

# 中国计量大学现代科技学院

## 课程设计报告

课 程： 高级语言课程设计

姓 名： 陈斌

学 号： 1932331109

班 级： 计算机 191

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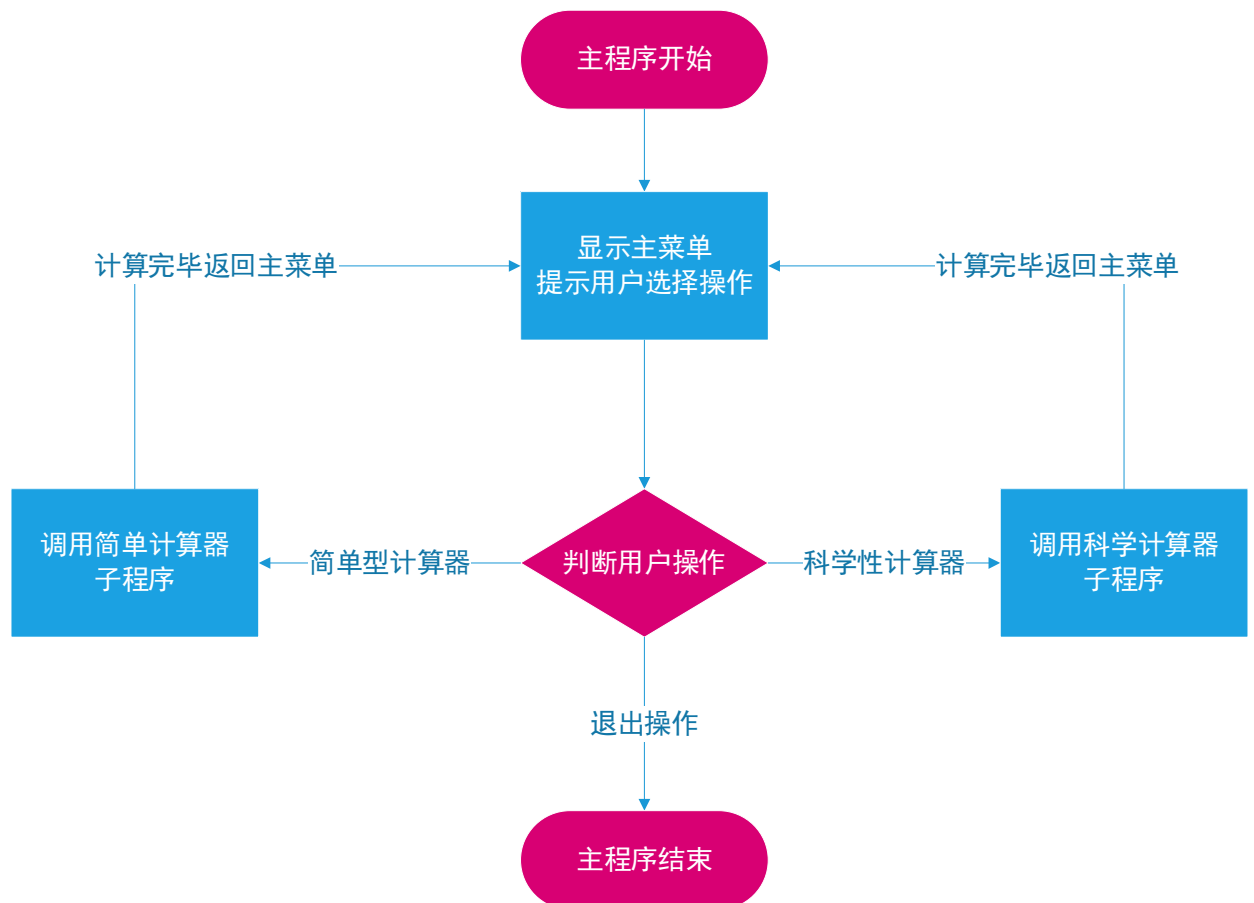
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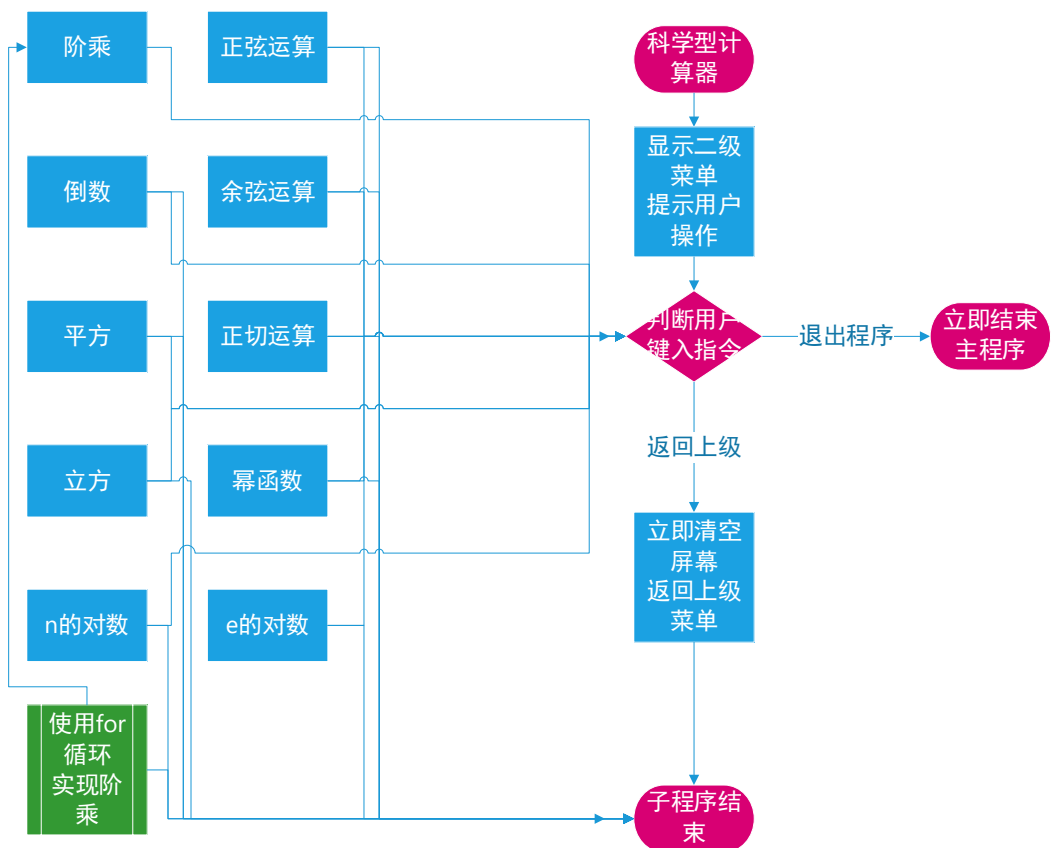
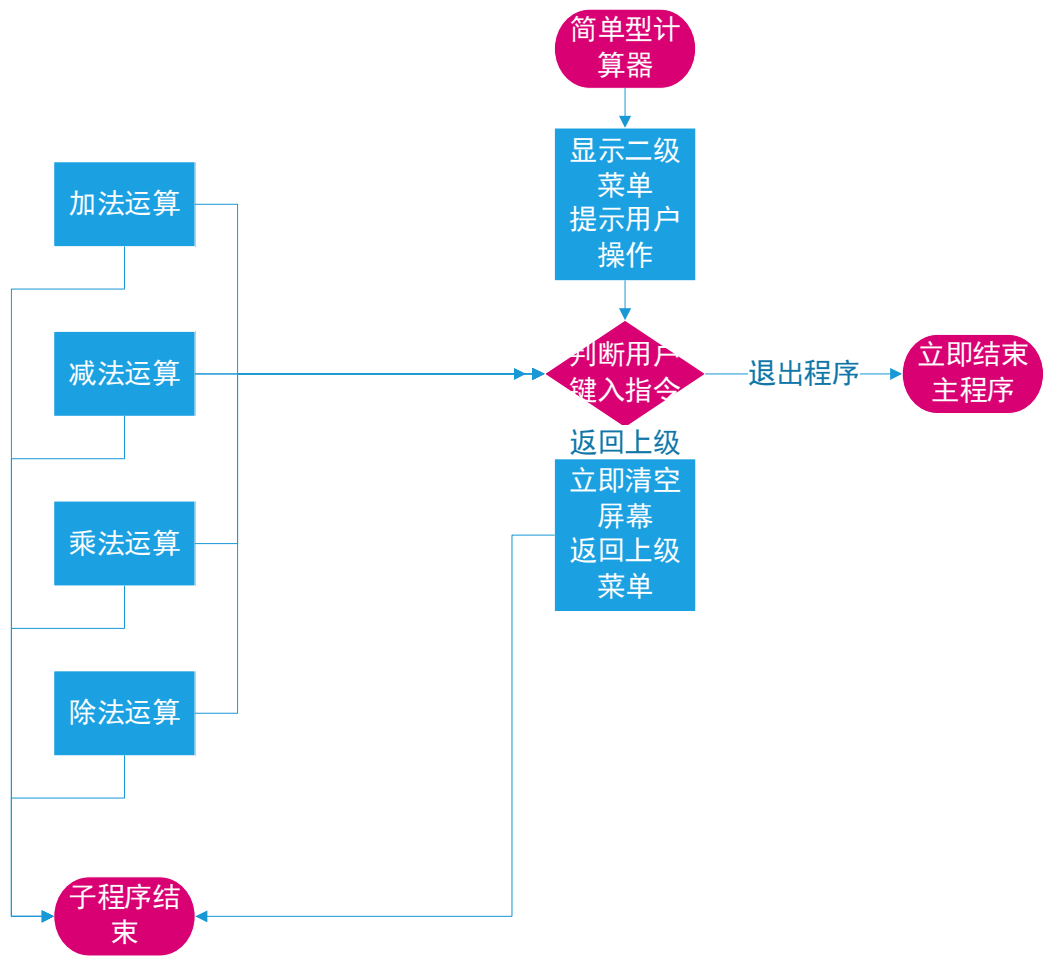
## 一、 参考文献

1. C 结构体 | 菜鸟教程  
<https://www.runoob.com/cprogramming/c-structures.html>
2. C 数组 | 菜鸟教程  
<https://www.runoob.com/cprogramming/c-arrays.html>

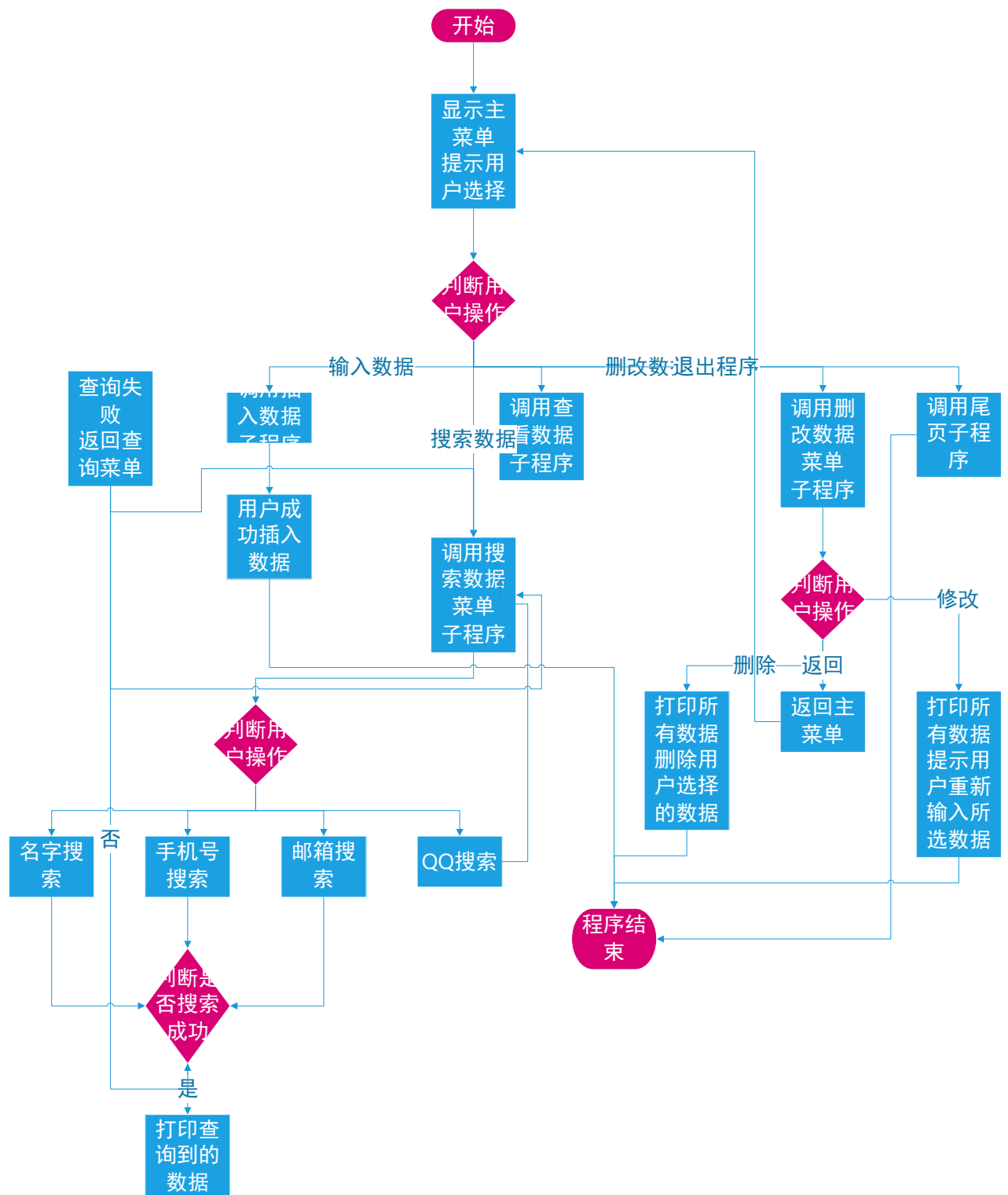
## 二、 流程图

### 1. 科学计算器





## 2. 通讯录管理系统



### 三、 程序代码

#### 1. 科学计算器

```
1. #include "stdio.h"
2. #include "math.h"
3. #include <windows.h>
4. //=====
   =====
5. //Author:chenbin    Student ID:1932331109
6. int one,i,operator,operator1,flag=0;
7. float a=0.0,b=0.0,out=0.0;
8. double n=0.0,x=0.0;    //避免阶乘溢出 采用双精度
9.
10.
11.
12. void simple()
13. {
14.     printf("You have entered the simple mode calculator\n\n");
15.     printf("Please enter an operator\n\n");
16.     printf("<1>add    <2>subtract    <3>multiply    <4>
divide    <5>Superior menu <6>exit\n\n");
17.     scanf("%d",&operator1);
18.     switch(operator1)    //嵌套 switch 实现加减乘除和退出功能
19.     {
20.     case 1:
21.         printf("Please enter the first number\n\n");
22.         scanf("%f",&a);
23.         printf("Please enter the second number\n\n");
24.         scanf("%f",&b);
25.         out=a+b;
26.         printf("The calculation result is %f \n\n",out);
27.         break;
28.     case 2:
```

```

29.         printf("Please enter the first number\n\
n");
30.         scanf("%f",&a);
31.         printf("Please enter the second number\n\
\n");
32.         scanf("%f",&b);
33.         out=a-b;
34.         printf("The calculation result is %f \n\
n",out);
35.         break;
36.     case 3:
37.         printf("Please enter the first number\n\
n");
38.         scanf("%f",&a);
39.         printf("Please enter the second number\n\
\n");
40.         scanf("%f",&b);
41.         out=a*b;
42.         printf("The calculation result is %f \n\
n",out);
43.         break;
44.     case 4:
45.         printf("Please enter the first number\n\
n");
46.         scanf("%f",&a);
47.         printf("Please enter the second number\n\
\n");
48.         scanf("%f",&b);
49.         out=a/b;
50.         printf("The calculation result is %f \n\
n",out);
51.         break;
52.     case 6:
53.         return 0;
54.         break;
55.     }
56.     if(operator1==5) //判断是否返回上级菜单
57.     {
58.         system("cls");
59.         main(); //立即清空屏幕并返回上级菜单
60.     }
61.     else
62.     {
63.         system("pause"); //计算结果暂留

```



```

64.         system("cls");    //计算完毕清空屏幕
65.         main();
66.     }
67. }
68.
69.
70.
71. void scientific()
72. {
73.     printf("You have entered the Scientific mode ca
        lculator\n\n");
74.     printf("Please enter an operator\n\n");
75.     printf("<1> sin (x) <2> cos (x) <3> tan
        (x) <4> x^y <5> ln(x) <6> logn(x)\n");
76.     printf("<7> x! <8> 1/x <9> x^2
        <10> x^3 <11> Superior menu <12> exit \n\n");
77.     scanf("%d",&operator);
78.     switch(operator)
79.     {
80.         case 1:
81.             printf("Please enter the number\n\n");
82.             scanf("%f",&a);
83.             out=sin(x);
84.             printf("The calculation result is %lf \n
                \n",out);
85.             break;
86.         case 2:
87.             printf("Please enter the number\n\n");
88.             scanf("%f",&a);
89.             out=cos(x);
90.             printf("The calculation result is %lf \n
                \n",out);
91.             break;
92.         case 3:
93.             printf("Please enter the number\n\n");
94.             scanf("%f",&a);
95.             out=tan(x);
96.             printf("The calculation result is %lf \n
                \n",out);
97.             break;
98.         case 4:
99.             printf("Please enter the first number\n\
                n");
100.             scanf("%f",&a);

```

```

101.                printf("Please enter the second numbe
    r \n\n");
102.                scanf("%lf",&n);
103.                out=pow(x,n);
104.                printf("The calculation result is %lf
    \n\n",out);
105.                break;
106.                case 5:
107.                printf("Please enter the number\n\n")
    ;
108.                scanf("%f",&a);
109.                out=log(x);
110.                printf("The calculation result is %lf
    \n\n",out);
111.                break;
112.                case 6:
113.                printf("Please enter the first number
    \n\n");
114.                scanf("%f",&a);
115.                printf("Please enter the second numbe
    r \n\n");
116.                scanf("%lf",&n);
117.                out=log(n)/log(x);    //使用换底公式
    实现对数计算
118.                printf("The calculation result is %lf
    \n\n",out);
119.                break;
120.                case 7:
121.                printf("Please enter the number\n\n")
    ;
122.                scanf("%f",&a);
123.                for(i=1,out=1;i<=x;i++)    //使用 for 循
    环实现阶乘
124.                out=out*i;
125.                printf("The calculation result is %lf
    \n\n",out);
126.                break;
127.                case 8:
128.                printf("Please enter the number\n\n")
    ;
129.                scanf("%f",&a);
130.                if(x!=0)    //判断 x 是否合法，不合法则让
    用户重新输入
131.                {

```

```

132.                out=1/x;
133.                printf("The calculation result is %lf
    \n\n",out);
134.            }
135.            else
136.            {
137.                printf("x is not allowed to b
    e 0, please enter again /n\n");
138.                scanf("%lf",&x);
139.            }
140.            break;
141.        case 9:
142.            printf("Please enter the number\n\n")
    ;
143.            scanf("%f",&a);
144.            out=x*x;
145.            printf("The calculation result is %lf
    \n\n",out);
146.            break;
147.        case 10:
148.            printf("Please enter the number\n\n")
    ;
149.            scanf("%f",&a);
150.            out=x*x*x;
151.            printf("The calculation result is %lf
    \n\n",out);
152.            break;
153.        case 12:
154.            return 0;
155.            break;
156.    }
157.    if(operator==11) //判断是否返回上级菜单
158.    {
159.        system("cls");
160.        main();    //立即清空屏幕并返回上级菜
    单
161.    }
162.    else
163.    {
164.        system("pause"); //计算结果暂留
165.        system("cls");  //计算完毕清空屏幕
166.        main();
167.    }
168. }

```

```

169.
170.
171.     void main()
172.     {
173.         printf("Welcome to Chenbin's Personal calcula
tor\n\n");
174.         while(operator!=12 && operator1!=6){    //使用
while 语句实现多次计算
175.         printf("Please enter the menu you want to ent
er\n\n");
176.         printf("<1> Simple      <2> Scientific      <3>
Exit\n\n");
177.         scanf("%d",&one);
178.         switch(one)    //使用 switch 实现多种功能选项
179.         {
180.             case 1:
181.                 simple();
182.                 break;
183.             case 2:
184.                 scientific();
185.                 break;
186.             case 3 :
187.                 return 0;
188.                 break;
189.         }
190.     }
191. }

```

## 2. 通讯录管理系统

```
1. #include <stdio.h>
2. #include <stdlib.h>
3. #include <windows.h>
4. //=====
   =====
5. //Author:chenbin    Student ID:1932331109
6. struct person
7. {
8.     char name[8];
9.     char phone[11];
10.    char email[30];
11.    char qq[10];
12. };
13. int count=1;
14. struct person pe[100];
15.
16.
17.
18. void menu_main() //主菜单
19. {
20.     printf("#####      Contacts Management
System      #####\n");
21.     printf("#####
#####\n");
22.     printf("#
                                #\n");
23.     printf("#          1-----Input-----
-----
                                #\n");
24.     printf("#
                                #\n");
25.     printf("#          2-----Inquire-----
-----
                                #\n");
26.     printf("#
                                #\n");
27.     printf("#          3-----Allshow-----
-----
                                #\n");
28.     printf("#
                                #\n");
```

```

29.     printf("#          4-----Modify-----
   -----
   #\n");
30.     printf("#
   #\n");
31.     printf("#          5-----Exit-----
   -----
   #\n");
32.     printf("#
   #\n");
33.     printf("#
   #\n");
34.     printf("#
   #\n");
35.     printf("#####
   #####\n");
36.     printf("#####
   #####\n");
37. }
38.
39. void menu_inquire() //信息查询菜单
40. {
41. int Check_key;
42.     printf("#####      Contacts Management Sys
   tem #####\n");
43.     printf("#####
   #####\n");
44.     printf("#
   #\n");
45.     printf("#
   #\n");
46.     printf("#          1-----Search by name
   #\n");
47.     printf("#
   #\n");
48.     printf("#
   #\n");
49.     printf("#          2-----Search by phon
   e
   #\n");
50.     printf("#
   #\n");
51.     printf("#
   #\n");
52.     printf("#          3-----Search by Emai
   l
   #\n");

```

```

53.     printf("#
                                     #\n");
54.     printf("#
                                     #\n");
55.     printf("#                     4-----Search by QQ
                                     #\n");
56.     printf("#
                                     #\n");
57.     printf("#
                                     #\n");
58.     printf("#                     5-----Exit inquire
                                     #\n");
59.     printf("#
                                     #\n");
60.     printf("#
                                     #\n");
61.     printf("#####
#####\n");
62.     printf("#####
#####\n");
63.
64.     printf("Please enter the operation number :");
65.     scanf("%d",&Check_key);
66.     if (Check_key==1)
67.     {
68.         system("cls");
69.         Inquire_name();
70.     }
71.     else if(Check_key==2)
72.     {
73.         system("cls");
74.         Inquire_phone();
75.     }
76.     else if (Check_key==3)
77.     {
78.         system("cls");
79.         Inquire_Email();
80.     }
81.     else if (Check_key==4)
82.     {
83.         system("cls");
84.         Inquire_QQ();
85.     }
86.

```

```

87.         else if (Check_key==5)
88.         {
89.             system("cls");
90.             main();
91.         }
92.     }
93.
94. void menu_Modify() //信息删改菜单
95. {
96.     int Check_key;
97.     printf("##### Contacts Management Sys
tem #####\n");
98.     printf("#####
#####\n");
99.     printf("#
#\\n");
100.    printf("#
#\\n");
101.    printf("# 1-----Information
modificatio #\\n");
102.    printf("#
#\\n");
103.    printf("#
#\\n");
104.    printf("# 2-----Information
deletion #\\n");
105.    printf("#
#\\n");
106.    printf("#
#\\n");
107.    printf("# 3-----Exit modify
#\\n");
108.    printf("#
#\\n");
109.    printf("#
#\\n");
110.    printf("#####
#####\n");
111.    printf("#####
#####\n");
112.
113.    printf("Please enter the operation number :");
114.    scanf("%d",&Check_key);
115.    if (Check_key==1)

```



```

116.     {
117.         system ("cls");
118.         modify();
119.     }
120.     else if (Check_key==2)
121.     {
122.         system ("cls");
123.         delete();
124.     }
125.     else if (Check_key==3)
126.     {
127.         system ("cls");
128.         main();
129.     }
130. }
131.
132. void lastpage() //尾页
133. {
134.     printf("#####      Contacts Management
System #####\n");
135.     printf("#####
#####\n");
136.     printf("#
#\\n");
137.     printf("#
#\\n");
138.     printf("#
#\\n");
139.     printf("#
#\\n");
140.     printf("#
#\\n");
141.     printf("#              Thanks for usi
ng!
#\\n");
142.     printf("#
#\\n");
143.     printf("#
#\\n");
144.     printf("#
#\\n");
145.     printf("#
#\\n");
146.     printf("#
#\\n");

```

```

147.     printf("#####\n");
148.     printf("#####\n");
149.
150. }
151.
152.
153.
154.
155.
156. void input() //信息输入
157. {
158.     int r;
159.     while (1) //循环输入
160.     {
161.         printf("Please enter your name :");scanf("%s"
,pe[count].name);
162.         printf("Phone:
");scanf("%s",pe[count].phone);
163.         printf("Email:
");scanf("%s",pe[count].email);
164.         printf("QQ: ");scanf("%s",pe[count].qq);
165.         printf("Entered successfully !\n");
166.         count++;
167.         printf("Enter 1 to continue input, enter 0 to
end \n");
168.         scanf("%d",&r);
169.         if(r==1){system("cls");continue;} //当条件满足
时清空屏幕并继续循环
170.         else if (r==0)break;
171.         else printf("Input error !
\n");system("pause");break;//错误提示
172.     }
173.     system("cls"); //清屏
174.     main(); //返回主程序
175. }
176.
177.
178.
179.
180. void Inquire_name() //姓名查询
181. {
182.     int name0[8];

```

```

183.     int i;
184.     printf("Please enter the name you want to inquire
        :");
185.     scanf("%s",name0);
186.     for (i=0;i<count;i++)
187.     {
188.         if (strcmp(name0,pe[i].name)==0)
189.         {
190.             printf("#####      Contacts Managem
ent System      #####\n");
191.             printf("#####\n");
192.             printf("%s      %s      %s      %s
\n","Name","Phone","Email","QQ");
193.             printf("-----\n");
194.             printf("%-10.8s %6.6s %16.6s%16.6s\n",pe[i].name,
pe[i].phone,pe[i].email,pe[i].qq);
195.             break;
196.         }
197.         else if (i==count-1)printf ("No one found !\n");
198.     }
199.         //查询失败时退出
200.     system("pause"); //失败信息提示暂留
201.     system("cls");
202.     menu_inquire();//回到总查询页面
203. }
204.
205.
206.
207.
208.
209.
210. void Inquire_phone() //电话查询
211. {
212.     int phone0[11];
213.     int i;
214.     printf("Please enter the phone you want to inquire
        :");
215.     scanf("%s",phone0);
216.     for (i=0;i<count;i++)
217.     {
218.         if (strcmp(phone0,pe[i].phone)==0)

```

```

219.     {
220.
221.         printf("#####      Contacts Managem
ent System      #####\n");
222.         printf("#####
#####\n");
223.         printf("%s      %s      %s      %
s      \n", "Name", "Phone", "Email", "QQ");
224.         printf("-----
-----\n");
225.         printf("%-10.8s %6.6s %16.6s%16.6s\n", pe[i].name,
pe[i].phone, pe[i].email, pe[i].qq);
226.         break;
227.     }
228.     else if (i==count-1)printf ("No one found !\n");}
//查询失败时退出
229.     system("pause"); //失败信息提示暂留
230.     system("cls");
231.     menu_inquire();//回到总查询页面
232. }
233.
234.
235.
236. void Inquire_QQ() //QQ 查询
237. {
238.     int QQ0[10];
239.     int i;
240.     printf("Please enter the phone you want to inquir
e :");
241.     scanf("%s", QQ0);
242.     for (i=0; i<count; i++)
243.     {
244.         if (strcmp(QQ0, pe[i].qq)==0)
245.         {
246.
247.             printf("#####      Contacts Managem
ent System      #####\n");
248.             printf("#####
#####\n");
249.             printf("%s      %s      %s      %
s      \n", "Name", "Phone", "Email", "QQ");
250.             printf("-----
-----\n");

```

```

251.         printf("%-10.8s %6.6s %16.6s%16.6s\n",pe[i].name,
                pe[i].phone,pe[i].email,pe[i].qq);
252.         break;
253.     }
254.     else if (i==count-1)printf ("No one found !\n");}
    //查询失败时退出
255.     system("pause"); //失败信息提示暂留
256.     system("cls");
257.     menu_inquire();//回到总查询页面
258. }
259.
260.
261.
262. void Inquire_Email() //Email 查询
263. {
264.     int Email0[10];
265.     int i;
266.     printf("Please enter the Email you want to inquire :");
267.     scanf("%s",Email0);
268.     for (i=0;i<count;i++)
269.     {
270.         if (strcmp(Email0,pe[i].email)==0)
271.         {
272.
273.             printf("##### Contacts Management System #####\n");
274.             printf("#####\n");
275.             printf("%s %s %s %s\n","Name","Phone","Email","QQ");
276.             printf("-----\n");
277.             printf("%-10.8s %6.6s %16.6s%16.6s\n",pe[i].name,
                pe[i].phone,pe[i].email,pe[i].qq);
278.             break;
279.         }
280.         else if (i==count-1)printf ("No one found !\n");}
    //查询失败时退出
281.     system("pause"); //失败信息提示暂留
282.     system("cls");
283.     menu_inquire();//回到总查询页面
284. }
285.

```

```

286.
287.
288.     void Allshow()    //全部信息查询
289.     {
290.         int r,i;
291.         printf("#####      Contacts Managem
ent System      #####\n");
292.         printf("#####
#####\n");
293.         printf("%s      %s      %s      %
s      \n","name","phone","Email","QQ");
294.         printf("-----
-----\n");
295.         for (i=0;i<count;i++)    //for 循环查找所有信息
296.         {
297.             printf("%-10.8s %6.6s %16.6s%16.6s\n",pe[
i].name,pe[i].phone,pe[i].email,pe[i].qq);
298.         }
299.         printf("Enter 0 to exit ");
300.         scanf("%d",&r);
301.         if (r==0)
302.         {
303.             system("cls");
304.             main();
305.         }
306.         else printf("Input error ! ");
307.     }
308.
309.
310.     void modify()    //信息修改
311.     {
312.         int r,i,j;
313.         char name9[8];
314.         printf("#####      Contacts Managem
ent System      #####\n");
315.         printf("#####
#####\n");
316.         printf("%s      %s      %s      %
s      \n","name","phone","Email","QQ");
317.         for (i=0;i<count;i++)    //for 循环查找所有信息
318.         {
319.             printf("%-10.8s %6.6s %16.6s%16.6s\n",pe[
i].name,pe[i].phone,pe[i].email,pe[i].qq);
320.         }

```

```

321.         printf("-----\n");
322.         printf("-----\n");
323.         printf("Please enter the name of the person you want to modify : ");
324.         scanf("%s",name9);
325.         for (j=0;j<count;j++)
326.         {
327.             if (strcmp(name9,pe[j].name)==0)
328.             {
329.                 printf("Please enter your name :");scanf("%s",
,pe[j].name);
330.                 printf("Phone: ");scanf("%s",pe[j].phone);
331.                 printf("Email: ");scanf("%s",pe[j].email);
332.                 printf("QQ: ");scanf("%s",pe[j].qq);
333.             }
334.             printf("Successfully deleted !\n");
335.         }
336.         if (j==count)printf("No one found !");
337.         printf("enter 0 to end\n");
338.         scanf("%d",&r);
339.         if (r==0)
340.         {
341.             system("cls");
342.             menu_Modify();
343.         }
344.         else printf("Input error ! \n");
345.     }
346.
347.
348.     void delete()
349.     {
350.         int r,j,n,i;
351.         char name9[8];
352.         printf("#####      Contacts Managem
ent System      #####\n");
353.         printf("#####\n");
354.         printf("%s      %s      %s      %s\n", "name", "phone", "Email", "QQ");
355.         for (i=0;i<count;i++) //for 循环查找所有信息
356.         {

```

```

357.             printf("%-10.8s %6.6s %16.6s%16.6s\n",pe[
    i].name,pe[i].phone,pe[i].email,pe[i].qq);
358.         }
359.         printf("-----\n");
360.         printf("-----\n");
361.         printf("Please enter the name of the person you w
    ant to delete :");
362.         scanf("%s",name9);
363.         for (j=0;j<count;j++)
364.         {
365.             if (strcmp(name9,pe[j].name)==0)
366.             {
367.                 n=j;
368.             }
369.         }
370.
371.         for (n;n<count;n++)
372.         {
373.             pe[n]=pe[n+1];//用后一个联系人的数组覆盖前一个
    人
374.         }count--;
375.         printf("Successfully deleted !\n");
376.         printf("enter 0 to end\n");
377.         scanf("%d",&r);
378.         if (r==0)
379.         {system("cls");
380.          main();}
381.         else printf("Input error ! ");
382.     }
383.
384.
385.
386.     void main()
387.     {
388.         int key;
389.         menu_main();
390.         printf("Please enter the required action:");
391.         scanf("%d",&key);
392.         if(key==1)
393.         {
394.             system("cls");
395.             input();

```



```
396.         }else if(key==2)
397.         {
398.             system("cls");
399.             menu_inquire();
400.         }
401.         else if(key==3)
402.         {
403.             system("cls");
404.             Allshow();
405.         }
406.         else if(key==4)
407.         {
408.             system("cls");
409.             menu_Modify();
410.         }
411.         else if(key==5)
412.         {
413.             system("cls");
414.             lastpage();
415.         }
416.
417.     }
```

## 四、 调试难点

### 1. 科学计算器

- 1) 实现不同模式计算器能够返回上级菜单功能。最后使用标记变量在计算结束后进行判断，使程序在结束计算后清空屏幕，根据用户的选项来决定显示上级菜单还是本菜单，最终实现返回上级菜单的效果
- 2) 计算功能的实现。利用 `math` 库中的函数以及 `for` 循环来实现计算，完成计算器本该有的功能。一些无法直接计算的表达式可以使用例如换底公式来实现

### 2. 通讯录管理系统

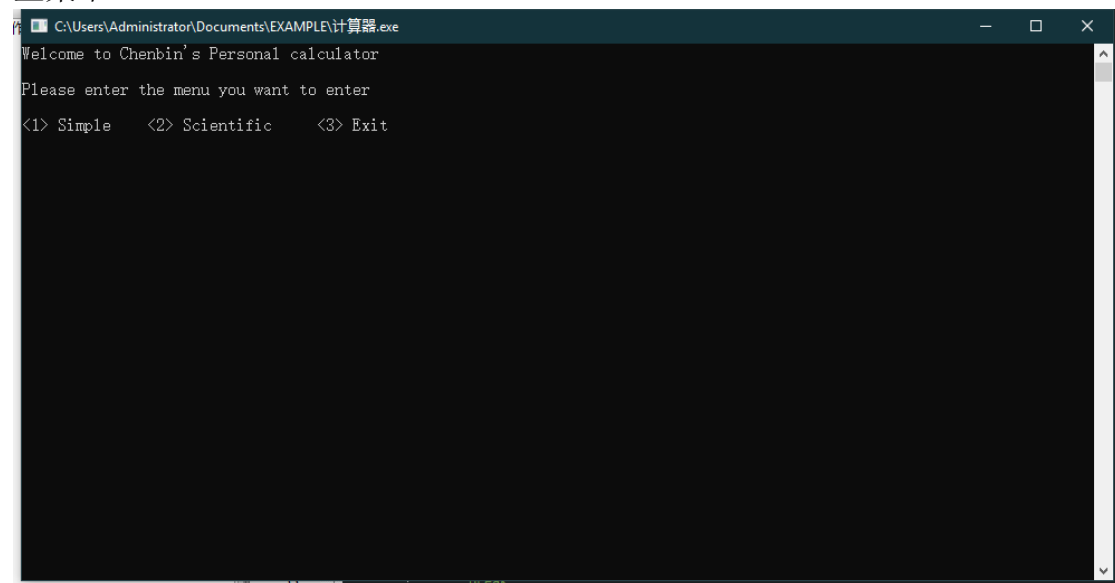
- 3) 实现菜单管理，需要制作一个提示到位的简易菜单，来实现对用户操作的引导。
- 4) 数据存储。使用结构体数组，来实现类似数据库的数据存储功能。
- 5) 数据删除。使用先查找，然后往后依次覆盖的方法实现数据删除。该方法适用于少量数据，数据一旦过于庞大会导致效率非常低下。
- 6) 数据修改。采用先查找数据，然后重新键入一次数据的方法实现数据修改。

## 五、 调试用例

声明：调试使用 Codeblocks IDE，编码使用 UTF-8，在 Windows 10 64bit 环境下运行。

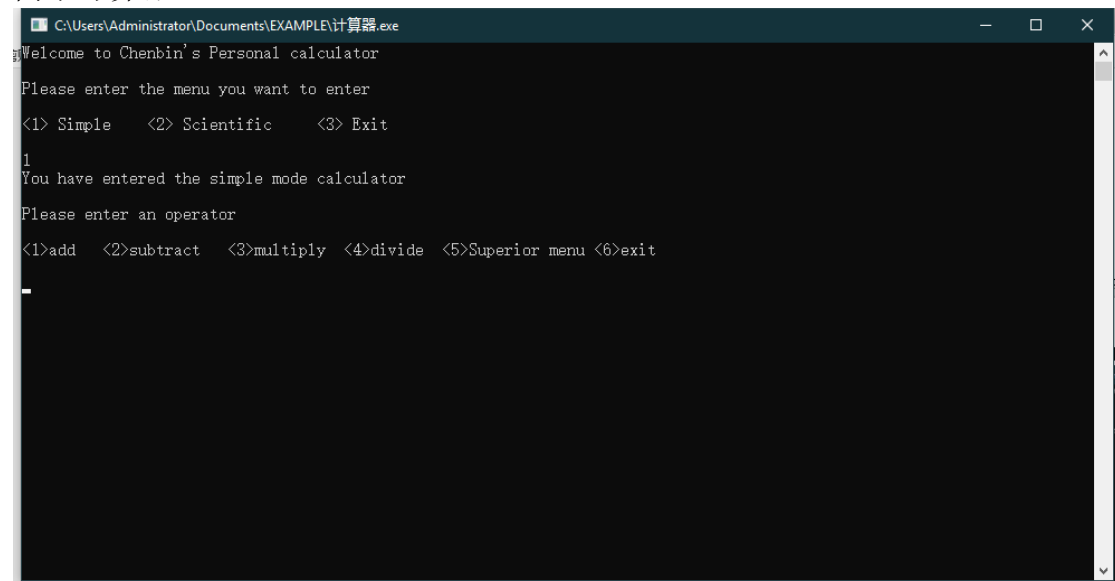
### 1. 科学计算器

#### 主菜单



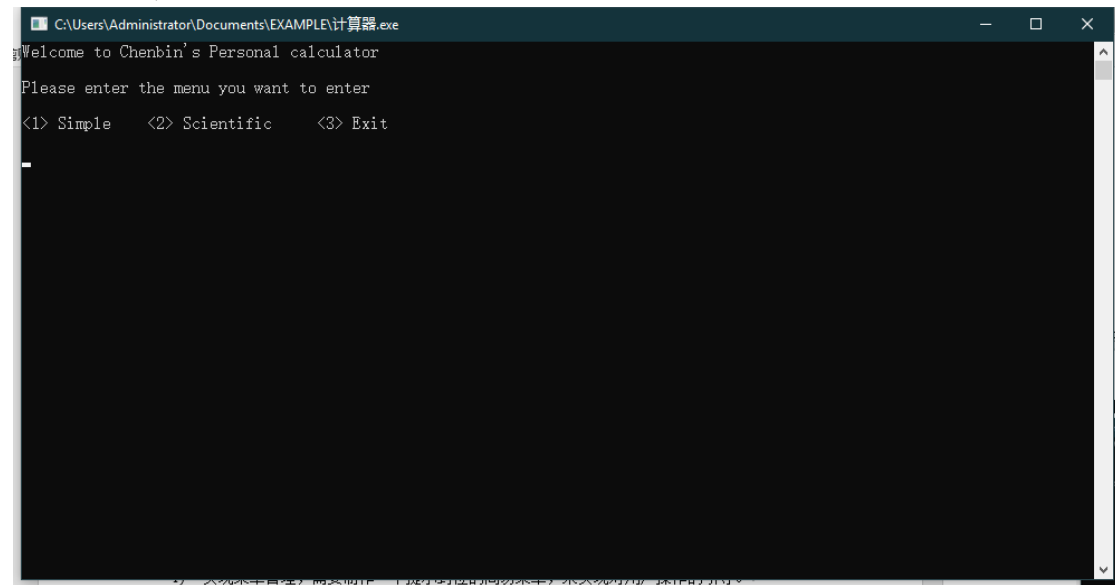
```
C:\Users\Administrator\Documents\EXAMPLE\计算器.exe
Welcome to Chenbin's Personal calculator
Please enter the menu you want to enter
<1> Simple    <2> Scientific    <3> Exit
```

#### 简单计算器

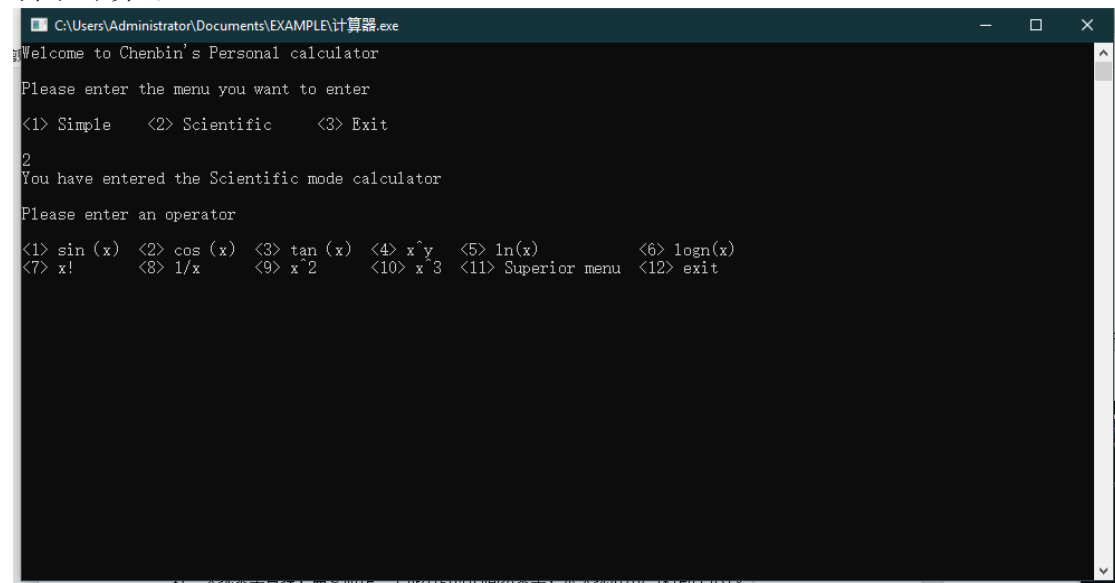


```
C:\Users\Administrator\Documents\EXAMPLE\计算器.exe
Welcome to Chenbin's Personal calculator
Please enter the menu you want to enter
<1> Simple    <2> Scientific    <3> Exit
1
You have entered the simple mode calculator
Please enter an operator
<1>add    <2>subtract    <3>multiply    <4>divide    <5>Superior menu    <6>exit
```

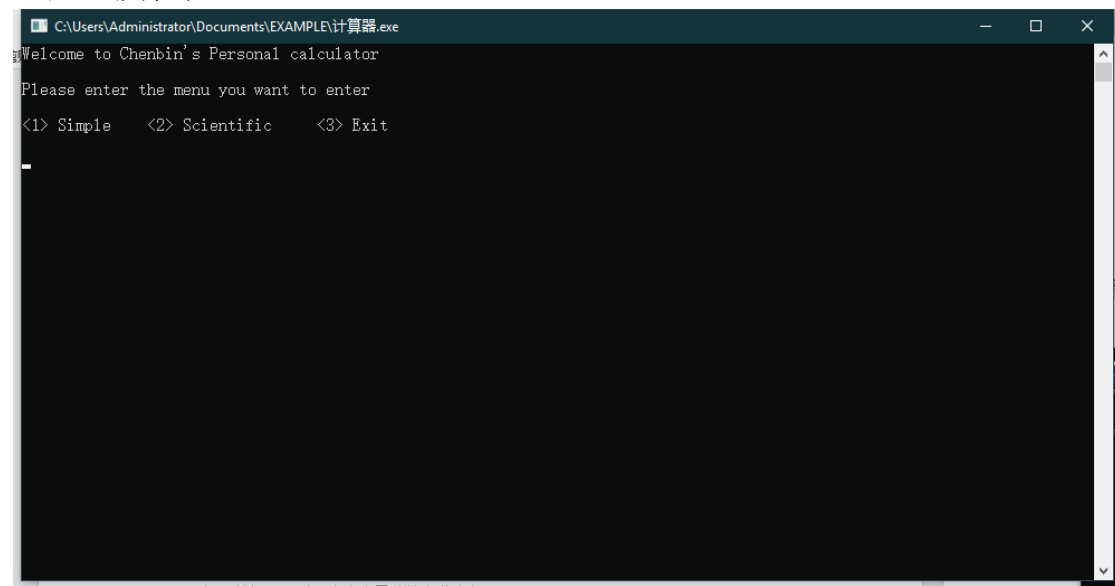
## 返回上级菜单



## 科学计算器

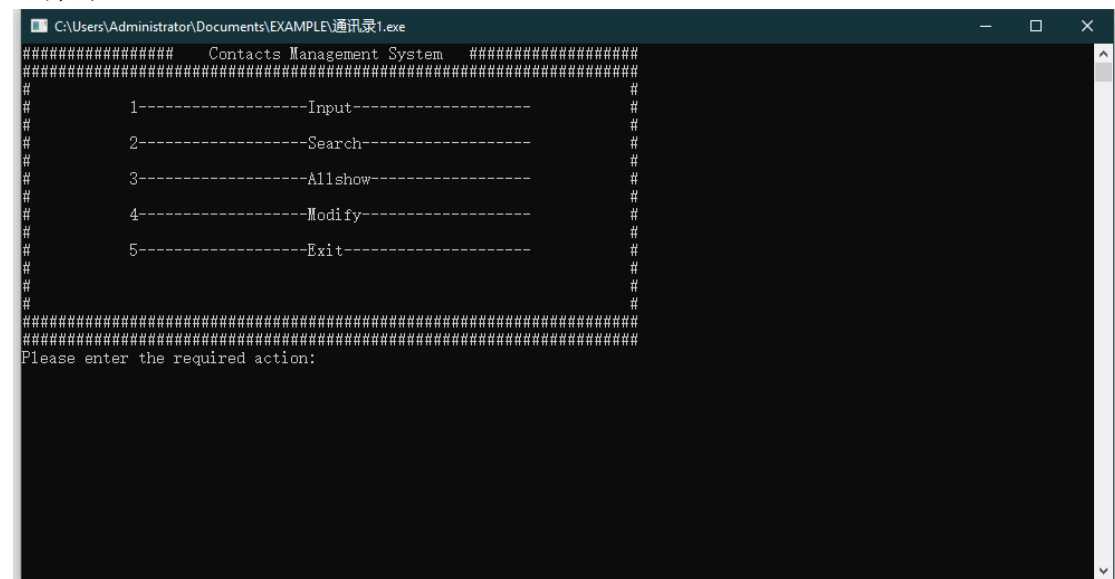


## 返回上级菜单

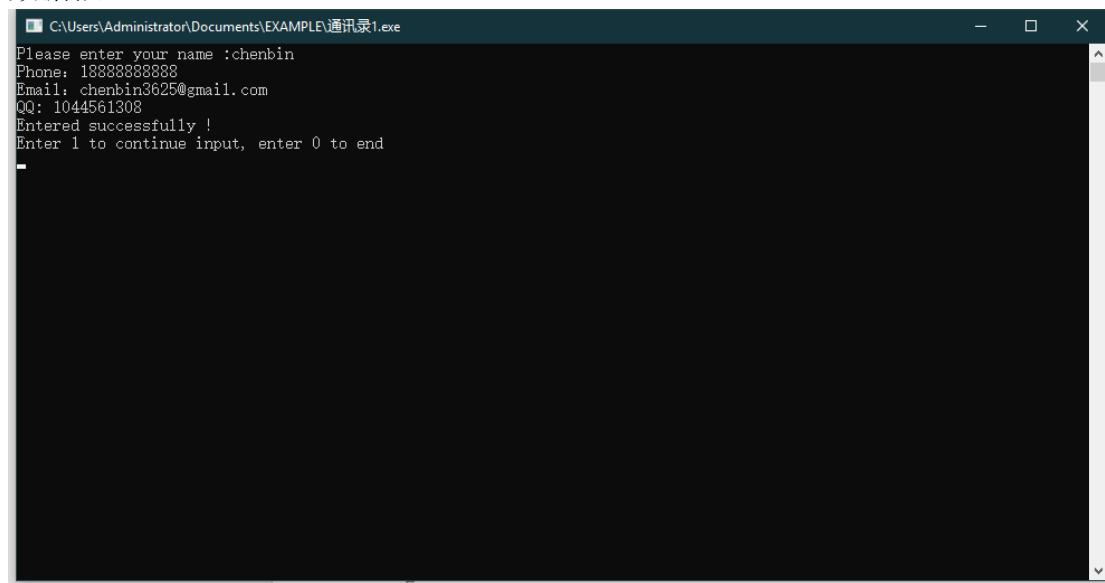


## 2. 通讯录管理系统

### 主菜单

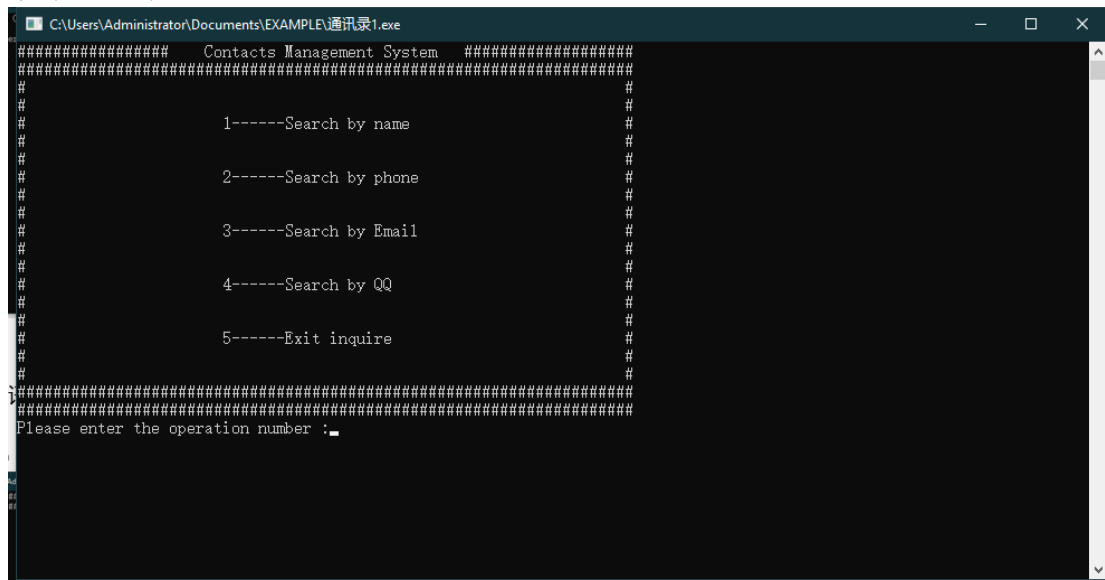


## 数据插入



```
C:\Users\Administrator\Documents\EXAMPLE\通讯录1.exe
Please enter your name :chenbin
Phone: 18888888888
Email: chenbin3625@gmail.com
QQ: 1044561308
Entered successfully !
Enter 1 to continue input, enter 0 to end
_
```

## 数据搜索菜单



```
C:\Users\Administrator\Documents\EXAMPLE\通讯录1.exe
##### Contacts Management System #####
#####
#
#
#           1-----Search by name           #
#
#           2-----Search by phone          #
#
#           3-----Search by Email          #
#
#           4-----Search by QQ             #
#
#           5-----Exit inquire             #
#
#####
Please enter the operation number :_
```

## 数据查看

```
C:\Users\Administrator\Documents\EXAMPLE\通讯录1.exe
##### Contacts Management System #####
#####
name      phone      Email      QQ
-----
chenbin   188888      chenbi     104456
Enter 0 to exit _
```

## 数据删改菜单

```
C:\Users\Administrator\Documents\EXAMPLE\通讯录1.exe
##### Contacts Management System #####
#####
#
#
#          1-----Information modificatio
#
#
#          2-----Information deletion
#
#
#          3-----Exit modify
#
#
#####
Please enter the operation number :_
```





## 六、 总结

本次高级语言的课程设计，简单开发两款非常基础的 C 语言程序，有效锻炼了我构建算法、写代码的能力，甚至包括查找资料、理解别人的代码的能力都有所提高。纸上得来终觉浅，绝知此事要躬行，不动手设计代码，永远不会知道编写代码过程的艰辛。一次次思考功能实现的方式、Debug、使用功能，无一不锻炼了我们学生的动手能力。并且重新复习了上学期学习的 C 语言，为以后深入地学习夯实了基础。

另外，在撰写这篇设计报告的时候，需要用到 Word、Visio，需要按照格式进行排版，也学会了很多 office 软件的常用技能。

在调试程序的时候，常常会出现各种各样的 Bug，我们需要善于使用搜索引擎，搜索出现的问题，也需要一定的英语基础，很多优秀的 IDE 和文献都是英文。

在编代码之前，我特别搜索了写代码的一些规范，比如变量的命名、函数的命名、注释等等，都应该做到使代码可读性更高，才能让他人阅读代码时不费力。在这一点上，我仍需学习。

这次的课程设计使我收获良多，希望以后的项目能做的更加优秀。