i],
                            sex[i],
                            year[i],
                            month[i],
                            day[i],
                            x[i],
                            y[i],
                            z[i],
                            avg[i],
                            sum[i]
```

```c
                        );
                    }
                }
            }
            else if (strcmp(find, str) == 0)
            {
                char id[100];
                scanf("%s", id);
                printf("Find:\n");
                int flag = 0;
                for (int i = 0; i < p; i++)
                {
                    if (strcmp(num[i], id) == 0)
                    {
                        printf(
                            "%s %s %s %d %d %d %.1lf %.1lf %.1lf %.1lf %.1lf\n",
                            num[i],
                            name[i],
                            sex[i],
                            year[i],
                            month[i],
                            day[i],
                            x[i],
                            y[i],
                            z[i],
                            avg[i],
                            sum[i]
                            );
                        flag = 1;
                        break;
                    }
                }
                if (flag == 0)
                {
                    printf("Failed\n");
                }
            }
            else if (strcmp(change, str) == 0)
            {
                char id[100];
                scanf("%s", id);
                printf("Change:\n");
                int flag = 0;
                int j;
                for (int i = 0; i < p; i++)
                {
                    if (strcmp(num[i], id) == 0)
                    {
                        j = i;
                        flag = 1;
                    }
                }
                if (flag)
                {
                    scanf(
                        "%s %s %d %d %d %lf %lf %lf",
                        name[j],
                        sex[j],
                        &year[j],
                        &month[j],
                        &day[j],
                        &x[j],
                        &y[j],
                        &z[j]
                        );

                    sum[j] = x[j] + y[j] + z[j];
                    avg[j] = sum[j] / 3.0;

                    printf(
                        "%s %s %s %d %d %d %.1lf %.1lf %.1lf %.1lf %.1lf\n",
                        num[j],
                        name[j],
                        sex[j],
                        year[j],
                        month[j],
                        day[j],
                        x[j],
                        y[j],
                        z[j],
                        avg[j],
                        sum[j]
                        );
                }
                else
                {
                    scanf(
                        "%s %s %d %d %d %lf %lf %lf",
                        name[p],
                        sex[p],
                        &year[p],
```

```
454.                        &month[p],
455.                        &day[p],
456.                        &x[p],
457.                        &y[p],
458.                        &z[p]
459.                        );
460.                    printf("Failed\n");
461.                }
462.            }
463.            else if (strcmp(del, str) == 0)
464.            {
465.                char id[100];
466.                scanf("%s", id);
467.                printf("Delete:\n");
468.                int flag = 0;
469.                int j;
470.                for (int i = 0; i < p; i++)
471.                {
472.                    if (strcmp(num[i], id) == 0)
473.                    {
474.                        j = i;
475.                        flag = 1;
476.                    }
477.                }
478.                if (flag)
479.                {
480.                    for (int i=j+1; i < p; i++)
481.                    {
482.                        strcpy(num[i-1], num[i]);
483.                        strcpy(name[i-1], name[i]);
484.                        strcpy(sex[i-1], sex[i]);
485.                        year[i-1] = year[i];
486.                        month[i-1] = month[i];
487.                        day[i-1] = day[i];
488.                        x[i-1] = x[i];
489.                        y[i-1] = y[i];
490.                        z[i-1] = z[i];
491.                        sum[i-1] = sum[i];
492.                        avg[i-1] = avg[i];
493.                    }
494.                    p--;
495.                    printf("Deleted\n");
496.                }
497.                else
498.                {
499.                    printf("Failed\n");
500.                }
501.            }
502.            scanf("%s", str);
503.        }
504.        printf("Good bye!\n");
505.        return 0;
506.    }
```

八、判题结果

AC - 答案正确

判题结果补充说明：

test id:3824,result:AC, usedtime:0MS, usedmem:1040KB,score:50 test id:3825,result:AC, usedtime:0MS,
usedmem:1040KB,score:50