#include<iostream>

#include <stdlib.h>

#include <windows.h>

#include<fstream>

#include<string>

#include<iomanip>

using namespace std;

int num; //总学生人数

class student {

friend class studentMessage;

private:

string sno;

string name;

double score[4]; //score[0-3]记录python、c++、fortran和总分

student \* next;

public:

student();

student(string sn, string n, double sco[4]);

string getName() {return name;}

string getSno() {return sno;}

double getPython() {return score[0];}

double getCpp() {return score[1];}

double getFortran() {return score[2];}

double gettotal() {return score[3];}

student\* getNext() {return next;}

static void analyse(int ,student \* ); //分析成绩

void display(); //打印成绩

void swap(); //交换对象和对象->next的信息,用于排序

};

student::student() //构造

{

cout<<"请输入学生学号 : ";cin>>sno;

cout<<"请输入学生姓名 : ";cin>>name;

cout<<"请输入学生的python、c++、fortran成绩 : "<<endl;

int a,b,c;

cin>>a;

while(a<0||a>100)

{

cout<<"PYTHON成绩输入有误，请重新输入: "<<endl;

cin>>a;

}

cin>>b;

while(b<0||b>100)

{

cout<<"C++输入成绩输入有误，请重新输入: "<<endl;

cin>>b;

}

cin>>c;

while(c<0||c>100)

{

cout<<"FORTRAN成绩输入有误，请重新输入: "<<endl;

cin>>c;

}

score[0]=a;

score[1]=b;

score[2]=c;

score[3]=a+b+c;

next=NULL;

}

student::student(string sn,string n,double sco[4]) //构造重载

{ //这个函数本没必要，因为一开始没考虑保存功能，上头那个构造函数只能从键盘输入，

//故不能从文件写入，也不能修改，故此重载构造函数诞生了

sno = sn;

name = n;

for(int i = 0; i <= 3; i++)

{

score[i] = sco[i];

}

next=NULL;

}

void student::analyse(int a,student \* first)

{

int x;

if(a==1) x = 0;

else if(a ==2) x = 1;

else x = 2;

int you=0,liang=0,zhong=0,bujige=0;

student \* t=first;

double average=0; //平均分

while(t)

{

int b = int(t->score[x]/10);

switch(b)

{

case 10:

case 9:you++; break;

case 8:

case 7:liang++; break;

case 6:zhong++; break;

default:bujige++;

}

average+=t->score[x];

t=t->next;

}

average=average/num;

cout<<" 考生总人数 : "<<num<<" 平均分 : "<<average<<endl;

cout<<"\n 优 良 中 不及格 "<<endl;

cout<<" "<<you<<" \t"<<liang<<" \t"<<zhong<<"\t"<<bujige<<endl;

}

void student::display()

{

cout<<" "<<setw(3)<<sno<<" "<<setw(3)<<name<<" ";

for (int i=0;i<=3;i++)

{

cout<<setw(3)<<score[i]<<" ";

}

cout<<endl;

}

void student::swap() //用于排序

{

int j;

string na,id;

double sco[4];

na=name;name=next->name;next->name=na;

id=sno;sno=next->sno;next->sno=id;

for(j=0;j<=3;j++)

{

sco[j]=score[j];

score[j]=next->score[j];

next->score[j]=sco[j];

}

}

class studentMessage{

private:

student \* first;

student \* last;

public:

studentMessage();

student\* getFirst(){return first;}

student\* getLast(){return last;}

int getNum(){return num;}

void add(); //添加

void search(); //查找

void del(); //删除

void update();

void showOne(); //分析

void showAll(); //输出所有同学所有成绩

void sort(); //排序

void read(); //读

void write(); //写

void clear(); //清空并退出

};

studentMessage::studentMessage()

{

first=NULL; //头结点

last=NULL; //尾结点

num=0;

}

void studentMessage::add()

{

student \* t =new student;

student \*p = first;

while(p)

{

if(p->sno==t->sno)

{

cout<<"\n学号输入错误或该学生成绩已经存在！"<<endl;

Sleep(2000);

system("cls");

return;

}

p=p->next;

}

num++;

if(first==NULL)

{

first=last=t;

}

else

{

last->next=t;

last=last->next;

}

cout<<"添加成功!";

system("pause");system("cls");

}

void studentMessage::search()

{

string a;

cout<<"\n请输入要查找的学生的学号:";cin>>a;

student \*t = first;

while(t)

{

if(t->sno==a)

break;

t=t->next;

}

if(!t)

{

cout<<"\n未找到要查找学生！"<<endl;

system("pause");system("cls");

return;

}

cout<<"\n查找成功！"<<endl;

cout << " 学号 姓名 PYTHON C++ FORTRAN 总分" << endl;

t->display();

system("pause");system("cls");

}

void studentMessage::del()

{

string a;

cout<<"\n请输入要删除的学生的学号: ";cin>>a;

student \*t = first;

student \*p=NULL;

while(t){

if(t->sno==a)break;

p=t;

t=t->next;

}

if(!t)

{

cout<<"\n未找到要删除学生！"<<endl;

system("pause");system("cls");

return;

}

if(!p)

{

first=first->next;

cout<<"\n成功删除学生"<<a<<endl;

delete t;

}

else

{

p->next=t->next;

cout<<"成功删除学生"<<a<<endl;

delete t;

}

num--;

system("pause");system("cls");

}

void studentMessage::showOne()

{

int a;

while(1)

{

cout<<"\n想要分析哪一门成绩？请输入学科序号(1:PYTHON 2:C++ 3:FORTRAN): ";cin>>a;

if(a!=1 && a!=2 && a!=3)

cout<<"\n输入序号或名称有误，请重新输入！"<<endl;

else break;

}

cout<<"\n\t成绩分析如下: \n"<<endl;

student::analyse(a,first);

system("pause");system("cls");

}

void studentMessage::showAll()

{

if(!first)

{

cout<<"当前系统内无学生记录"<<endl;

system("pause");

system("cls");

return;

}

cout << "-----------------------成绩列表------------------------"<< endl;

cout << " 学号 姓名 PYTHON C++ FORTRAN 总分" << endl;

student \*t = first;

while(t){

t->display();

t=t->next;

}

system("pause");

system("cls");

}

void studentMessage::sort()

{

int a,n=0; //n--排名

cout<<"请输入相应序号(1.python 2.c++ 3.fortran 4.总成绩)排序: ";

while(1)

{

cin>>a;

if (a!=1&&a!=2&&a!=3&&a!=4)

cout<<"\n输入序号有误，请重新输入 : ";

else break;

}

student \*t=first;

student \*p=t;

/\*student \*tail=last;

for(;t->next!=NULL;t=t->next)

for(student \* q=t->next;q!=NULL;q=q->next)

if(t->next->score[a-1]>=t->score[a-1])

{

t->swap();

}\*/

while(p->next)

{

t=first;

while(t->next)

{

if(t->next->score[a-1]>=t->score[a-1])

{

t->swap();

}

t=t->next;

}

p=p->next;

}

t = first;

cout<<"\n\t 成绩表如下: "<<endl;

cout<<"学号 姓名 成绩 排名"<<endl;

while(t)

{

n++;

cout<<" "<<t->getSno()<<" \t"<<t->getName()<<" \t";

switch(a)

{

case 1 :cout<<t->getPython()<<" \t"<<n<<endl;break;

case 2 :cout<<t->getCpp()<<" \t"<<n<<endl;break;

case 3 :cout<<t->getFortran()<<" \t"<<n<<endl;break;

case 4 :cout<<t->gettotal()<<" \t"<<n<<endl;break;

}

t=t->next;

}

system("pause");system("cls");

}

//

void studentMessage::update()

{

string a;

cout<<"\n请输入要修改的学生的学号或姓名:";cin>>a;

student \*t = first;

while(t)

{

if(t->sno==a || t->getName()==a) break;

t=t->next;

}

if(!t)

{

cout<<"\n未找到要修改学生！"<<endl;

return;

}

cout<<"\n要修改的学生记录如下："<<endl;

cout << " 学号 姓名 PYTHON C++ FORTRAN 总分" << endl;

t->display();

int x=0,flag=0;

string na;

student \*m;

while(x!=6)

{

cout<<"\n1.修改学号 2.修改姓名 3.修改PYTHON分数 4.修改C++分数 5.修改FORTRAN分数 6.退出修改:"; cin>>x;

switch(x)

{

case 1:

{

cout<<"请输入学号:";

cin>>na;

m=first;

while(m)

{

if(m->sno==na)

{

cout<<"\n学号输入错误或该学生成绩已经存在!"<<endl;flag=1;

break;

}

m=m->next;

}

if(!flag) t->sno=na;

break;

}

case 2:cout<<"请输入姓名:"; cin>>t->name;break;

case 3:cout<<"请输入PYTHON分数:"; cin>>t->score[0];t->score[3]=t->score[1]+t->score[0]+t->score[2];break;

case 4:cout<<"请输入C++分数:"; cin>>t->score[1];t->score[3]=t->score[1]+t->score[0]+t->score[2];break;

case 5:cout<<"请输入FORTRAN分数:"; cin>>t->score[2];t->score[3]=t->score[1]+t->score[0]+t->score[2];break;

case 6:break;

default:cout<<"输入错误，请重新选择修改项"<<endl;

}

cout<<"\n\t 修改后学生记录为：\n";

cout << " 学号 姓名 PYTHON C++ FORTRAN 总分" << endl;

t->display();

}

system("pause");

system("cls");

}

void studentMessage::read()

{

ifstream fs;

student \*s=first;

string sno,name;

double score[4];

fs.open("Student.dat",ios::in|ios::binary );

fs>>sno>>name>>score[0]>>score[1]>>score[2]>>score[3];

while(fs.good())

{

s= new student(sno,name,score);

student \*s2 = first;

if(first) //若已经存在结点

{

student \*s2 = first;

while(s2->next) //查找尾结点

{

s2=s2->next;

}

s2->next=s; //连接

}

else //若不存在结点(表空)

{

first=s; //连接

}

fs>>sno>>name>>score[0]>>score[1]>>score[2]>>score[3];

num++;

last=s;

}

fs.close();

cout<<"\n读取成功!\n";

}

void studentMessage::write()

{

ofstream fs("Student.dat",ios::out|ios::binary );

char c;

cout<<"\n保存数据,是否继续?(输入Y/N):";

cin>>c;

if(toupper(c)!='Y')

return;

student \*s=first;

while(s)

{

fs<<s->sno<<" "<<s->name<<" "<<s->score[0]<<" "<<s->score[1]<<" "<<s->score[2]<<" "<<s->score[3]<<endl;

s=s->next;

}

fs.close();

cout<<"\n保存成功!\n";

system("pause");

system("cls");

}

void studentMessage::clear()

{

char x;

cout<<"确认要清空所有信息？(输入Y/N) : ";cin>>x;

if (toupper(x)!='Y')

{

cout<<"\n取消清空\n"<<endl;

return;

}

student \*t = first;

student \*p;

while(t){

p=t;

t=t->next;

delete p;

}

last=first=NULL;

cout<<"\n清空完成!\n";

system("pause");system("cls");

}

void showMenu()

{

cout << " \n";

cout << "===============================\n";

cout << " 学生成绩管理系统\n\n";

cout << " 1.显示所有学生成绩\n";

cout << " 2.添加信息\n";

cout << " 3.查询信息\n";

cout << " 4.删除信息\n";

cout << " 5.成绩排序\n";

cout << " 6.单科成绩分析\n";

cout << " 7.修改信息\n";

cout << " 8.保存\n";

cout << " 9.清空成绩信息\n";

cout << " 0.退出系统\n";

cout << "===============================\n";

cout << " \n";

}

int main()

{

char x;

int h;

studentMessage stuM=studentMessage();

cout<<"\n\n\t\t------欢迎进入学生成绩管理系统!-------"<<endl;

cout<<"\t\t\t需要读取数据吗？(输入Y/N) : ";cin>>x;

if (toupper(x)=='Y')

{

stuM.read();

}

system("pause");

system("cls");

while(1)

{

showMenu();

cout << "请输入操作对应的序号 : ";

cin >>h;

cout<<endl;

switch(h)

{

case 1: stuM.showAll(); break;

case 2: stuM.add(); break;

case 3: stuM.search(); break;

case 4: stuM.del(); break;

case 5: stuM.sort();break;

case 6: stuM.showOne(); break;

case 7: stuM.update();break;

case 8: stuM.write();break;

case 9: stuM.clear();break;

case 0: cout<<"\n退出成功！";return 0;

default:cout<<"\n输入序号有误！请输入正确的序号。"<<endl;

}

}

}