第十三次作业

第一题

```
#include <stdio.h>
#include <stdlib.h>
#pragma warning(disable:4996)
struct birthday
{
    int year;
    int month;
    int day;
};
struct student {
    int id;
    char name[30];
    char sex[10];
    struct birthday birth;
    float score;
};
float average(student s[]);
void sort(student s[]);
void save(student s[]);
student find(int id);
int main() {
    struct student s[10];
    for (int i = 0; i < 10; i++) {
        scanf("%d %s %s %d %d %d %f", &s[i].id, s[i].name,
s[i].sex, &s[i].birth.year, &s[i].birth.month, &s[i].birth.day,
&s[i].score);

    }
    float avg = average(s);
    printf("平均成绩：  %.2f\n", avg);
    save(s);
    int id;
    printf("请输入学号：");
```

```
    scanf("%d", &id);
    student ans = find(id);
    printf("ID:%d 姓名：%s  性别：%s  出生日期：%d 年%d 月%d 日  成绩：%.2f\n\n", ans.id, ans.name, ans.sex, ans.birth.year, ans.birth.month, ans.birth.day, ans.score);
    sort(s);
    printf("成绩排序：\n");
    for (int i = 0; i < 10; i++) {
        printf("姓名：%s  成绩：%.2f  排名：%d  \n", s[i].name, s[i].score, i + 1);
    }
}

float average(student s[])
{
    float sum = 0;
    for (int i = 0; i < 10; i++) {
        sum += s[i].score;
    }
    sum /= 10;
    return sum;
}

void sort(student s[])
{
    for (int i = 0; i < 10; i++) {
        float min = s[i].score;
        int k = i;
        for (int j = i; j < 10; j++) {
            if (s[j].score >= min) {
                min = s[j].score;
                k = j;
            }
        }
        student t = s[i];
        s[i] = s[k];
        s[k] = t;
    }

}

void save(student s[])
{
```

```
72      FILE* fp;
73      fp=fopen("student.txt", "w");
74      for (int i = 0; i < 10; i++) {
75          fprintf(fp, "%d %s %s %d %d %d %.2f\n", s[i].id,
    s[i].name, s[i].sex, s[i].birth.year, s[i].birth.month,
    s[i].birth.day, s[i].score);
76      }
77      fclose(fp);
78  }
79
80  student find(int id)
81  {
82      FILE* fp;
83      fp = fopen("student.txt", "r");
84      student ans;
85      for (int i = 0; i < 10; i++) {
86          fscanf(fp, "%d %s %s %d %d %d %f", &ans.id, ans.name,
    ans.sex, &ans.birth.year, &ans.birth.month, &ans.birth.day,
    &ans.score);
87          if (ans.id == id)break;
88      }
89      fclose(fp);
90      return ans;
91  }
92
```

```
1 alice female 2003 1 20 78
2 bob male 2004 11 1 95.5
3 carol female 2002 12 3 88.8
4 dave male 2002 2 3 78.7
5 eve male 2003 6 8 89.5
6 francis male 2003 4 6 85.4
7 grace male 2004 3 4 67.6
8 hans male 2003 1 2 60
9 isabella female 2005 4 5 80
10 jason male 2002 7 8 90
平均成绩： 81.35
请输入学号:4
ID:4 姓名：dave 性别：male 出生日期：2002年2月3日 成绩：78.70

成绩排序：
姓名:bob 成绩:95.50 排名:1
姓名:jason 成绩:90.00 排名:2
姓名:eve 成绩:89.50 排名:3
姓名:carol 成绩:88.80 排名:4
姓名:francis 成绩:85.40 排名:5
姓名:isabella 成绩:80.00 排名:6
姓名:dave 成绩:78.70 排名:7
姓名:alice 成绩:78.00 排名:8
姓名:grace 成绩:67.60 排名:9
姓名:hans 成绩:60.00 排名:10
```

思路：

声明日期结构体与学生结构体，输入十个学生的信息，并求平均，然后将信息保存在student.txt中，之后输入学号，打开文件遍历查找，返回对应的学生信息，最后按照成绩排序输出。

第二题

```c
#include <stdio.h>
#include <stdlib.h>
#pragma warning(disable:4996)
int main() {
    enum week { Mon = 1, Tues, Wed, Thurs, Fri, Sat, Sun } day;
    scanf("%d", &day);
    switch (day) {
    case Mon: puts("Monday"); break;
    case Tues: puts("Tuesday"); break;
    case Wed: puts("Wednesday"); break;
```

```
    case Thurs: puts("Thursday"); break;
    case Fri: puts("Friday"); break;
    case Sat: puts("Saturday"); break;
    case Sun: puts("Sunday"); break;
    default: puts("Error!");
    }
    return 0;

}

```

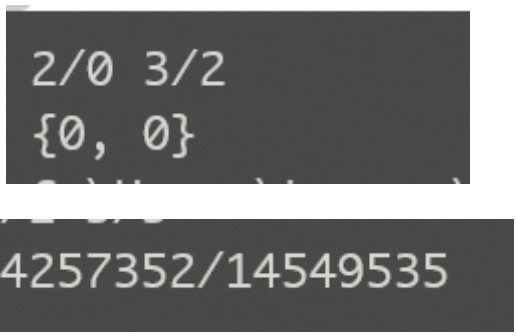
```
3
Wednesday
```

第三题

```
#include <stdio.h>
#include <stdlib.h>
#pragma warning(disable:4996)

struct fraction {
    long long int numerator;
    unsigned long long int denominator;

};
fraction Fra_Add(fraction f1, fraction f2);
fraction Fra_Sub(fraction f1, fraction f2);
long long gcd(long long a, long long b) { return b ? gcd(b, a % b) : a; }
int main() {
    fraction f1, f2;
    scanf("%lld/%lld %lld/%lld", &f1.numerator, &f1.denominator, &f2.numerator, &f2.denominator);
    if (f1.denominator == 0 || f2.denominator == 0) {
        printf("{0, 0}");
    }
```

```
    else {
        fraction sum = { 0,1 };
        for (int i = 1; i <= 10; i ++) {
            if (i % 2 == 0)sum = Fra_Sub(sum, { 1,(unsigned long long)2 * i - 1 });
            else sum = Fra_Add(sum, { 1,(unsigned long long)2 * i - 1 });
        }

        sum.numerator *= 4;
        long long g = gcd(sum.numerator > 0 ? sum.numerator : (0 - sum.denominator), sum.denominator);
        sum.numerator = sum.numerator / g;
        sum.denominator = sum.denominator / g;
        printf("%lld/%lld\n", sum.numerator, sum.denominator);
    }

}

fraction Fra_Add(fraction f1, fraction f2)
{
    fraction ans = { f1.numerator * (long long int)f2.denominator + (long long int)f1.denominator *

f2.numerator,f1.denominator * f2.denominator };
    long long g = gcd(ans.numerator > 0 ? ans.numerator : (0 - ans.denominator), ans.denominator);
    ans.numerator = ans.numerator / g;
    ans.denominator = ans.denominator / g;
    return ans;
}

fraction Fra_Sub(fraction f1, fraction f2)
{
    fraction ans = { f1.numerator * (long long int)f2.denominator - (long long int)f1.denominator *

f2.numerator,f1.denominator * f2.denominator };

    long long g = gcd(ans.numerator > 0 ? ans.numerator : (0 - ans.numerator), ans.denominator);
    ans.numerator = ans.numerator / g;
    ans.denominator = ans.denominator / g;
```

```
53      return ans;
54  }
55
```



思路：

首先判断分母是否为 0，如果不为零，对于Fra_Add函数而言，先通分计算，然后求分子分母最大公因数并化简，之后 n 从 1 到 10，如果 n 为奇数就加上下一项，n 为偶数则减去下一项。