《C 语言程序设计》课程设计

实验报告

题目：伦敦奥运会信息管理系统

专业：计算机科学与技术

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Contents

1 本系统功能及特色介绍

1.1 列表视图

本系统采用列表视图，将代表团、参赛项目、运动员三级放到界面左侧同一列表下，通过左右方向键进行不同级别链表的切换，同时在右侧显示当前节点的信息，在选中的节点上摁 Enter 可以进行插入或者修改或者删除等不同的操作，直观便捷。

1.2 支持 Linux 系统

本信息管理系统在 Linux 下开发完成，弥补 Linux 平台下因为软件少而可能没有类似软件的缺憾。

1.3 简洁的界面

界面采用 Ncurses 字符终端处理库，所有界面均由作者独立完成，简洁却具备所有功能。键盘操作更快捷。

1.4 支持中文输入

本系统在支持英文输入前提下，还支持中文输入和中英文混合输入，方便中国用户。

1.5 增强用户体验

本系统开启时自动加载数据文件，退出时如果没有保存还会提示是否保存。另外还可对输入数据进行判断是否合乎规定，避免出错。

1.6 人性化的查找系统

本信息管理系统不仅可以通过各级节点的编号查找，还可以通过名称查找，而且只需要对一个输入框输入，系统就可自动判别是编号还是名称而自动查找用户想要的数据

2 题目

2.1 题目：伦敦奥运会信息管理系统

2.2 需要处理的数据

2.2.1 代表团基本信息参考

中文字段名	类型及长度	举例
代表团编号	char[6]	100001
代表团名称	char[20]	中国体育代表团
所在国	char[20]	中华人民国和国
团长姓名	char[20]	
团长联系方式	char[20]	
参赛运动项目数	int	
参赛运动员数	int	
教练员人数	int	
裁判人数	int	
其他辅助人员人数	int	
代表团入住地址	char[20]	
代表团入住电话	char[20]	
预订房间数	int	
需配备翻译人数	int	
入住奥运村时间	char[20]	YYYY-MM-DD-HH-MM-SS
离开奥运村时间	char[20]	YYYY-MM-DD-HH-MM-SS

2.2.2 参赛项目基本信息参考

中文字段名	类型及长度	举例
参赛项目编号	char[4]	1005
参赛项目名称	char[20]	1005 代表男子 400 米
代表团编号	char[6]	100001
项目领队姓名	char[8]	
领队联系方式	char[20]	
教练员人数	int	
参赛运动员人数	int	
历次去的最好成绩	char[20]	
取得最好成绩时间	char[20]	YYYY-MM-DD-HH-MM-SS
取得最好成绩地点	char[20]	
违禁记录	char[1]	Y 有，N 无

2.2.3 参赛选手基本信息参考

中文字段名	类型及长度	举例
参赛选手编号	char[8]	
参赛项目编号	char[4]	
代表团编号	char[6]	
参赛选手姓名	char[8]	
姓名	char[1]	M/F
出生日期	char[12]	YYYY-MM-DD
出生地	char[20]	中国，湖北，武汉
身高	int	182cm
体重	int	75kg
入围成绩	char[20]	
最好成绩	char[20]	
兴趣爱好	char[256]	

2.3 需实现的系统功能

2.3.1 信息录入和插入

* 代表团基本信息录入和插入
* 参赛项目基本信息录入和插入
* 参赛选手基本信息录入和插入
* 其他基本信息录入和插入

2.3.2 信息修改

* 代表团基本信息修改
* 参赛项目基本信息修改
* 参赛选手基本信息修改
* 其他基本信息修改

2.3.3 信息删除

* 代表团基本信息删除
* 参赛项目基本信息删除
* 参赛选手基本信息删除
* 其他基本信息删除

2.3.4 信息查询

* 查询指定代表团的团长姓名、参赛运动项目数、参赛运动员人数、代表团入住地地址、入住奥运村时间和离开奥运村时间。
* 查询某代表团中某参赛项目的领队姓名、参赛运动员人数、历次取得最好成绩，以及是否存在违禁记录信息。
* 查询某参赛项目的参赛运动员人数最多的领队姓名、代表团名称。
* 查询指定参赛项目中运动成绩最好的运动员姓名、年龄、身高、体重信息。

2.3.5 数据统计

* 统计并输出本届奥运会总参赛运动项目数，总参赛运动员人数，总教练员人数，总裁判人数。
* 统计并输出某指定参赛项目的参赛运动员人数、教练员人数、有违禁记录的代表团数。
* 统计并输出本届奥运会参赛男女运动员的人数。
* 统计并输出参赛运动员人数位居前三名的运动项目的名称。
* 统计并输出本届奥运会体重居前三名运动员姓名，年龄，身高。

3 系统功能模块结构图

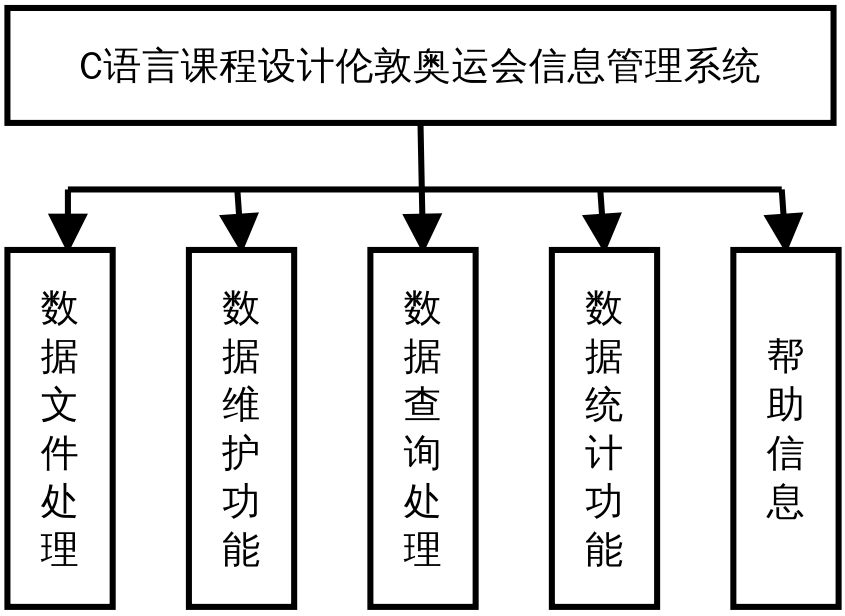


图1,系统功能模块结构图示

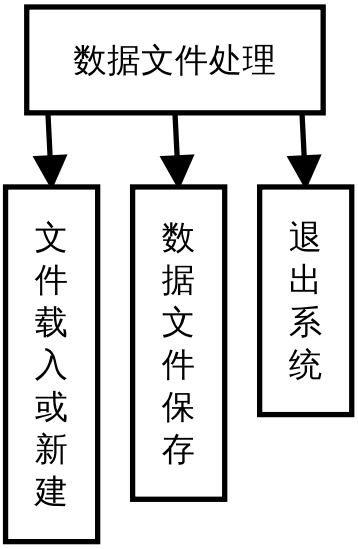


图2.数据文件处理结构图示

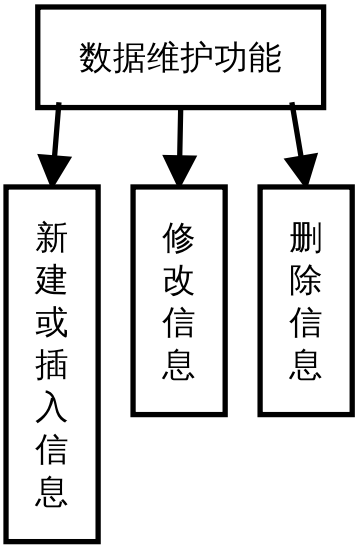


图3.数据维护结构图示

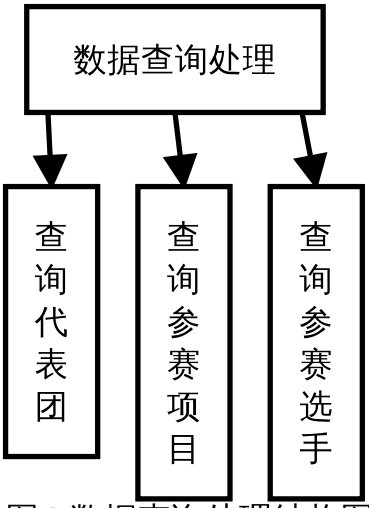


图4.数据查询处理结构图示

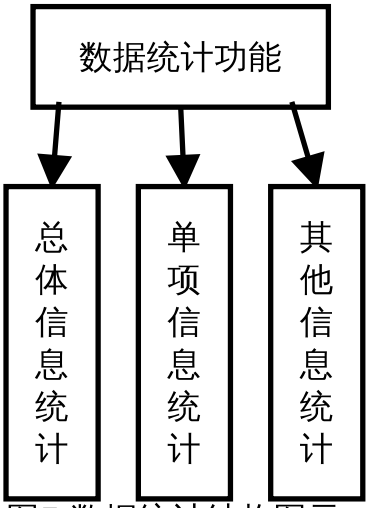


图5.数据统计结构图示

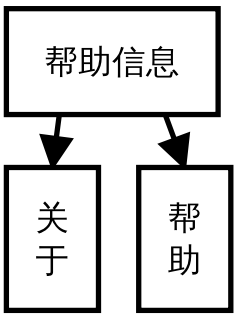


图6.帮助信息结构图示

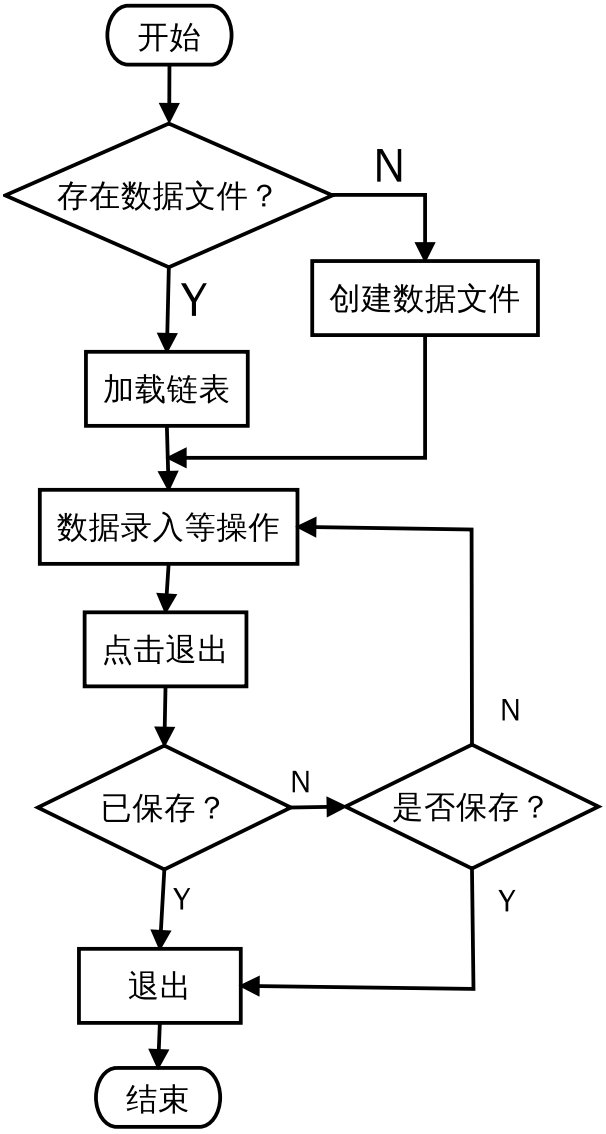
4 数据结构设计

```
typedef struct _mission {                   //代表团结构体
    char index[6+1];                        //代表团编号
    char name[20+10+1];                     //代表团名称
    char country[20+10+1];                  //所在国
    char headerName[20+10+1];               //团长姓名
    char headerContact[20+10+1];            //团长联系方式
    int numSports;                          //参赛运动项目数
    int numSportsman;                       //参赛运动员人数
    int numCoach;                           //教练员人数
    int numJudge;                           //裁判人数
    int numOtherman;                        //其他辅助人员人
    char address[20+10+1];                  //代表团入住地地
    char telephone[20+10+1];                //代表团入住地电
    int numRoom;                            //预定房间数
    int numTranslator;                      //需配备翻译人数
    char timeIn[20+10+1];                   //入住奥运村时间
    char timeOut[20+10+1];                  //离开奥运村时间
    struct _mission* next;                  //下一个节点
    struct _entries* headEntries;           //参赛项目头指针
}Mission;

typedef struct _entries{                    //参赛项目结构体
    char index[4+1];                        //参赛项目编号
    char name[20+10+1];                     //参赛项目名称
    char missionIndex[6+1];                 //代表团编号
    char leaderName[8+4+1];                 //项目领队姓名
    char leaderContact[20+10+1];            //领队联系方式
    int numCoach;                           //教练员人数
    int numSportsman;                       //参赛运动员人数
    char bestAch[20+10+1];                  //历次取得最好成绩
    char bestAchTime[20+10+1];              //取得最好成绩时间
    char bestAchLoc[20+10+1];               //取得最好成绩地点
    char isBan;                             //违禁记录
    struct _entries* next;                  //下一个节点
    struct _sportsman* headSportsman ;      //参赛选手头指针
}Entries;

typedef struct _sportsman{                  //参赛选手结构体
    char index[8+1];                        //参赛选手编号
    char entriesIndex[4+1];                 //参赛项目编号
    char missionIndex[6+1];                 //代表团编号
    char name[8+4+1];                       //参赛选手姓
    char sex;                               //性别
    char birthday[12+1];                    //出生日期
    char hometown[20+10+1];                 //出生地
    int height;                             //身高
    int weight;                             //体重
```

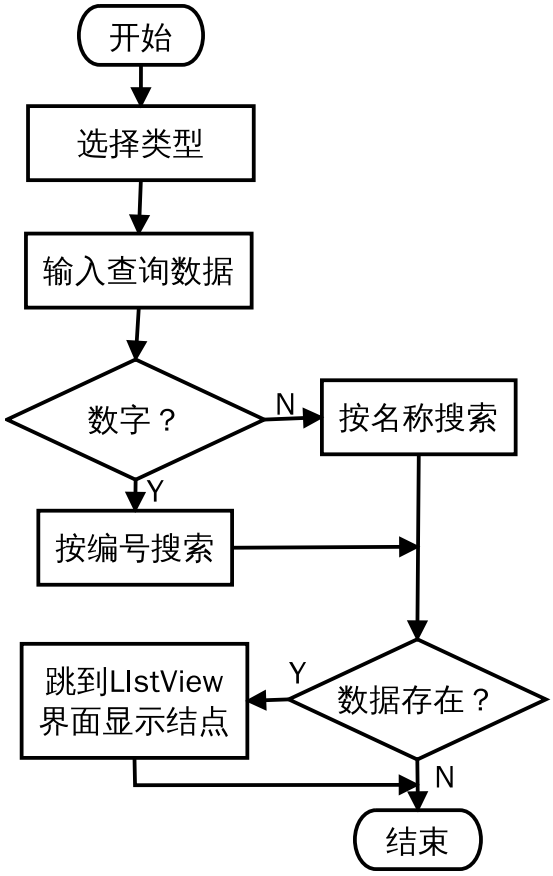
```
    char finalistAch[20+10+1];          //入围成绩
    char bestAch[20+10+1];              //最好成绩
    char hobby[256+1];                  //兴趣爱好
    struct _sportsman* next;            //下一个节点
}Sportsman;
```

5 程序结构（流程图）

5.1 软件打开加载流程图



5.2 数据查询流程图



6 功能模块及操作说明

6.1 打开软件

在 Linux 终端下进入本软件所在文件夹，打开本软件。第一次进入会自动在本软件所在文件夹内生成三个文件 mission.info，entries.info，sportsman.info 以储存数据，以后每次进入都会自动读取文件生成十字交叉链表。

6.2 保存、清空、退出

保存和清空时都会进行询问，以确保用户数据的安全性；退出时如果数据没有被修改则不进行询问直接退出，否则询问是否保存。

6.3 录入与插入信息

选择维护 -> 输入 -> 任意一选项即可进入新建节点的界面，该界面左边是一个 ListView，通过上下方向键对节点进行选择，同时右边区域会及时的显示当前节点的信息。最后一个节点是作者设置的空节点以方便保存。通过左右方向键切换链表的等级，右键进入该节点的下一等级的节点，左方向键进入该节点上一等级的节点。在选择好的节点上单击 Enter 即可进入输入模式，切换到中间的 Editbox 输入信息，当输入完毕后再摁 Enter 键进入右边的按钮区进行保存、清空或退出等操作。保存是保存到当前选中的节点之前。

6.4 修改节点

修改功能的界面与输入界面一样，区别在于当在保存按钮那里摁 Enter 键时会将当前选中的节点的信息进行修改。

6.5 删除节点

删除功能的界面与输入界面一样，区别在于最后是删除当前节点以及它的所有子节点。

6.6 查询功能

当进入查询菜单并且选择对应的查询后，会打开查询窗口，中间有一个输入框，本软件的查询功能可检测用户输入的是字符串还是数字，若是数字则按编号查询，若是字符串则按名称查询。如果查询成功则跳到新建界面的对应节点上，否则弹出没有查询到数据的对话框。

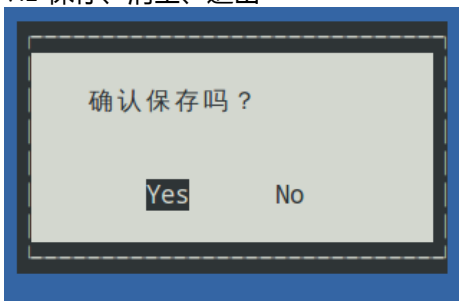
6.7 统计功能

统计菜单包含三项总体、单项、其他，加起来就实现了要求的所有功能。因为其他选项在统计之前要求用户保存文件，所以如果数据被修改的话，会询问是否保存。

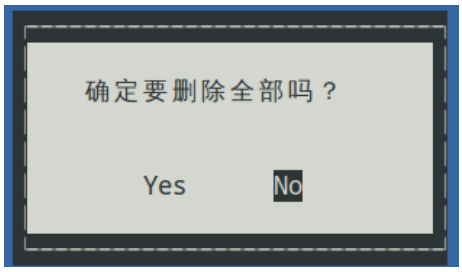
7　试验结果

7.1 整体界面

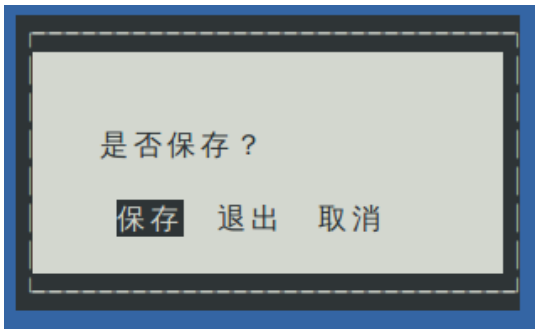
7.2 保存、清空、退出



保存及保存成功

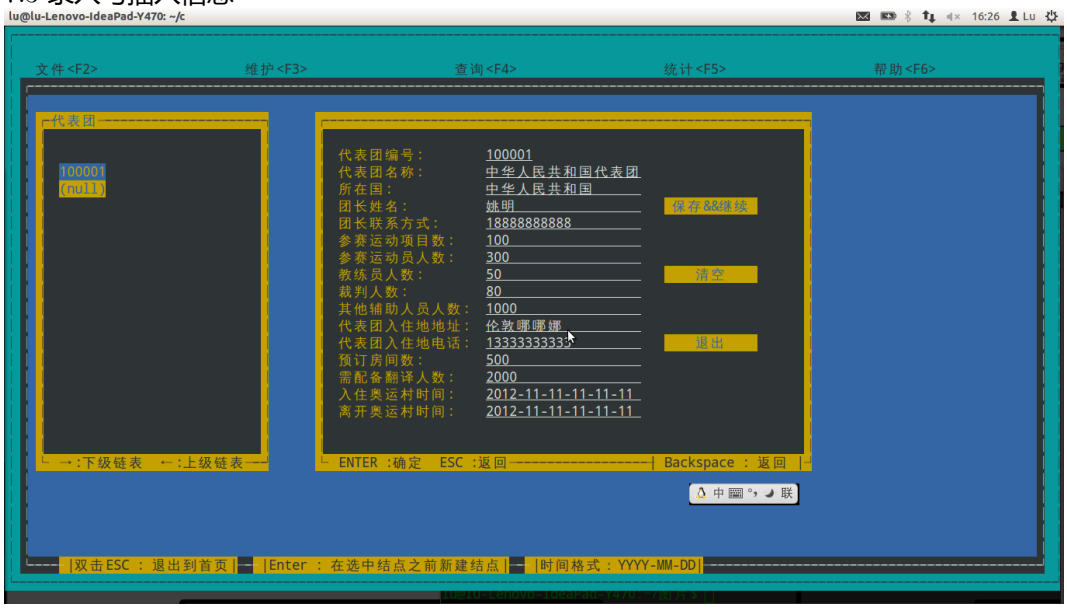


清空及清空成功



退出时询问

7.3 录入与插入信息

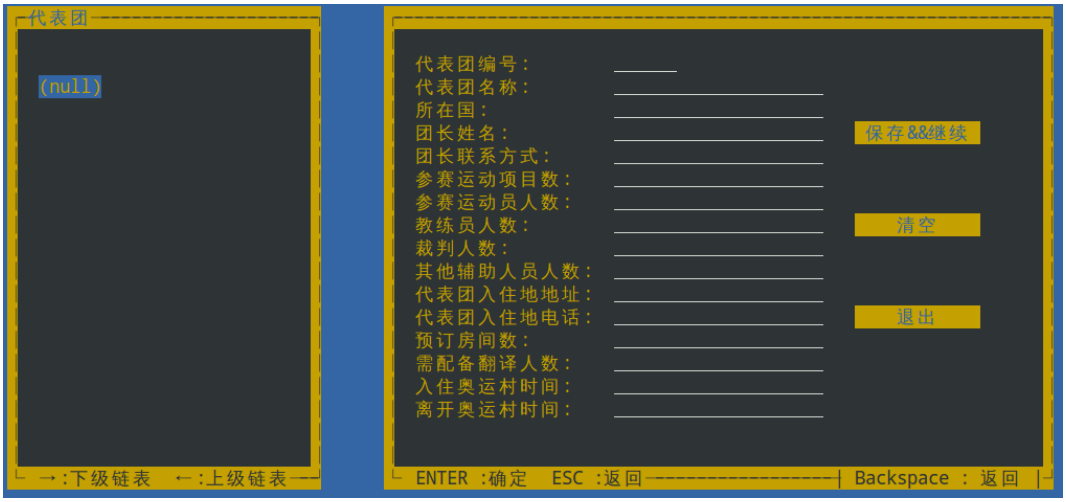


整个输入界面

7.4 修改节点

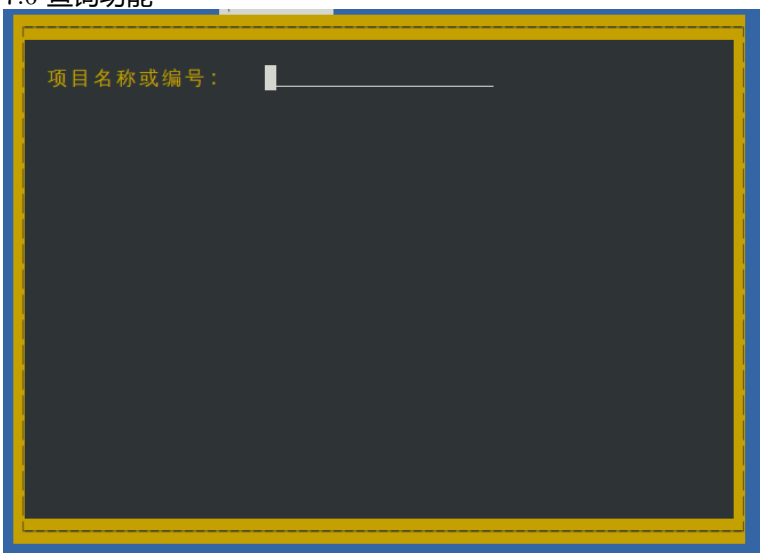
与添加无太大区别，不再贴图.7.5 删除节点

删除与删除成功



删除成功后的列表

7.6 查询功能

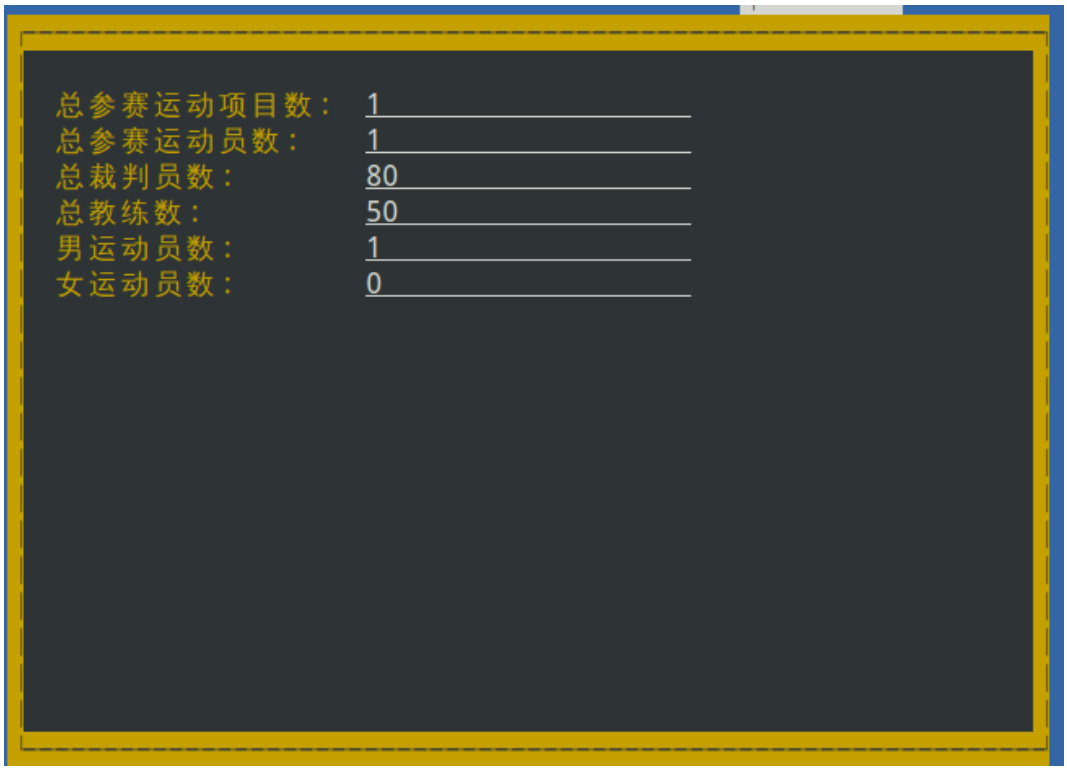


查询界面

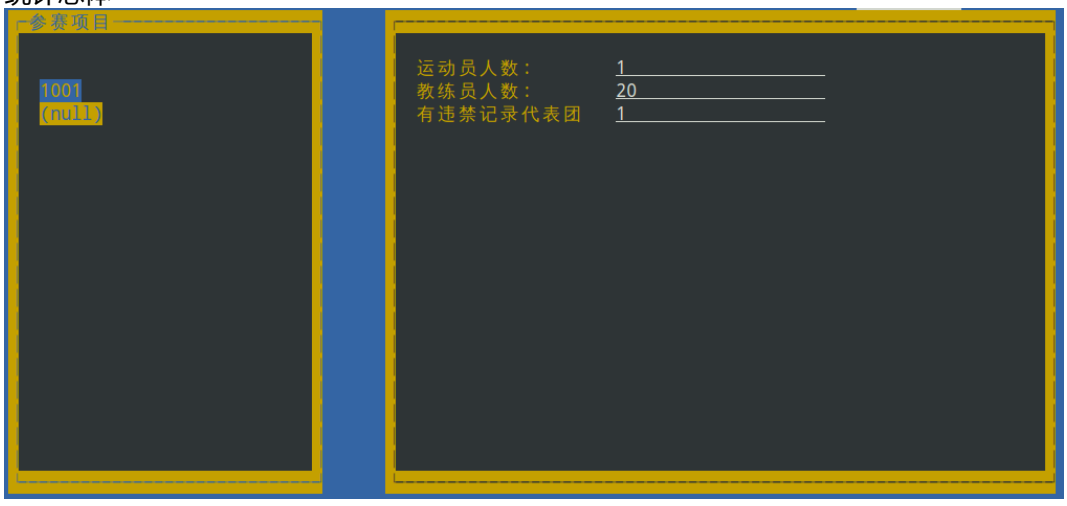
没有找到数据对话框

7.7 统计功能

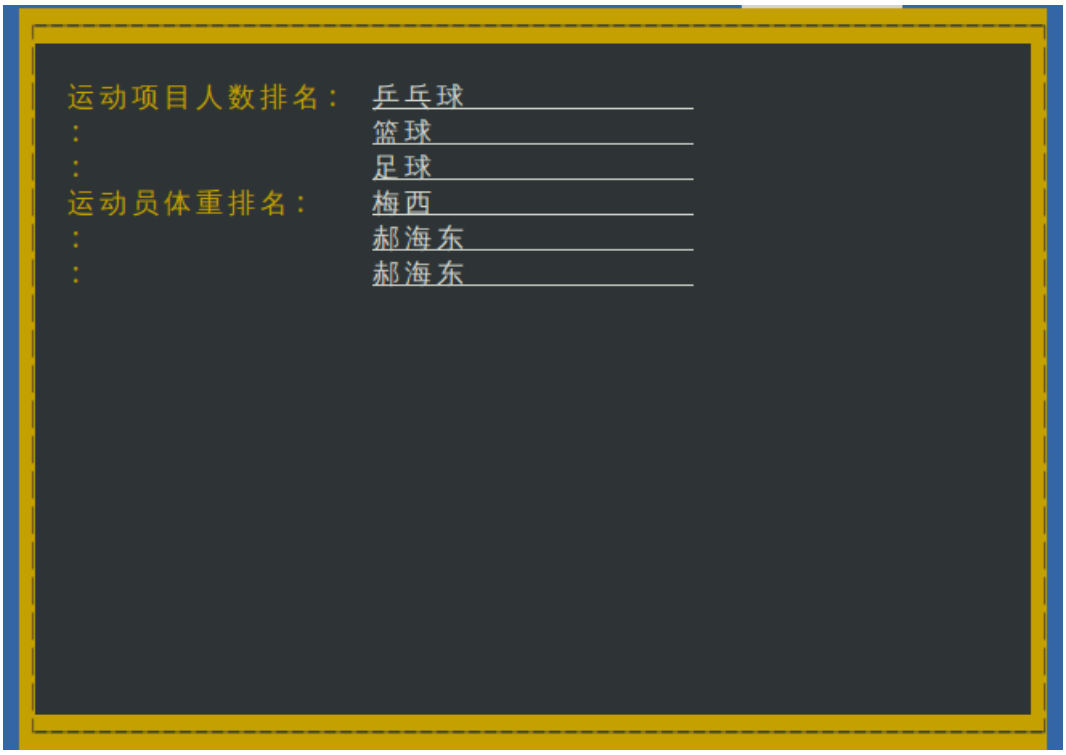
以下是截图即可清晰的显示每一项的功能。



统计总体



统计参赛项目单项



统计其他

7.8 关于

关于界面

8　体会

9 附录：程序源代码

9.1 前言

本系统在 Linux 下用 vim 编辑完成，用 ncurses 图形库，Makefile 将在下面给出。
Makefile 使用方法：
将 3 个 c 文件与一个头文件放在同一目录下，打开终端切换到该目录，输入以下命令：
vim Makefile
将下面 Makefile 的内容复制进去：“+p
保存：:wq
在终端 Makefile 所在目录下输入 make 即可编译完成。
输入./main 运行本软件

9.2 Makefile

```
main : main.o draw.o list.o
gcc -o main -Wall -g main.o draw.o list.o -lncursesw -lformw

main.o : main.c drawnlist.h
gcc -c -g main.c

draw.o : draw.c drawnlist.h
gcc -c -g draw.c

list.o : list.c drawnlist.h
gcc -c -g list.c

clean :
rm edit main.o draw.o list.o
```

9.3 main.c

```
#include "drawnlist.h"

int main(int argc, char **argv)
{
    initScreen();       //初始化屏幕
    initColor();        //初始化颜色
    bkgd(COLOR_PAIR(1));//给背景设定颜色
    box(stdscr, 0, 0);  //画边框
    editWin = newwin(LINES-4, COLS-4, 3, 2);
    wbkgd(editWin, COLOR_PAIR(2));
    wattron(editWin, COLOR_PAIR(3));    //当前使用该色彩
    box(editWin, 0, 0);
    wattroff(editWin, COLOR_PAIR(3));   //不使用该色彩了
    wattron(editWin,COLOR_PAIR(7));
    initMenu(); //初始化菜单
    draw_main_menu(stdscr); //画菜单
    initList(); //初始化链表
    while(isOn){
        wnoutrefresh(stdscr);
        wnoutrefresh(editWin);
        doupdate();
```

```
        drawMenuList(0, 0);
        touchwin(editWin);
        wrefresh(editWin);
    }
    exitScreen();   //退出函数
    return 0;
}
```

9.4 drawnlist.c

```
#include <ncurses.h>/* stdio.h 也被包含在 ncurses.h 里面 */
#include <stdlib.h>
#include <string.h>
#include <locale.h>
#include <form.h>

#define MAIN_MENU_NUM 5
#define SUB_MENU_NUM 1
#define KEY_ESC 27
#define ENTER 10
#define MENUNAME_LEN 20
#define MAX_MENU_ITEMS 10

#define NORMAL 0
#define SKIP -1
#define DIALOG -2
#define SAVE -3
#define CREATE -3
#define CREATE_MISSION -30
#define CREATE_ENTRIES -31
#define CREATE_SPORTSMAN -32
#define CHANGE -4
#define CHANGE_MISSION -40
#define CHANGE_ENTRIES -41
#define CHANGE_SPORTSMAN -42
#define DELETE -5
#define DELETE_MISSION -50
#define DELETE_ENTRIES -51
#define DELETE_SPORTSMAN -52
#define STA_ALL -63
#define STA_SINGER -74
#define STA_OTHER -85
#define QUERY -9
#define QUERY_MISSION -96
#define QUERY_ENTRIES -97
#define QUERY_SPORTSMAN -98
#define HELP -10
#define EXIT -'q'

#define ARRAY_SIZE(a) (sizeof(a)/sizeof(a[0]))

struct MenuList {
    char menuname[MENUNAME_LEN];
    char str[MAX_MENU_ITEMS][MENUNAME_LEN];
    int type[MAX_MENU_ITEMS];//正数代表有子菜单且子菜单序号，负数代表其他功能
    int n;
} menuList[MAIN_MENU_NUM + SUB_MENU_NUM];

/*UTF8 中每个汉字 3 个字节，
 * 因此以下凡是有可能出现汉字的字符串
 * 长度一律 ×1.5
 */
```

```
typedef struct _mission {                //代表团结构体
    char index[6+1];                     //代表团编号
    char name[20+10+1];                  //代表团名称
    char country[20+10+1];               //所在国
    char headerName[20+10+1];            //团长姓名
    char headerContact[20+10+1];         //团长联系方式
    int numSports;                       //参赛运动项目数
    int numSportsman;                    //参赛运动员人数
    int numCoach;                        //教练员人数
    int numJudge;                        //裁判人数
    int numOtherman;                     //其他辅助人员人
    char address[20+10+1];               //代表团入住地地
    char telephone[20+10+1];             //代表团入住地电
    int numRoom;                         //预定房间数
    int numTranslator;                   //需配备翻译人数
    char timeIn[20+10+1];                //入住奥运村时间
    char timeOut[20+10+1];               //离开奥运村时间
    struct _mission* next;               //下一个结点
    struct _entries* headEntries;        //参赛项目头指针
}Mission;

typedef struct _entries{                 //参赛项目结构体
    char index[4+1];                     //参赛项目编号
    char name[20+10+1];                  //参赛项目名称
    char missionIndex[6+1];              //代表团编号
    char leaderName[8+4+1];              //项目领队姓名
    char leaderContact[20+10+1];         //领队联系方式
    int numCoach;                        //教练员人数
    int numSportsman;                    //参赛运动员人数
    char bestAch[20+10+1];               //历次取得最好成绩
    char bestAchTime[20+10+1];           //取得最好成绩时间
    char bestAchLoc[20+10+1];            //取得最好成绩地点
    char isBan;                          //违禁记录
    struct _entries* next;               //下一个结点
    struct _sportsman* headSportsman ;   //参赛选手头指针
}Entries;

typedef struct _sportsman{
    char index[8+1];                     //参赛选手编号
    char entriesIndex[4+1];              //参赛项目编号
    char missionIndex[6+1];              //代表团编号
    char name[8+4+1];                    //参赛选手姓
    char sex;                            //性别
    char birthday[12+1];                 //出生日期
    char hometown[20+10+1];              //出生地
    int height;                          //身高
    int weight;                          //体重
    char finalistAch[20+10+1];           //入围成绩
    char bestAch[20+10+1];               //最好成绩
    char hobby[256+1];                   //兴趣爱好
    struct _sportsman* next;
}Sportsman;


extern void initScreen(void);
extern void initColor(void);
extern void initMenu(void);
extern void draw_main_menu(WINDOW *win);
extern void drawMenuList(int m, int t);
extern void moveMenuList(int m, int n);
extern void drawSubmenuList(int m, int n, int k);
extern void moveSubmenuList(int m, int t, int k);
```

```
extern void moveMenuItem(int *,int *,int);
extern int doNext(int ,int ,_Bool *);
extern void exitScreen(void);
extern void drawListview(int,int);
extern void createEditbox(int,int,int);
extern int drawButtons(WINDOW**,int,int,int,int type);
extern void cleanFields();
extern void createStaEditbox(int type,int index,int flag);

extern void initList(void);
extern void saveList();

extern Mission* headMission ;
extern Mission* tailMission ;

extern WINDOW *menu_win[MAIN_MENU_NUM];
extern WINDOW *sub_win[SUB_MENU_NUM];
extern WINDOW *editWin;
extern WINDOW   *helpWin;

extern int screenHeight,screenWidth;
extern int isOn ;
extern int      isChanged;
extern int mIndex,eIndex,sIndex;
extern char *info[9][17];
extern char *stringButton[][3];

extern FIELD *fields[17];

extern int addMissionNode(int );
extern int addEntriesNode(int );
extern int addSportsmanNode(int );
extern void delNode(int type);
extern void delMissionNode(Mission* priM);
extern void delEntriesNode(Entries** phE,Entries** priE);
extern void delSportsmanNode(Sportsman** phS,Sportsman** priS);
extern void addMissionInfo(Mission **p);
extern void addEntriesInfo(Entries**);
extern void addSportsmanInfo(Sportsman**);

extern void setMInfo2Fields(Mission *pM);
extern void setEInfo2Fields(Entries *pE);
extern void setSInfo2Fields(Sportsman *pS);
extern void setInfo2Fields(int type);
extern void setIndex2Fields(int type);
extern Mission* fMByIndex();
extern Entries* fEByIndex();
extern Sportsman* fSByIndex();
extern void set2Fields(int type,int flag);
extern void calStaNSet2Fields();
extern void calOthNSet2Fields();
extern void calSigNSet2Fields();
extern int calMSportsmanNum(Mission* pM,int* mN, int* fN);
extern int calESportsmanNum(Entries* pE,int* mN,int* fN);
extern int checkIsStd(int type);
extern int queryGoal(int type,char* name);
extern void deleteAllList();
```

9.5 draw.c

```
#include "drawnlist.h"
```

```
WINDOW *menu_win[MAIN_MENU_NUM];//一级子菜单窗口
WINDOW *sub_win[SUB_MENU_NUM];//二级子菜单窗口
WINDOW *editWin;//主界面

FIELD *fields[17];//输入框

int screenHeight,screenWidth;//屏幕高度，宽度
int isOn = 1;
//三个级别的菜单的标号，-1 代表不是当前菜单
int mIndex = 0,eIndex = -1,sIndex = -1;
int shortcutsF(int);//F(n) 快捷键
int getFieldLength(int type,int i);//定义文本域长度
void changeMESIndex(int uod,int size);//改变 List 标号
int drawSelDialog(char* str,int index);//绘画选择对话框
void drawOKDialog(char* str);//绘画通知对话框
void createStaEditbox(int type,int index,int flag);
int getFieldsNum(int type);
void initFields(WINDOW* formWin,int type);
void drawStaListview(int type,int typeindex,int index);
void createQueryEditbox(int type);
int drawSaveDialog(void);
void createHelpEditbox();

/* 各种名称 */
char *info[9][17]={//代表团，参赛项目，运动员
    {//16+1
        " 代表团编号",
        " 代表团名称",
        " 所在国",
        " 团长姓名",
        " 团长联系方式",
        " 参赛运动项目数",
        " 参赛运动员人数",
        " 教练员人数",
        " 裁判人数",
        " 其他辅助人员人数",
        " 代表团入住地地址",
        " 代表团入住地电话",
        " 预订房间数",
        " 需配备翻译人数",
        " 入住奥运村时间",
        " 离开奥运村时间",
        (char *)NULL,
    },
    {//11+1
        " 参赛项目编号",
        " 参赛项目名称",
        " 代表团编号",
        " 项目领队姓名",
        " 领队联系方式",
        " 教练员人数",
        " 参赛运动员人数",
        " 历次去的最好成绩",
        " 去的最好成绩时间",
        " 去的最好成绩地点",
        " 违禁记录",
        (char *)NULL,
    },
    {//12+1
        " 参赛选手编号",
        " 参赛项目编号",
```

```
            " 代表团编号",
            " 参赛选手姓名",
            " 性别",
            " 出生日期",
            " 出生地",
            " 身高",
            " 体重",
            " 入围成绩",
            " 最好成绩",
            " 兴趣爱好",
            (char *)NULL,
        },
        {//6+1
            " 总参赛运动项目数",
            " 总参赛运动员数",
            " 总裁判员数",
            " 总教练数",
            " 男运动员数",
            " 女运动员数",
            (char *)NULL,
        },
        {//3+1
            " 运动员人数",
            " 教练员人数",
            " 有违禁记录代表团数",
            (char*)NULL,
        },
        {//2+1
            " 运动项目人数排名",
            "",
            "",
            " 运动员体重排名",
            "",
            "",
            (char *)NULL,
        },
        {
            " 代表团名称或编号",
            (char *)NULL,
        },
        {
            " 项目名称或编号",
            (char *)NULL,
        },
        {
            " 运动员名称或编号",
            (char *)NULL,
        },
};

/*button 的名称 */
char *stringButton[][3]={
    {
        " 保存 && 继续 ",
        "    清空    ",
        "    退出    ",
    },
    {
        "   新建   ",
        "   修改   ",
    }
};
```

```
/* 初始化屏幕 */
void initScreen(void)
{
    setlocale(LC_ALL,"");//使支持 utf-8
    initscr(); //初始化 ncurses
    noecho(); //输入的字符不可见
    cbreak(); //直接被利用
    getmaxyx(stdscr,screenHeight,screenWidth);//获取屏幕高宽
    start_color();
    curs_set(0);//使光标隐藏
}

/* 初始化各种颜色 */
void initColor(void)
{
    init_pair(1, COLOR_BLACK, COLOR_CYAN);
    init_pair(2, COLOR_CYAN, COLOR_BLUE);
    init_pair(3, COLOR_WHITE, COLOR_BLACK);
    init_pair(4, COLOR_BLACK, COLOR_WHITE);
    init_pair(5, COLOR_GREEN, COLOR_BLACK);
    init_pair(6, COLOR_BLUE, COLOR_YELLOW);
    init_pair(7 ,COLOR_BLACK, COLOR_YELLOW);
}

/*
 *setMenuText
 * */
void initMenu(void)
{
    int i;
    for (i = 0; i < MAIN_MENU_NUM; ++i)
        menu_win[i] = NULL;
    for (i = 0; i < SUB_MENU_NUM; ++i)
        sub_win[i] = NULL;
    strcpy(menuList[0].menuname, " 文件<F2>");
    strcpy(menuList[0].str[0],"<------->");
    strcpy(menuList[0].str[1], " 保存");
    menuList[0].type[1] = SAVE;
    strcpy(menuList[0].str[2], " 清空");
    menuList[0].type[2] = DELETE;
    strcpy(menuList[0].str[3], "--------");
    menuList[0].type[3] = SKIP;
    strcpy(menuList[0].str[4], " 退出");
    menuList[0].type[4] = EXIT;
    menuList[0].n = 5;

    strcpy(menuList[1].menuname, " 维护<F3>");
    strcpy(menuList[1].str[0],"<------->");
    strcpy(menuList[1].str[1], " 输入 ->");
    menuList[1].type[1] = 1;
    strcpy(menuList[1].str[2], " 修改");
    // menuList[1].type[2] = 3;
    menuList[1].type[2] = CHANGE_MISSION;
    strcpy(menuList[1].str[3]," 删除");
    //  menuList[1].type[3] = 4;
    menuList[1].type[3] = DELETE_MISSION;
    menuList[1].n = 4;

    strcpy(menuList[2].menuname, " 查询<F4>");
    strcpy(menuList[2].str[0],"<------->");
    strcpy(menuList[2].str[1], " 代表团");
```

```
    menuList[2].type[1] = QUERY_MISSION;
    strcpy(menuList[2].str[2], " 项目");
    menuList[2].type[2] = QUERY_ENTRIES;
    strcpy(menuList[2].str[3], " 运动员");
    menuList[2].type[3] = QUERY_SPORTSMAN;
    menuList[2].n = 4;

    strcpy(menuList[3].menuname, " 统计<F5>");
    strcpy(menuList[3].str[0],"<------->");
    strcpy(menuList[3].str[1], " 总体");
    menuList[3].type[1] = STA_ALL;
    strcpy(menuList[3].str[2], " 单项");
    menuList[3].type[2] = STA_SINGER;
    strcpy(menuList[3].str[3]," 其他");
    menuList[3].type[3] = STA_OTHER;
    menuList[3].n = 4;

    strcpy(menuList[4].menuname, " 帮助<F6>");
    strcpy(menuList[4].str[0],"<------->");
    strcpy(menuList[4].str[1], " 关于");
    menuList[4].type[1] = -2;
    strcpy(menuList[4].str[2], " 帮助");
    menuList[4].type[2] = HELP;
    menuList[4].n = 3;

    //以下是子菜单
    strcpy(menuList[5].str[0], " 代表团");
    menuList[5].type[0] = CREATE_MISSION;
    strcpy(menuList[5].str[1], " 项目");
    menuList[5].type[1] = CREATE_ENTRIES;
    strcpy(menuList[5].str[2], " 运动员");
    menuList[5].type[2] = CREATE_SPORTSMAN;
    menuList[5].n = 3;
}

/* 画主菜单 */
void draw_main_menu(WINDOW *win)
{
    int i;
    for (i = 0; i < MAIN_MENU_NUM; ++i)
        mvwprintw(win, 2, 4+i*screenWidth/5, menuList[i].menuname);
}

/*!
  画一级子菜单
  \param m: 主菜单第 m 项 t: 子菜单第 t 项
  */
void drawMenuList(int m, int t)
{
    int i;
    curs_set(0);
    wattron(editWin, COLOR_PAIR(3));
    box(editWin, 0, 0);
    wattroff(editWin, COLOR_PAIR(3));
    if (NULL == menu_win[m]) {
        menu_win[m] = newwin(2+menuList[m].n, 10, 3, 4+m*screenWidth/5);
        wbkgd(menu_win[m], COLOR_PAIR(4));
    }

    touchwin(editWin);
    wrefresh(editWin);
    box(menu_win[m], 0, 0);
```

```
    //画各项，选中的反色显示
    for (i = 0; i < menuList[m].n; ++i) {
        if (t == i) wattron(menu_win[m], A_REVERSE);
        mvwprintw(menu_win[m], i+1, 1, menuList[m].str[i]);
        if (t == i) wattroff(menu_win[m], A_REVERSE);
    }
    wrefresh(menu_win[m]);
    moveMenuList(m, t);//进入监听
    delwin(menu_win[m]);
}

/*!
  在一级子菜单下对键盘的监听
  \param m: 主菜单第 m 项 t: 子菜单第 t 项
  */
void moveMenuList(int m, int t)
{
    int ch;
    bool bdomenu = TRUE;

    keypad(menu_win[m], TRUE);
    while (bdomenu) {
        ch = wgetch(menu_win[m]);
        //对快捷键 F(n) 判断
        if((shortcutsF(ch))) bdomenu =FALSE;
        switch (ch) {
            case KEY_ESC:
                drawMenuList(m, 0);
                bdomenu = FALSE;
                break;
            case 'q':
                drawMenuList(0, 5);
                bdomenu = FALSE;
                break;
            case KEY_LEFT:
                drawMenuList((m+MAIN_MENU_NUM-1)%MAIN_MENU_NUM, 0);
                bdomenu = FALSE;
                break;
            case KEY_RIGHT:
                //有子菜单则画出子菜单，否则往右移动
                if(menuList[m].type[t]>0){
                    drawSubmenuList(m, t, MAIN_MENU_NUM+menuList[m].type[t]-1);
                    drawMenuList(m, 0);
                } else{
                    drawMenuList((m+MAIN_MENU_NUM+1)%MAIN_MENU_NUM, 0);
                }

                bdomenu = FALSE;
                break;
            case KEY_UP:
                mvwprintw(menu_win[m], t+1, 1, menuList[m].str[t]);
                t = (t+menuList[m].n-1)%menuList[m].n;
                moveMenuItem(&m,&t,-1);
                wattron(menu_win[m], A_REVERSE);
                mvwprintw(menu_win[m], t+1, 1, menuList[m].str[t]);
                wattroff(menu_win[m], A_REVERSE);
                break;
            case KEY_DOWN:
                mvwprintw(menu_win[m], t+1, 1, menuList[m].str[t]);
                t = (t+menuList[m].n+1)%menuList[m].n;
                moveMenuItem(&m,&t,1);
```

```
                wattron(menu_win[m], A_REVERSE);
                mvwprintw(menu_win[m], t+1, 1, menuList[m].str[t]);
                wattroff(menu_win[m], A_REVERSE);
                break;
            case ENTER:
                //做下一步
                if(doNext(m,t,&bdomenu)) break;
                drawMenuList(0,0);
                bdomenu = FALSE;
                break;
            default:
                break;
        }
    }
}

/*!
  偷懒做的函数，上下移并判断是否有 SKIP 以跳过
  \param uod 1down,-1up
  */
void moveMenuItem(int *m,int *t,int uod)
{
    if(menuList[*m].type[*t] == SKIP)
        *t +=uod;
}

/*!
  很重要的函数，对不同的情况判断决定一下步走向
  \param bdomenu: 使之变为 false 以结束调用该函数的函数的循环
  \return 不画子菜单为 0，反之为 1
  */
int doNext(int m,int t ,_Bool *bdomenu)
{
    int type = menuList[m].type[t];
    switch(type){
        case EXIT:
            //退出
            //如果保存了就直接退出
            if(!isChanged){
                exitScreen();
            }
            //如果没保存就询问
            switch(drawSaveDialog()){
                case 0:
                    saveList();
                    drawOKDialog(" 保存成功！");
                    exitScreen();
                    break;
                case 1:
                    exitScreen();
                    break;
                case 2:
                    drawMenuList(0,0);
                    break;
                default:
                    break;
            }
        case DIALOG://关于对话框
            drawOKDialog(" 伦敦奥运会管理系统 \n\t@author 路少德");
            drawMenuList(4,1);
            break;
        case SAVE:
```

```
            if (drawSelDialog(" 确认保存吗？",0)) {
                saveList();
                drawOKDialog(" 保存成功");
            } else{

            }
            touchwin(editWin);
            refresh();
            break;
        case DELETE:
            if((drawSelDialog(" 确定要删除全部吗？",1))){
                deleteAllList();
                drawOKDialog(" 全部删除成功！");
            }
            break;
        case SKIP:
            break;
        case CHANGE_MISSION:
        case DELETE_MISSION:
            mIndex = 0;eIndex = -1; sIndex = -1;
            drawListview(type,0);
            break;
        case STA_ALL:
        case STA_OTHER:
            if (!isChanged) {
                createStaEditbox(type,0,1);
            } else if (drawSelDialog(" 只有保存才能进入 \n\t 是否保存？",0)) {
                saveList();
                drawOKDialog(" 保存成功！");
                createStaEditbox(type,0,1);
            }
            break;
        case STA_SINGER:
            // drawList
            //加一个 listview
            mIndex = 0; eIndex = -1;sIndex = -1;
            drawStaListview(type,0,0);
            break;
        case QUERY_MISSION:
        case QUERY_ENTRIES:
        case QUERY_SPORTSMAN:
            createQueryEditbox(type);
            break;
        case HELP:
            createHelpEditbox();
        case 0 ://do some things
            break;
        default:
            drawSubmenuList(m,t,MAIN_MENU_NUM+type-1);
            *bdomenu = FALSE;
            return 1;
    }
    return 0;
}

/*!
  画二级子菜单
  \param k: 需要写的子菜单在 menuList 里的下标
  */
void drawSubmenuList(int m, int t, int k)
{
    int i, sub_index;
```

```
    wattron(menu_win[m], A_REVERSE);
    mvwprintw(menu_win[m], t+1, 1, menuList[m].str[t]);
    wrefresh(menu_win[m]);
    wattroff(menu_win[m], A_REVERSE);
    for(sub_index=0;sub_index<SUB_MENU_NUM;sub_index++){
        int listIndex = sub_index+MAIN_MENU_NUM;
        if (NULL == sub_win[sub_index]) {
            int w,h;
            switch(sub_index){//规定 sub_win 的位置
                case 0:
                    w=1;h=4;break;
            }
        sub_win[sub_index] = newwin(menuList[listIndex].n+2, 15, h, w*screenWidth/5+14);
            wbkgd(sub_win[sub_index], COLOR_PAIR(4));
            box(sub_win[sub_index], 0, 0);
            for (i = 0; i < menuList[listIndex].n; ++i) {
               mvwprintw(sub_win[sub_index], i+1, 1, menuList[listIndex].str[i]);
            }
        }
    }
    touchwin(editWin);
    sub_index = k-MAIN_MENU_NUM;
    wattron(sub_win[sub_index], A_REVERSE);
    mvwprintw(sub_win[sub_index], 1, 1, menuList[k].str[0]);
    wattroff(sub_win[sub_index], A_REVERSE);
    touchwin(sub_win[sub_index]);
    refresh();
    moveSubmenuList(m, t, k);
    delwin(sub_win[sub_index]);
    return;
}

/* 在二级子菜单下监听 */
void moveSubmenuList(int m, int t, int k)
{
    bool bdosubmenu = TRUE;
    int ch, sub_index, choice;

    if (menuList[m].type[t]>0) {
        //sub_index = k-MAIN_MENU_NUM;//sub_index=3 ???
        sub_index = 0;
    }
    keypad(sub_win[sub_index], TRUE);
    choice = 0;
    while (bdosubmenu) {
        ch = wgetch(sub_win[sub_index]);
        if((shortcutsF(ch))) bdosubmenu = FALSE;
        mvwprintw(sub_win[sub_index], choice+1, 1, menuList[k].str[choice]);
        switch (ch) {
            case KEY_ESC:
                //drawMenuList(m,t);
                return;
                bdosubmenu = FALSE;
            case KEY_RIGHT:
                drawMenuList(m+1,t);
                bdosubmenu = FALSE;
                break;
            case KEY_LEFT:
                if (0 <= sub_index)
                    drawMenuList(m, t);
                bdosubmenu = FALSE;
```

```
                break;
            case KEY_UP:
                choice = (choice+menuList[k].n-1)%menuList[k].n;
                break;
            case KEY_DOWN:
                choice = (choice+menuList[k].n+1)%menuList[k].n;
                break;
            case ENTER:
                touchwin(editWin);
                mvwprintw(sub_win[sub_index],choice+1,1,menuList[k].str[choice]);
                switch (-menuList[k].type[choice]%10) {
                    case 2:
                        sIndex = 0;
                    case 1:
                        eIndex = 0;
                    case 0:
                        mIndex = 0;
                        break;
                    default:
                        break;
                }
                drawListview(menuList[k].type[choice],0);//制作一个列表显示代表团等
信息
                break;
            default:
                break;
        }
        wattron(sub_win[sub_index], A_REVERSE);
        mvwprintw(sub_win[sub_index], choice+1, 1, menuList[k].str[choice]);
        wattroff(sub_win[sub_index], A_REVERSE);
        touchwin(editWin);
    }
}

/*!
  显示某类链表的数据
  \param type:0 ~ 3 三类链表 index: 链表内第 index 项
  */
void drawListview(int type,int index)
{
    touchwin(editWin);
    wattron(editWin,COLOR_PAIR(7));
    mvwprintw(editWin,screenHeight-5,5," | 双击 ESC : 退出到首页 |");
    mvwprintw(editWin,screenHeight-5,30," |Enter : 在选中结点之前新建结点 |");
    mvwprintw(editWin,screenHeight-5,65," | 时间格式：YYYY-MM-DD|");
    wattroff(editWin,COLOR_PAIR(7));
    wrefresh(editWin);
    //读取链表
    WINDOW* listWin;
    listWin = newwin(21,30,5,4);
    wbkgd(listWin,COLOR_PAIR(3));
    wattron(listWin,COLOR_PAIR(7));
    box(listWin,0,0);
    mvwprintw(listWin,20,1,"  → : 下级链表  ← : 上级链表");
    wattron(listWin,COLOR_PAIR(6));
    int i = 0;
    Mission *cM = headMission;
    Entries *cE ;
    Sportsman *cS;
    keypad(listWin,TRUE);
    switch(-type%10){
        case 0:
```

```
        while(cM){
            if(index == i) wattron(listWin,A_REVERSE);
            mvwprintw(listWin,i+3,3,"%s",cM->index);
            if(index == i) wattroff(listWin,A_REVERSE);
            cM = cM->next;
            i++;
        }
        if(index == i) wattron(listWin,A_REVERSE);
        mvwprintw(listWin,i+3,3,"%s",cM->index);
        if(index == i) wattroff(listWin,A_REVERSE);
        i++;
        mvwprintw(listWin,0,2," 代表团");
        break;
    case 1:
        cM = fMByIndex();
        cE = cM->headEntries;
        while(cE){
            if(index == i) wattron(listWin,A_REVERSE);
            mvwprintw(listWin,i+3,3,"%s",cE->index);
            if(index == i) wattroff(listWin,A_REVERSE);
            cE = cE->next;
            i++;
        }
        if(index == i) wattron(listWin,A_REVERSE);
        mvwprintw(listWin,i+3,3,"%s",cE->index);
        if(index == i) wattroff(listWin,A_REVERSE);
        i++;
        mvwprintw(listWin,0,2," 参赛项目");
        break;
    case 2:
        cE = fEByIndex();
        cS = cE->headSportsman;
        while(cS){
            if(index == i) wattron(listWin,A_REVERSE);
            mvwprintw(listWin,i+3,3,"%s",cS->index);
            if(index == i) wattroff(listWin,A_REVERSE);
            cS = cS->next;
            i++;
        }
        if(index == i) wattron(listWin,A_REVERSE);
        mvwprintw(listWin,i+3,3,"%s",cS->index);
        if(index == i) wattroff(listWin,A_REVERSE);
        i++;
        mvwprintw(listWin,0,2," 参赛运动员");
        break;
    default:
        break;
}
createEditbox(type,index,0);
wrefresh(listWin);
curs_set(0);
int ch,flag = 1;
while(flag){
    ch = wgetch(listWin);
    if((shortcutsF(ch))) break;
    switch(ch){
        case KEY_ESC:
            eIndex = -1;
            sIndex = -1;
            drawMenuList(1,0);
            flag = 0;
            break;
```

```
            case KEY_UP:
                changeMESIndex(-1,i);
                drawListview(type,(index+i-1)%i);
                flag = 0;
                break;
            case KEY_DOWN:
                changeMESIndex(1,i);
                drawListview(type,(index+i+1)%i);
                flag = 0;
                break;
            case KEY_LEFT:
                if(sIndex != -1){
                    sIndex = -1;
                    drawListview(type+1,eIndex);
                } else if(eIndex != -1){
                    eIndex = -1;
                    drawListview(type+1,mIndex);
                }
                break;
            case KEY_RIGHT:
                if(eIndex == -1){
                    if(mIndex == i-1) break;
                    eIndex = 0;
                    drawListview(type-1,eIndex);
                    flag = 0;
                } else if(sIndex == -1){
                    if(eIndex == i-1) break;
                    sIndex = 0;
                    drawListview(type-1,sIndex);
                    flag = 0;
                }
                break;
            case ENTER:
                switch(type/10){
                    case CREATE:
                    case CHANGE:
                        createEditbox(type,index,1);
                        flag = 0;
                        break;
                    case DELETE:
                        if(index == i-1) break;
                        if((drawSelDialog(" 确定要删除？",0))){
                            delNode(type);
                            drawOKDialog(" 已成功删除！");
                            drawListview(type,index);
                            flag = 0;
                        } else {

                        }
                        break;
                    default:
                        break;
                }
                break;
            default:
                break;
        }
    }
    refresh();
    delwin(listWin);
}
```

```
/*!
  显示某个结点的详细数据
  \param flag 是否进行监听
  */
void createEditbox(int type,int index,int flag)
{
    FORM *myForm;
    WINDOW *formWin;
    int rows,cols;

    formWin = newwin(21, 64, 5,40);
    wbkgd(formWin,COLOR_PAIR(3));
    wattron(formWin,COLOR_PAIR(7));
    box(formWin, 0, 0);
    mvwprintw(formWin,20,1,"  ENTER : 确定  ESC : 返回");
    mvwprintw(formWin,20,43,"| Backspace : 返回 |");
    initFields(formWin,type);
    set2Fields(type,flag);
    /* Create the form and post it */
    myForm = new_form(fields);
    /* Calculate the area required for the form */
    scale_form(myForm, &rows, &cols);

    keypad(formWin, TRUE);
    /* Set main window and sub window */
    set_form_win(myForm, formWin);
    set_form_sub(myForm, derwin(formWin, rows, cols, 2, 20));

    drawButtons(&formWin,-1,0,index,type);

    /* Print a border around the main window and print a title */
    post_form(myForm);
    curs_set(1);
    wrefresh(formWin);
    int ch;
    while(flag){//wgetch 的参数是谁就相当与实现了一次 touchwin
        ch=wgetch(formWin);
        if((shortcutsF(ch))) break;
        switch(ch){
            case KEY_ESC:
                drawListview(type,index);
                flag = 0;
                break;
            case '\t':
            case KEY_DOWN:
                form_driver(myForm, REQ_NEXT_FIELD);
                form_driver(myForm, REQ_END_LINE);
                break;
            case KEY_UP:
                form_driver(myForm, REQ_PREV_FIELD);
                form_driver(myForm, REQ_END_LINE);
                break;
            case KEY_LEFT:
                form_driver(myForm,REQ_LEFT_CHAR);
                break;
            case KEY_RIGHT:
                form_driver(myForm,REQ_RIGHT_CHAR);
                break;
            case KEY_BACKSPACE:
                form_driver(myForm, REQ_LEFT_CHAR);
                form_driver(myForm, REQ_DEL_CHAR);
                break;
```

```
            case KEY_DC:
                form_driver(myForm,REQ_DEL_CHAR);
                break;
            case KEY_HOME:
                form_driver(myForm,REQ_BEG_FIELD);
                break;
            case KEY_END:
                form_driver(myForm,REQ_END_FIELD);
                break;
            case ENTER:
                form_driver(myForm,REQ_NEXT_FIELD);
                curs_set(0);
                if(drawButtons(&formWin,0,0,index,type)){
                    flag = 0;
                }
                curs_set(1);
                form_driver(myForm,REQ_FIRST_FIELD);
                break;
                break;
            default:
                form_driver(myForm, ch);
                break;
        }
    }
    delwin(formWin);
    unpost_form(myForm);
}

/*!
  画 button 们
 \param mWin: 被画的窗口 now: 第 now 个 button flag: 第 flag 组 string\param fields: form
中用于显示及输入的域
  \todo 保存到链表
  */
int drawButtons(WINDOW **mWin,int now,int flag,int index,int type)
{
    int i;
    int id = 0;
    wattron(*mWin,COLOR_PAIR(6));
    int arraySize = ARRAY_SIZE(stringButton[flag]);
    char* str = (char*)malloc(sizeof(char)*20);
    for(i=0;i<arraySize;i++){
        if(now == i) wattron(*mWin,A_REVERSE);
        mvwprintw(*mWin,5+i*4,45,"%s",stringButton[flag][i]);
        if(now == i) wattroff(*mWin,A_REVERSE);
    }
    wrefresh(*mWin);
    int ch,isGoing = (now == -1)? 0 : 1 ;
    while(isGoing){
        ch=wgetch(*mWin);
        if((shortcutsF(ch))) break;
        Mission* pM;
        Entries* pE;
        Sportsman* pS;
        switch(ch){
            case KEY_UP:
           if(!drawButtons(mWin,(now+arraySize-1)%arraySize,flag,index,type)) return 0;
                break;
            case KEY_DOWN:
           if(!drawButtons(mWin,(now+arraySize+1)%arraySize,flag,index,type)) return 0;
                break;
            case KEY_LEFT:
```

```
        case KEY_ESC:
        case KEY_BACKSPACE:
            createEditbox(type,0,1);
            isGoing = false;
            return 0;
        case ENTER:
            switch(now){
                case 0:
                    if((id=checkIsStd(type))>0){
                        sprintf(str," 第%d 项不符合规范",id);
                        drawOKDialog(str);
                        drawListview(type,index);
                        break;
                    }
                    //还要写保存到链表的代码
                    switch(type){
                        case CREATE_MISSION:
                            addMissionNode(index);
                            break;
                        case CREATE_ENTRIES:
                            addEntriesNode(index);
                            break;
                        case CREATE_SPORTSMAN:
                            addSportsmanNode(index);
                            break;
                        case CHANGE_MISSION:
                            pM = fMByIndex();
                            if(pM!=NULL)
                                addMissionInfo(&pM);
                            break;
                        case CHANGE_ENTRIES:
                            pE = fEByIndex();
                            if(pE!=NULL)
                                addEntriesInfo(&pE);
                            break;
                        case CHANGE_SPORTSMAN:
                            pS = fSByIndex();
                            if(pS!=NULL)
                                addSportsmanInfo(&pS);
                            break;
                        default:
                            break;
                    }
                    drawListview(type,index);
                    isGoing = 0;
                    break;
                case 1:
                    //清空
                    cleanFields();
                    mvwprintw(*mWin,5+4,45,"%s",stringButton[flag][1]);
                    isGoing = 0;
                    break;
                case 2:
                    //退出到显示菜单
                    drawMenuList(0,0);
                    isGoing = 0;
                    break;
            }
            break;
    }
}
return 1;
```

```
}

/*!
  \param str 主要内容
  \param index 0:yes 1:no
  \return 1:yes 0:no
  */
int drawSelDialog(char* str,int index)
{
    WINDOW* diaWin;
    int i;
    diaWin = newwin(8,30,7,screenWidth/2-20);
    wbkgd(diaWin,COLOR_PAIR(4));
    mvwprintw(diaWin,2,5,"%s",str);
    wattron(diaWin,COLOR_PAIR(3));
    box(diaWin,0,0);
    wattroff(diaWin,COLOR_PAIR(3));
    char *yon[2] = {
        "Yes",
        "No",
    };
    for (i=0; i<2; i++) {
        if(index == i) wattron(diaWin,A_REVERSE);
        mvwprintw(diaWin,5,9*(i+1),"%s",yon[i]);
        if(index == i) wattroff(diaWin,A_REVERSE);
    }
    keypad(diaWin,TRUE);
    wrefresh(diaWin);
    int flag = 1,ch;
    while(flag){
        ch = wgetch(diaWin);
        if((shortcutsF(ch))) break;
        switch(ch){
            case KEY_LEFT:
                index = (index-1+2)%2;
                for (i=0; i<2; i++) {
                    if(index == i) wattron(diaWin,A_REVERSE);
                    mvwprintw(diaWin,5,9*(i+1),"%s",yon[i]);
                    if(index == i) wattroff(diaWin,A_REVERSE);
                }
                break;
            case KEY_RIGHT:
                index = (index+1+2)%2;
                for (i=0; i<2; i++) {
                    if(index == i) wattron(diaWin,A_REVERSE);
                    mvwprintw(diaWin,5,9*(i+1),"%s",yon[i]);
                    if(index == i) wattroff(diaWin,A_REVERSE);
                }
                break;
            case ENTER:
                delwin(diaWin);
                touchwin(editWin);
                flag = 0;
                return !index;
                break;
            default:
                break;
        }
    }
    touchwin(editWin);
    delwin(diaWin);
    return 0;
```

```
}

/*!
  通知型对话框，只有一个 OK 键
  \param str 显示在对话框里的字符串
 * */
void drawOKDialog(char* str)
{
    WINDOW* diaWin;
    diaWin = newwin(8,30,7,screenWidth/2-20);
    wbkgd(diaWin,COLOR_PAIR(4));
    mvwprintw(diaWin,3,5,"%s",str);
    wattron(diaWin,COLOR_PAIR(4));
    wattron(diaWin,A_REVERSE);
    box(diaWin,0,0);
    wattroff(diaWin,A_REVERSE);
    wattroff(diaWin,COLOR_PAIR(4));
    char *yon ="  OK  ";
    wattron(diaWin,COLOR_PAIR(4));
    wattron(diaWin,A_REVERSE);
    mvwprintw(diaWin,5,12,"%s",yon);
    wattroff(diaWin,A_REVERSE);
    wattroff(diaWin,COLOR_PAIR(4));
    touchwin(diaWin);
    wrefresh(diaWin);
    wgetch(diaWin);
    delwin(diaWin);
    touchwin(editWin);
    refresh();
}

/* 为方便将对 F(n) 的判断做成一个 ie 函数 */
int shortcutsF(int ch)
{
    switch(ch){
        case KEY_F(2):
            drawMenuList(0,0);
            return 1;
        case KEY_F(3):
            drawMenuList(1, 0);
            return 1;
        case KEY_F(4):
            drawMenuList(2, 0);
            return 1;
        case KEY_F(5):
            drawMenuList(3, 0);
            return 1;
        case KEY_F(6):
            drawMenuList(4, 0);
            return 1;
        default:
            return 0;
    }
}

/* 退出关闭屏幕 */
void exitScreen()
{
    int i;
    delwin(editWin);
    for (i = 0; i < MAIN_MENU_NUM; ++i)
        if (menu_win[i] != NULL)
```

```
            delwin(menu_win[i]);
    for (i = 0; i < SUB_MENU_NUM; ++i)
        if (sub_win[i] != NULL)
            delwin(sub_win[i]);
    endwin(); /* leave ncurses mode */
    exit(0);
}

/*!
  根据实现的定义给文本域长度
  \param type 当前链表类型
  \param i 当前第 i 个文本域
  \return 文本域长度
  */
int getFieldLength(int type,int i)
{
    switch(-type%10){
        case 0:
            switch(i){
                case 0:
                    return 6;
                default:
                    return 20;
            }
            break;
        case 1:
            switch(i){
                case 0:
                    return 4;
                case 2:
                    return 6;
                case 3:
                    return 8;
                case 10:
                    return 1;
                default:
                    return 20;
            }
            break;
        case 2:
            switch(i){
                case 0:
                case 3:
                    return 8;
                case 1:
                    return 4;
                case 2:
                    return 6;
                case 4:
                    return 1;
                case 5:
                    return 12;
                case 11:
                    return 20;
                default:
                    return 20;
            }
        default:
            return 20;
    }
}
```

```
/* 清空文本域 */
void cleanFields()
{
    int i;
    for(i=0;i<16;i++){
        set_field_buffer(fields[i],0,"");
    }
}

/*!
  改变三级链表的标号
  \param uod up or down up:-1 down:-1
  \param size 当前链表一共的个数
  */
void changeMESIndex(int uod,int size)
{
    if(sIndex != -1){
        sIndex = (sIndex+uod+size)%size;
        return ;
    }
    if(eIndex != -1){
        eIndex = (eIndex+uod+size)%size;
        return ;
    }
    if(mIndex != -1){
        mIndex = (mIndex+uod+size)%size;
        return ;
    }
}

/*!
  显示统计信息的 Editbox
 * */
void createStaEditbox(int type,int index,int flag)
{
    FORM *myForm;
    WINDOW *formWin;
    int rows = 15,cols = 60;

    curs_set(0);
    formWin = newwin(21, 64, 5,40);
    wbkgd(formWin,COLOR_PAIR(3));
    wattron(formWin,COLOR_PAIR(7));
    box(formWin, 0, 0);
    initFields(formWin,type);
    set2Fields(type,0);//将信息 set 进 fields 里面
    myForm = new_form(fields);
    /* Calculate the area required for the form */
    scale_form(myForm, &rows, &cols);
    keypad(formWin, TRUE);
    /* Set main window and sub window */
    set_form_win(myForm, formWin);
    set_form_sub(myForm, derwin(formWin, rows, cols, 2, 20));
    post_form(myForm);
    wrefresh(formWin);
    int ch;
    while(flag){//wgetch 的参数是谁就相当与实现了一次 touchwin
        ch=wgetch(formWin);
        if((shortcutsF(ch))) break;
        switch(ch){
            case KEY_ESC:
                curs_set(1);
```

```
                drawMenuList(3,0);
                flag = 0;
                break;
            default:
                break;
        }
    }
    curs_set(1);
    delwin(formWin);
    unpost_form(myForm);

}

/* 根据类型获得文本域的个数 */
int getFieldsNum(int type)
{
    switch((-type)%10){
        case 0:
            return 16;
        case 1:
            return 11;
        case 2:
            return 12;
        case 3:
            return 6;
        case 4:
            return 3;
        case 5:
            return 6;
        case 6:
        case 7:
        case 8:
            return 1;
        default:
            return 0;
    }
}

/* 初始化文本域 */
void initFields(WINDOW* mWin,int type)
{
    int i;
    int arraySize = getFieldsNum(type);
    for(i=0;i<arraySize;i++){
        int length = getFieldLength(type,i);
        fields[i] = new_field(1,length,i,2,0,0);
        set_field_back(fields[i], A_UNDERLINE);
      field_opts_off(fields[i], O_AUTOSKIP); /* Don't go to next field when this */
        wattron(mWin, A_REVERSE);
        mvwprintw(mWin,i+2,3,"%s: ",info[-type%10][i]);
        wattroff(mWin,A_REVERSE);
    }
    fields[arraySize] = NULL;
}

/* 画统计中单项的列表 */
void drawStaListview(int type ,int typeindex,int index)
{
    touchwin(editWin);
    //读取链表
    WINDOW* listWin;
    listWin = newwin(21,30,5,4);
```

```
wbkgd(listWin,COLOR_PAIR(3));
wattron(listWin,COLOR_PAIR(6));
box(listWin,0,0);
int i = 0;
Mission *cM = headMission;
Entries *cE ;

keypad(listWin,TRUE);
switch(typeindex){
    case 0:
        while(cM){
            if(index == i) wattron(listWin,A_REVERSE);
            mvwprintw(listWin,i+3,3,"%s",cM->index);
            if(index == i) wattroff(listWin,A_REVERSE);
            cM = cM->next;
            i++;
        }
        if(index == i) wattron(listWin,A_REVERSE);
        mvwprintw(listWin,i+3,3,"%s",cM->index);
        if(index == i) wattroff(listWin,A_REVERSE);
        i++;
        mvwprintw(listWin,0,2," 代表团");
        break;
    case 1:
        cM = fMByIndex();
        cE = cM->headEntries;
        while(cE){
            if(index == i) wattron(listWin,A_REVERSE);
            mvwprintw(listWin,i+3,3,"%s",cE->index);
            if(index == i) wattroff(listWin,A_REVERSE);
            cE = cE->next;
            i++;
        }
        if(index == i) wattron(listWin,A_REVERSE);
        mvwprintw(listWin,i+3,3,"%s",cE->index);
        if(index == i) wattroff(listWin,A_REVERSE);
        i++;
        mvwprintw(listWin,0,2," 参赛项目");
        break;
    default:
        break;
}
if (typeindex) {
    createStaEditbox(type,0,0);
}
wrefresh(listWin);
curs_set(0);
int ch,flag = 1;
while(flag){
    ch = wgetch(listWin);
    if((shortcutsF(ch))) break;
    switch(ch){
        case KEY_ESC:
            eIndex = -1;
            sIndex = -1;
            drawMenuList(1,0);
            flag = 0;
            break;
        case KEY_UP:
            changeMESIndex(-1,i);
            drawStaListview(type,typeindex,(index+i-1)%i);
            flag = 0;
```

```
                break;
            case KEY_DOWN:
                changeMESIndex(1,i);
                drawStaListview(type,typeindex,(index+i+1)%i);
                flag = 0;
                break;
            case KEY_LEFT:
                if(eIndex != -1){
                    eIndex = -1;
                    drawStaListview(type,typeindex-1,mIndex);
                }
                break;
            case KEY_RIGHT:
                if(eIndex == -1){
                    if(mIndex == i-1) break;
                    eIndex = 0;
                    drawStaListview(type,typeindex+1,eIndex);
                    flag = 0;
                }
                break;
            case ENTER:
                break;
            default:
                break;
        }
    }

}

/* 画查询后显示的 Editbox*/
void createQueryEditbox(int type)
{
    FORM *myForm;
    WINDOW *formWin;
    int rows = 15,cols = 60;
    int flag = 1;
    int index;
    char *str = (char*)malloc(30*sizeof(char));

    formWin = newwin(21, 64, 5,40);
    wbkgd(formWin,COLOR_PAIR(3));
    wattron(formWin,COLOR_PAIR(7));
    box(formWin, 0, 0);
    initFields(formWin,type);
    myForm = new_form(fields);
    scale_form(myForm, &rows, &cols);
    keypad(formWin, TRUE);
    set_form_win(myForm, formWin);
    set_form_sub(myForm, derwin(formWin, rows, cols, 2, 20));
    post_form(myForm);
    curs_set(1);
    wrefresh(formWin);
    int ch;
    while(flag){
        ch = wgetch(formWin);
        if((shortcutsF(ch))) break;
        switch(ch){
            case ENTER:
                form_driver(myForm,REQ_NEXT_FIELD);
                strcpy(str,field_buffer(fields[0],0));
                if (queryGoal(type,str)) {
                    switch(type){
```

```
                        case QUERY_MISSION:
                            index = mIndex;
                            eIndex = -1;
                            sIndex = -1;
                            break;
                        case QUERY_ENTRIES:
                            index = eIndex;
                            sIndex = -1;
                            break;
                        case QUERY_SPORTSMAN:
                            index = sIndex;
                            break;
                        default:
                            index = 0;
                            break;
                    }
                    drawListview(type+66,index);
                } else{
                    mIndex = -1;
                    eIndex = -1;
                    sIndex = -1;
                    drawOKDialog(" 没有该数据！");
                }
                flag = 0;
                break;
            case KEY_ESC:
                drawMenuList(0,1);
                break;
            case KEY_LEFT:
                form_driver(myForm,REQ_LEFT_CHAR);
                break;
            case KEY_RIGHT:
                form_driver(myForm,REQ_RIGHT_CHAR);
                break;
            case KEY_BACKSPACE:
                form_driver(myForm, REQ_LEFT_CHAR);
                form_driver(myForm, REQ_DEL_CHAR);
                break;
            case KEY_DC:
                form_driver(myForm,REQ_DEL_CHAR);
                break;
            case KEY_HOME:
                form_driver(myForm,REQ_BEG_FIELD);
                break;
            case KEY_END:
                form_driver(myForm,REQ_END_FIELD);
                break;
            default:
                form_driver(myForm, ch);
                break;
        }
    }
}

/*!
  画退出时提醒是否保存的对话框
  \return 0: 保存退出 1: 不保存退出 2: 取消
 * */
int drawSaveDialog(){
    WINDOW* diaWin;
    int i;
    int index = 0;
```

```
    diaWin = newwin(8,30,7,screenWidth/2-20);
    wbkgd(diaWin,COLOR_PAIR(4));
    mvwprintw(diaWin,3,5," 是否保存？");
    wattron(diaWin,COLOR_PAIR(3));
    box(diaWin,0,0);
    wattroff(diaWin,COLOR_PAIR(3));
    char *yon[3] = {
        " 保存",
        " 退出",
        " 取消",
    };
    for (i=0; i<3; i++) {
        if(index == i) wattron(diaWin,A_REVERSE);
        mvwprintw(diaWin,5,6*(i+1),"%s",yon[i]);
        if(index == i) wattroff(diaWin,A_REVERSE);
    }
    keypad(diaWin,TRUE);
    wrefresh(diaWin);
    int flag = 1,ch;
    while(flag){
        ch = wgetch(diaWin);
        if((shortcutsF(ch))) break;
        switch(ch){
            case KEY_LEFT:
                index = (index-1+3)%3;
                for (i=0; i<3; i++) {
                    if(index == i) wattron(diaWin,A_REVERSE);
                    mvwprintw(diaWin,5,6*(i+1),"%s",yon[i]);
                    if(index == i) wattroff(diaWin,A_REVERSE);
                }
                break;
            case KEY_RIGHT:
                index = (index+1+3)%3;
                for (i=0; i<3; i++) {
                    if(index == i) wattron(diaWin,A_REVERSE);
                    mvwprintw(diaWin,5,6*(i+1),"%s",yon[i]);
                    if(index == i) wattroff(diaWin,A_REVERSE);
                }
                break;
            case ENTER:
                delwin(diaWin);
                touchwin(editWin);
                flag = 0;
                return index;
                break;
            default:
                break;
        }
    }
    touchwin(editWin);
    delwin(diaWin);
    return 0;
}

/* 画帮助对话框 */
void createHelpEditbox(){
    WINDOW *formWin;
    int flag = 1;
    formWin = newwin(21, 64, 5,40);
    wbkgd(formWin,COLOR_PAIR(3));
    wattron(formWin,COLOR_PAIR(7));
    box(formWin, 0, 0);
```

```
    keypad(formWin, TRUE);
    curs_set(0);
    mvwprintw(formWin,3,4," 暂无");
    wrefresh(formWin);
    int ch;
    while(flag){
        ch = wgetch(formWin);
        if((shortcutsF(ch))) break;
        switch (ch) {
            case KEY_ESC:
            case ENTER:
                flag = 0;
                drawMenuList(4,2);
                break;
            default:
                break;
        }
    }
    delwin(formWin);
}
```

9.6 list.c

```
#include "drawnlist.h"

int isChanged = 0;
Mission* headMission = NULL;
Mission* tailMission = NULL;

Mission* findMission();
Entries* findEntries();
Sportsman* findSportsman();
void addInfo2FatherE(Mission* pM,Entries* pE,Sportsman* pS);
void addInfo2FatherM(Mission* pM,Entries* pE);

/* 初始化列表，从文件中读取 */
void initList()
{
Mission *pM,*hpM = NULL;
Entries *pE;
Sportsman *pS;
FILE *finMission,*finEntries,*finSportsman;
if((finMission = fopen("mission.info","rb"))==NULL){
        finMission = fopen("mission.info","wb");
        fclose(finMission);
    }
if((finEntries = fopen("entries.info","rb"))==NULL){
        fopen("entries.info","wb");
        fclose(finEntries);
    }
if((finSportsman = fopen("sportsman.info","rb"))==NULL){
        fopen("sportsman.info","wb") ;
        fclose(finSportsman);
        return;
    }
//创建后进先出式链表
while(!feof(finMission)){
pM = (Mission *)malloc(sizeof(Mission));
fread(pM,sizeof(Mission),1,finMission);
pM->headEntries = NULL;
if(!feof(finMission)){
```

```
pM->next = hpM;
hpM = pM;
}
}
headMission = hpM;
while(!feof(finEntries)){
pE = (Entries *)malloc(sizeof(Entries));
fread(pE,sizeof(Entries),1,finEntries);
if(!feof(finEntries)){
pM = headMission;
while(pM!=NULL){
if(!strcmp(pM->index,pE->missionIndex)){
pE->headSportsman = NULL;
pE->next = pM->headEntries;
pM->headEntries = pE;
break;
} else
pM = pM->next;
}
}
}
while(!feof(finSportsman)){
pS = (Sportsman *)malloc(sizeof(Sportsman));
fread(pS,sizeof(Sportsman),1,finSportsman);
if(!feof(finSportsman)){
pM = headMission;
while(pM!=NULL){
pE = pM->headEntries;
while(pE!=NULL){
if(!strcmp(pE->index,pS->entriesIndex)){
pS->next = pE->headSportsman;
pE->headSportsman = pS;
break;
} else
pE = pE->next;
}
pM = pM->next;
}
}
}
fclose(finMission);
fclose(finEntries);
fclose(finSportsman);
}

/* 保存链表到文件中 */
void saveList()
{
FILE *foutM,*foutE,*foutS;
Mission* pM = headMission;
Entries* pE ;
Sportsman* pS ;
if((foutM = fopen("mission.info","wb+"))==NULL)
exit(-1);
if((foutE = fopen("entries.info","wb+"))==NULL)
exit(-1);
if((foutS = fopen("sportsman.info","wb+"))==NULL)
exit(-1);
while(pM!=NULL){
fwrite(pM,sizeof(Mission),1,foutM);
pE = pM->headEntries;
while(pE!=NULL){
```

```
fwrite(pE,sizeof(Entries),1,foutE);
pS = pE->headSportsman;
while(pS!=NULL){
fwrite(pS,sizeof(Sportsman),1,foutS);
pS = pS->next;
}
pE = pE->next;
}
pM = pM->next;
}
fclose(foutM);
fclose(foutE);
fclose(foutS);
    isChanged = 0;
}

/*!
添加代表团结点到链表
\param index 当前结点在当前链表的位置
\return 1: 成功 0: 失败
*/
int addMissionNode(int index)
{
Mission *p,*pri,*aft;
int i;
p = (Mission *)malloc(sizeof(Mission));
addMissionInfo(&p);//添加数据到结点
strcpy(p->index,field_buffer(fields[0],0));
if(index == 0){
        p->next = headMission;
        headMission = p;
    } else{
        pri = headMission;
        for(i=0;i<mIndex-1;i++){
            pri = pri->next;
        }
        aft = pri->next;
        pri->next = p;
        p->next = aft;
    }
    return 1;
}

/*!
  添加参赛项目结点到链表
  \param index 当前结点在当前链表的位置
  \return 1: 成功 0: 失败
  */
int addEntriesNode(int index)
{
    Entries *p,*pri,*aft;
    int i;
    p = (Entries *)malloc(sizeof(Entries));
    addEntriesInfo(&p);//添加数据到结点
    p->headSportsman = NULL;
    Mission *pM = fMByIndex();
    if(eIndex == 0){
        p->next = pM->headEntries;
        pM->headEntries = p;
    } else{
        pri = pM->headEntries;
        for(i=0;i<eIndex-1;i++){
```

```
            pri = pri->next;
        }
        aft = pri->next;
        pri->next = p;
        p->next = aft;
    }
    return 1;
}

/*!
  添加运动员结点到链表
  \param index 当前结点在当前链表的位置
  \return 1: 成功 0: 失败
  */
int addSportsmanNode(int index)
{
    Sportsman *p,*pri,*aft;
    int i;
    p = (Sportsman *)malloc(sizeof(Sportsman));
    addSportsmanInfo(&p);//添加数据到结点
    Entries *pE = fEByIndex();
    if(sIndex == 0){
        p->next = pE->headSportsman;
        pE->headSportsman = p;
    } else{
        pri = pE->headSportsman;
        for(i=0;i<sIndex-1;i++){
            pri = pri->next;
        }
        aft = pri->next;
        pri->next = p;
        p->next = aft;
    }
    return 1;
}

/* 计算对应的代表团节点的教练和运动员人数 */
void addInfo2FatherM(Mission* pM,Entries* pE)
{
    pM->numCoach += pE->numCoach;
    pM->numSports += 1;
}

void addInfo2FatherE(Mission* pM,Entries* pE,Sportsman* pS)
{
    pE->numSportsman += 1;
    pM->numSportsman += 1;
}

/*!
  查找代表团节点，用到了全局变量
  \return 根据 index 找到的代表团结点
  */
Mission* findMission()
{
    Mission *pM = headMission;
    while(strcmp(pM->index,field_buffer(fields[2],0))){
        pM = pM->next;
    }
    return pM;
}
```

```
/*!
  查找参赛项目节点，用到了全局变量
  \return 根据 index 找到的参赛项目结点
  */
Entries* findEntries()
{
    Mission* pM ;
    if((pM=findMission())==NULL) return NULL;
    Entries* pE = pM->headEntries;
    while(strcmp(pE->index,field_buffer(fields[2],0))){
        pE = pE->next;
    }
    return pE;
}

/*!
  当添加修改代表团时，将文本域中的信息放到结点里面
  \param p 希望被添加信息的代表团结点
  */
void addMissionInfo(Mission** p)
{
    strcpy((*p)->index,field_buffer(fields[0],0));
    ((*p)->index)[6] = '\0';
    strcpy((*p)->name,field_buffer(fields[1],0));
    ((*p)->name)[20+10] = '\0';
    strcpy((*p)->country,field_buffer(fields[2],0));
    ((*p)->country)[20+10] = '\0';
    strcpy((*p)->headerName,field_buffer(fields[3],0));
    ((*p)->headerName)[20+10] = '\0';
    strcpy((*p)->headerContact,field_buffer(fields[4],0));
    ((*p)->headerContact)[20+10] = '\0';
    (*p)->numSports = atoi(field_buffer(fields[5],0));
    (*p)->numSportsman = atoi(field_buffer(fields[6],0));
    (*p)->numCoach = atoi(field_buffer(fields[7],0));
    (*p)->numJudge = atoi(field_buffer(fields[8],0));
    (*p)->numOtherman = atoi(field_buffer(fields[9],0));
    strcpy((*p)->address,field_buffer(fields[10],0));
    ((*p)->address)[20+10] = '\0';
    strcpy((*p)->telephone,field_buffer(fields[11],0));
    ((*p)->telephone)[20+10] = '\0';
    (*p)->numRoom = atoi(field_buffer(fields[12],0));
    (*p)->numTranslator = atoi(field_buffer(fields[13],0));
    strcpy((*p)->timeIn,field_buffer(fields[14],0));
    ((*p)->timeIn)[20] = '\0';
    strcpy((*p)->timeOut,field_buffer(fields[15],0));
    ((*p)->timeOut)[20] = '\0';
    isChanged = 1;//数据已改变，未保存
}

/*!
  当添加修改参赛项目时，将文本域中的信息放到结点里面
  \param p 希望被添加信息的参赛项目结点
  */
void addEntriesInfo(Entries **p)
{
    strcpy((*p)->index,field_buffer(fields[0],0));
    ((*p)->index)[4] = '\0';
    strcpy((*p)->name,field_buffer(fields[1],0));
    ((*p)->name)[20+10] = '\0';
    strcpy((*p)->missionIndex,field_buffer(fields[2],0));
    ((*p)->missionIndex)[6] = '\0';
    strcpy((*p)->leaderName,field_buffer(fields[3],0));
```

```
    ((*p)->leaderName)[8+4] = '\0';
    strcpy((*p)->leaderContact,field_buffer(fields[4],0));
    ((*p)->leaderContact)[20+10] = '\0';
    (*p)->numCoach = atoi(field_buffer(fields[5],0));
    (*p)->numSportsman = atoi(field_buffer(fields[6],0));
    strcpy((*p)->bestAch,field_buffer(fields[7],0));
    ((*p)->bestAch)[20+10] = '\0';
    strcpy((*p)->bestAchTime,field_buffer(fields[8],0));
    ((*p)->bestAchTime)[20+10] = '\0';
    strcpy((*p)->bestAchLoc,field_buffer(fields[9],0));
    ((*p)->bestAchLoc)[20+10] = '\0';
    strcpy(&((*p)->isBan),field_buffer(fields[10],0));
    isChanged = 1;//数据已改变，未保存
}

/*!
  当添加修改运动员时，将文本域中的信息放到结点里面
  \param p 希望被添加信息的运动员结点
  */
void addSportsmanInfo(Sportsman **p)
{
    strcpy((*p)->index,field_buffer(fields[0],0));
    ((*p)->index)[8] = '\0';
    strcpy((*p)->entriesIndex,field_buffer(fields[1],0));
    ((*p)->entriesIndex)[4] = '\0';
    strcpy((*p)->missionIndex,field_buffer(fields[2],0));
    ((*p)->missionIndex)[6] = '\0';
    strcpy((*p)->name,field_buffer(fields[3],0));
    ((*p)->name)[8+4] = '\0';
    strcpy(&((*p)->sex),field_buffer(fields[4],0));
    strcpy((*p)->birthday,field_buffer(fields[5],0));
    ((*p)->birthday)[12] = '\0';
    strcpy((*p)->hometown,field_buffer(fields[6],0));
    ((*p)->hometown)[20+10] = '\0';
    (*p)->height = atoi(field_buffer(fields[7],0));
    (*p)->weight = atoi(field_buffer(fields[8],0));
    strcpy((*p)->finalistAch,field_buffer(fields[9],0));
    ((*p)->finalistAch)[20+10] = '\0';
    strcpy((*p)->bestAch,field_buffer(fields[10],0));
    ((*p)->bestAch)[20+10] = '\0';
    strcpy((*p)->hobby,field_buffer(fields[11],0));
    ((*p)->hobby)[256] = '\0';
    isChanged = 1;//数据已改变，未保存
}

/*!
  将代表团结点中的数据 set 给文本域以显示
  \param p 希望被显示的结点
  */
void setMInfo2Fields(Mission *p)
{
    set_field_buffer(fields[0],0,p->index);
    set_field_buffer(fields[1],0,p->name);
    set_field_buffer(fields[2],0,p->country);
    set_field_buffer(fields[3],0,p->headerName);
    set_field_buffer(fields[4],0,p->headerContact);
    char* str = (char*)malloc(sizeof(char)*20);
    sprintf(str,"%d",p->numSports);
    set_field_buffer(fields[5],0,str);
    sprintf(str,"%d",p->numSportsman);
    set_field_buffer(fields[6],0,str);
    sprintf(str,"%d",p->numCoach);
```

```
    set_field_buffer(fields[7],0,str);
    sprintf(str,"%d",p->numJudge);
    set_field_buffer(fields[8],0,str);
    sprintf(str,"%d",p->numOtherman);
    set_field_buffer(fields[9],0,str);
    set_field_buffer(fields[10],0,p->address);
    set_field_buffer(fields[11],0,p->telephone);
    sprintf(str,"%d",p->numRoom);
    set_field_buffer(fields[12],0,str);
    sprintf(str,"%d",p->numTranslator);
    set_field_buffer(fields[13],0,str);
    set_field_buffer(fields[14],0,p->timeIn);
    set_field_buffer(fields[15],0,p->timeOut);
}

/*!
  将参赛项目结点中的数据 set 给文本域以显示
  \param p 希望被显示的结点
  */
void setEInfo2Fields(Entries *p)
{
    set_field_buffer(fields[0],0,p->index);
    set_field_buffer(fields[1],0,p->name);
    set_field_buffer(fields[2],0,p->missionIndex);
    set_field_buffer(fields[3],0,p->leaderName);
    set_field_buffer(fields[4],0,p->leaderContact);
    char* str = (char*)malloc(sizeof(char)*20);
    sprintf(str,"%d",p->numCoach);
    set_field_buffer(fields[5],0,str);
    sprintf(str,"%d",p->numSportsman);
    set_field_buffer(fields[6],0,str);
    set_field_buffer(fields[7],0,p->bestAch);
    set_field_buffer(fields[8],0,p->bestAchTime);
    set_field_buffer(fields[9],0,p->bestAchLoc);
    sprintf(str,"%c",p->isBan);
    set_field_buffer(fields[10],0,str);
}

/*!
  将运动员结点中的数据 set 给文本域以显示
  \param p 希望被显示的结点
  */
void setSInfo2Fields(Sportsman *p)
{
    set_field_buffer(fields[0],0,p->index);
    set_field_buffer(fields[1],0,p->entriesIndex);
    set_field_buffer(fields[2],0,p->missionIndex);
    set_field_buffer(fields[3],0,p->name);
    set_field_buffer(fields[4],0,&(p->sex));
    set_field_buffer(fields[5],0,p->birthday);
    set_field_buffer(fields[6],0,p->hometown);
    char* str = (char*)malloc(sizeof(char)*20);
    sprintf(str,"%d",p->height);
    set_field_buffer(fields[7],0,str);
    sprintf(str,"%d",p->weight);
    set_field_buffer(fields[8],0,str);
    set_field_buffer(fields[9],0,p->finalistAch);
    set_field_buffer(fields[10],0,p->bestAch);
    set_field_buffer(fields[11],0,p->hobby);
}

/*!
```

```
  根据 type 分类 set 哪一类别的 Info 到文本域
  \param type 当前结点的类型
 * */
void setInfo2Fields(int type)
{
    Mission *pM = headMission;
    Entries *pE;
    Sportsman *pS;
    switch(-type%10){
        case 0:
            pM = fMByIndex();
            if(pM!=NULL) setMInfo2Fields(pM);
            break;
        case 1:
            pE = fEByIndex();
            if(pE!=NULL) setEInfo2Fields(pE);
            break;
        case 2:
            pS = fSByIndex();
            if(pS!=NULL) setSInfo2Fields(pS);
            break;
        default:
            break;
    }
}

/*!
  根据全局变量 mIndex 查找代表团结点
  \return 被查找的结点，如无返回 NULL
  */
Mission* fMByIndex()
{
    Mission* pM = headMission;
    int i;
    for(i = 0;i<mIndex;i++){
        pM = pM->next;
    }
    return pM;
}

/*!
  根据全局变量 mIndex,eIndex 查找参赛项目结点
  \return 被查找的结点，如无返回 NULL
  */
Entries* fEByIndex()
{
    Mission *pM = fMByIndex();
    if(pM==NULL) return NULL;
    Entries *pE = pM->headEntries;
    int i;
    for(i = 0;i<eIndex;i++){
        pE = pE->next;
    }
    return pE;
}

/*!
  根据全局变量 mIndex,eIndex,sIndex 查找运动员结点
  \return 被查找的结点，如无返回 NULL
  */
Sportsman* fSByIndex()
{
```

```
    Entries *pE = fEByIndex();
    if(pE == NULL) return NULL;
    Sportsman *pS = pE->headSportsman;
    int i;
    for(i = 0;i<sIndex;i++){
        pS = pS->next;
    }
    return pS;
}

/*!
  当新建结点时只显示它上一级链表的 index
  \param type 当前结点的类型
  */
void setIndex2Fields(int type)
{
    Mission* pM = headMission;
    Entries* pE ;
    switch(type){
        case CREATE_ENTRIES:
            pM = fMByIndex();
            if(pM!=NULL)
                set_field_buffer(fields[2],0,pM->index);
            break;
        case CREATE_SPORTSMAN:
            pE = fEByIndex();
            if(pE!=NULL){
                set_field_buffer(fields[1],0,pE->index);
                set_field_buffer(fields[2],0,pE->missionIndex);
            }
            break;
    }
}

/*!
  根据全局变量 mIndex,eIndex,sIndex 选择删除的结点
  \param type 根据 type 选择删除的结点类型
  */
void delNode(int type)
{
    Mission* pM = headMission,*priM = headMission;
    Entries* pE,*priE;
    Sportsman *priS;
    switch(-type%10){
        case 0:
            if(mIndex == 0)
                priM = NULL;
            else{
                mIndex--;
                priM = fMByIndex();
                mIndex++;
            }
            delMissionNode(priM);
            break;
        case 1:
            pM = fMByIndex();
            if(eIndex == 0){
                priE = NULL;
                delEntriesNode(&(pM->headEntries),NULL);
            } else {
                eIndex--;
                priE = fEByIndex();
```

```
                eIndex++;
                delEntriesNode(&(pM->headEntries),&priE);
            }
            break;
        case 2:
            pE = fEByIndex();
            if(sIndex == 0){
                delSportsmanNode(&(pE->headSportsman),NULL);
            } else{
                sIndex--;
                priS = fSByIndex();
                sIndex++;
                delSportsmanNode(&(pE->headSportsman),&priS);
            }
            break;
    }
    isChanged = 1;
}

/* 删除代表团结点 */
void delMissionNode(Mission *priM)
{
    Mission *pM;
    Entries *pE;
    if(priM == NULL){
        pM = headMission;
        headMission = pM->next;
    } else {
        pM = priM->next;
        priM->next = pM->next;
    }
    while(pE){
        delEntriesNode(&(pM->headEntries),NULL);
        pE = pE->next;
    }
    free(pM);
}

/* 删除参赛项目结点 */
void delEntriesNode(Entries** phE,Entries** priE)
{
    Entries *pE;
    Sportsman *pS;
    if(*phE == NULL) return;
    if(priE == NULL){
        pE = *phE;
        *phE = pE->next;
    } else {
        pE = (*priE)->next;
        (*priE)->next = pE->next;
    }
    while(pS){
        delSportsmanNode(&(pE->headSportsman),NULL);
        pS = pS->next;
    }
    free(pE);
}

/* 删除运动员结点 */
void delSportsmanNode(Sportsman** phS,Sportsman** priS)
{
    Sportsman* pS;
```

```
    if(*phS == NULL) return;
    if(priS == NULL){
        pS = *phS;
        *phS = pS->next;
    } else {
        pS = (*priS)->next;
        (*priS)->next = pS->next;
    }
    free(pS);
}

/* 将节点信息复制到域中 */
void set2Fields(int type,int flag)
{
    switch(type/10){
        //  info 就是在这输入的
        case CREATE:
            setIndex2Fields(type);
            if(flag==0){
                setInfo2Fields(type);
            }
            break;
        case CHANGE:
        case DELETE:
            setInfo2Fields(type);
            break;
        case -6://总体的统计
            calStaNSet2Fields();
            break;
        case -7://排序的那个
            if (eIndex!=-1) {
                calSigNSet2Fields();
            }
            break;
        case -8://其他统计
            calOthNSet2Fields();
            break;
        default:
            break;
    }
}

/* 计算统计中总体那个选项
 * 并且把值赋到文本域中 */
void calStaNSet2Fields()
{
    Mission* pM = headMission;
    Entries* pE ;
    int entriesNum = 0;
    int sportsmanNum = 0;
    int judgeNum = 0;
    int coachNum = 0;
    int maleNum = 0,femaleNum = 0;
    char *str = (char *)malloc(sizeof(int));
    while (pM) {
        pE = pM->headEntries;
        while(pE){
            entriesNum += 1;
            pE = pE->next;
        }
        sportsmanNum += calMSportsmanNum(pM,&maleNum,&femaleNum);
        judgeNum += pM->numJudge;
```

```
        coachNum += pM->numCoach;
        pM = pM->next;
    }
    //set2Field
    sprintf(str,"%d",entriesNum);
    set_field_buffer(fields[0],0,str);
    sprintf(str,"%d",sportsmanNum);
    set_field_buffer(fields[1],0,str);
    sprintf(str,"%d",judgeNum);
    set_field_buffer(fields[2],0,str);
    sprintf(str,"%d",coachNum);
    set_field_buffer(fields[3],0,str);
    sprintf(str,"%d",maleNum);
    set_field_buffer(fields[4],0,str);
    sprintf(str,"%d",femaleNum);
    set_field_buffer(fields[5],0,str);
}

/* 计算统计中其他选项
 * 并且把值赋到文本域中 */
void calOthNSet2Fields()
{
    Entries* pEn[3],*pE;
    Mission* pM = headMission;
    Sportsman* pSn[3],*pS;
    while(pM){
        if((pEn[0]=pM->headEntries) != NULL)
            break;
        pM = pM->next;
    }
    pM = headMission;
    while(pM){
        if((pE = pM->headEntries) == NULL){
            pM = pM->next;
            continue;
        }
        while (pE->headSportsman==NULL) {
            pE = pE->next;
            if(pE == NULL)
                break;
        }
        if (pE == NULL) {
            pM = pM->next;
            continue;
        }
        break;

    }
    if(pEn[0] == NULL)
        return;
    pEn[1] = pEn[0];
    pEn[2] = pEn[0];
    pSn[0] = pE->headSportsman;
    int i,j;
    FILE* finEntries ;
    if((finEntries = fopen("entries.info","rb"))==NULL)
        return;
    while(!feof(finEntries)) {
        pE = (Entries *)malloc(sizeof(Entries));
        fread(pE,sizeof(Entries),1,finEntries);
        if(feof(finEntries)) break;
        for (i=0; i<3; i++) {
```

```
            if(pE->numSportsman<pEn[i]->numSportsman){
                continue;
            }
            for (j=2; j>i; j--) {
                pEn[j] = pEn[j-1];
            }
            pEn[i] = pE;
            i++;
        }
    }
    fclose(finEntries);
    for (i=0; i<3; i++) {
        set_field_buffer(fields[i],0,pEn[i]->name);
    }

    if (pSn[0] == NULL)
        return;
    pSn[1] = pSn[0];
    pSn[2] = pSn[0];
    FILE* finSportsman;
    if ((finSportsman = fopen("sportsman.info","rb"))==NULL)
        return;
    while (!feof(finSportsman)) {
        pS = (Sportsman*)malloc(sizeof(Sportsman));
        fread(pS,sizeof(Sportsman),1,finSportsman);
        if(feof(finSportsman)) break;
        for (i=0; i<3; i++) {
            if(pS->weight<pSn[i]->weight)
                continue;
            for (j=2 ; j>i ; j--) {
                pSn[j] = pSn[j-1];
            }
            pSn[i] = pS;
            i++;
            break;
        }
    }
    for (i=0; i<3; i++) {
        set_field_buffer(fields[i+3],0,pSn[i]->name);
    }

    fclose(finSportsman);
}

/* 计算统计中单项选项
 * 并且把值赋到文本域中 */
void calSigNSet2Fields()
{
    Entries* pE = fEByIndex();
    if(pE == NULL) return;
    Sportsman* pS = pE->headSportsman;
    int sportsmanNum = 0;
    int banMissionNum = 0;
    while(pS){
        pS = pS->next;
        sportsmanNum++;
    }
    Mission* pM = headMission;
    while (pM) {
        Entries* pE1 = pM->headEntries;
        while (pE1) {
            if(!strcmp(pE1->index,pE->index)){
```

```
                if (pE1->isBan == 'Y' || pE1->isBan == 'y') {
                    banMissionNum++;
                }
            }
            pE1 = pE1->next;
        }
        pM = pM->next;
    }
    char* str = (char*)malloc(sizeof(int));
    sprintf(str,"%d",sportsmanNum);
    set_field_buffer(fields[0],0,str);
    sprintf(str,"%d",pE->numCoach);
    set_field_buffer(fields[1],0,str);
    sprintf(str,"%d",banMissionNum);
    set_field_buffer(fields[2],0,str);
}

/*! 计算一个代表团中的运动员总数
\param pM 被求的代表团结点
\param mN 男运动员数，会被改动
\param fN 女运动员数，会被改动
\return 总运动员数
 * */
int calMSportsmanNum(Mission* pM,int* mN, int* fN)
{
    int sNum = 0;
    if(pM->headEntries == NULL) return 0;
    Entries* pE = pM->headEntries;
    while(pE){
        sNum += calESportsmanNum(pE,mN,fN);
        pE = pE->next;
    }
    return sNum;
}

/* 计算一个参赛项目中的运动员总数 */
int calESportsmanNum(Entries* pE,int* mN,int* fN)
{
    int sNum = 0;
    if(pE->headSportsman == NULL) return 0;
    Sportsman* pS = pE->headSportsman;
    while(pS){
        sNum++;
        (pS->sex=='M'||pS->sex=='m') ? (*mN)++ : (*fN)++;
        pS = pS->next;
    }
    return sNum;
}

/* 计算输入时数据是否合法 */
int checkIsStd(type)
{
    char* str ;
    switch(-type%10){
        case 0:
            break;
        case 1:
            str = field_buffer(fields[10],0);
            if(*str == 'Y'||*str == 'y'||*str == 'N'||*str == 'n'){

            } else{
                return 11;
```

```
            }
            break;
        case 2:
            str = field_buffer(fields[4],0);
            if(*str == 'M'||*str == 'm'||*str == 'F'||*str == 'f'){

            } else{
                return 5;
            }
            break;
    }
    return 0;
}

/*!
根据编号或名称查找结点
\param type 需要查找的结点的类型
\param name 查找的数据，有可能是字符串，有可能是数字
\return 0: 没找到 1: 找到了
 * */
int queryGoal(int type,char* name)
{
    Mission* pM = headMission;
    Entries* pE;
    Sportsman* pS;
    mIndex = 0;
    int index = atoi(name); //若是字符串则 index 为 0
    if (index) {//以 index 查询
        while (pM) {
            if(type == QUERY_MISSION){
                int i = atoi(pM->index);
                if(i != index){
                    pM = pM->next;
                    mIndex++;
                    continue;
                } else {
                    return 1;//找到
                }
            }
            pE = pM->headEntries;
            eIndex = 0;
            while (pE) {
                int i = atoi(pE->index);
                if(type == QUERY_ENTRIES){
                    if (i != index) {
                        pE = pE->next;
                        eIndex++;
                        continue;
                    } else {
                        return 1;
                    }
                }
                pS = pE->headSportsman;
                sIndex = 0;
                while (pS) {
                    if(type == QUERY_SPORTSMAN){
                        int i = atoi(pS->index);
                        if(i != index){
                            pS = pS->next;
                            sIndex++;
                            continue;
                        } else{
```

```
                    return 1;
                }
            }
            sIndex++;
            pS = pS->next;
        }
        eIndex++;
        pE = pE->next;
    }
    mIndex++;
    pM = pM->next;
}
return 0;
} else{//以 name 查询
    while (pM) {
        if(type == QUERY_MISSION){
            name[30] = '\0';
            if(strcmp(name,pM->name)){
                pM = pM->next;
                mIndex++;
                continue;
            } else {
                return 1;//找到
            }
        }
        pE = pM->headEntries;
        eIndex = 0;
        while (pE) {
            if(type == QUERY_ENTRIES){
                name[30] = '\0';
                if (strcmp(name,pE->name)) {
                    pE = pE->next;
                    eIndex++;
                    continue;
                } else {
                    return 1;
                }
            }
            pS = pE->headSportsman;
            sIndex = 0;
            while (pS) {
                if(type == QUERY_SPORTSMAN){
                    name[12] = '\0';
                    if(strcmp(name,pS->name)){
                        pS = pS->next;
                        sIndex++;
                        continue;
                    } else{
                        return 1;
                    }
                }
                sIndex++;
                pS = pS->next;
            }
            eIndex++;
            pE = pE->next;
        }
        mIndex++;
        pM = pM->next;
    }
    return 0;
}
```

```
}

/* 清空，删除全部 */
void deleteAllList()
{
    fclose(fopen("mission.info","wb+"));
    fclose(fopen("entries.info","wb+"));
    fclose(fopen("sportsman.info","wb+"));
    while (headMission) {
        delMissionNode((Mission*)NULL);
    }
    isChanged = 0;
}
```