

c.圆形和正方形等对称图形

//正方形:

```
#include<iostream>
```

```
using namespace std;
```

```
void main(){
```

```
    //空心的
```

```
    for(int i=1;i<11;i++){
```

```
        cout<<"* ";
```

```
    cout<<endl;
```

```
    for(int j=2;j<10;j++){
```

```
        cout<<"*";
```

```
        for(i=2;i<19;i++){
```

```
            cout<<" ";
```

```
        cout<<"*"<<endl;
```

```
    }
```

```
    for(i=1;i<11;i++){
```

```
        cout<<"* "; cout<<endl;
```

```
    //实心的 cout<<endl;
```

```
    for(i=0;i<10;i++){
```

```
        for(j=0;j<10;j++){
```

```
            cout<<"* ";
```

```
        cout<<endl;
```

```
    }
```

```
}
```

//圆形:

```
#include<iostream.h>
```

```
#include<math.h>
```

```
void main(){
```

```
    char cir[25][50];
```

```
    int x,y;
```

```
    for(x=0;x<25;x++){
```

```
        for(y=0;y<50;y++){
```

```
            cir[x][y]=' ';
```

```
    for(x=0;x<25;x++){
```

```
        for(y=0;y<25;y++){
```

```
            if(((x-12)*(x-12)+(y-12)*(y-12))>137&&((x-12)*(x-12)+(y-12)*(y-12))<150)
```

```
                cir[x][2*y]='*';
```

```
        }
```

```
    }
```

```
    for(x=0;x<25;x++){
```

```
        for(y=0;y<50;y++){
```

```
            cout<<cir[x][y]; cout<<endl;
```

```
    }
```

```
}
```

```
* * * * *
*           *
*           *
*           *
*           *
*           *
*           *
* * * * *
```

```
* * * * *
* * * * *
* * * * *
* * * * *
* * * * *
* * * * *
* * * * *
* * * * *
* * * * *
```

Press any key to continue,

```
          * * * * *
        *   *   *   *
      * *   *   *   *
    *   *   *   *   *
  * *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
*   *   *   *   *   *
```

Press any key to continue

d.同时出现字母与符号的情况

```
#include<iostream.h>
```

```
void main(){
```

```
    int i,j;
```

```
    char c;
```

```
    for(i=0;i<5;i++){
```

```
        c='A'+4;
```

```
        for(j=0;j<i;j++){
```

```
            cout<<" ";
```

```
        for(j=0;j<5-i;j++){
```

```
            cout<<(char)(c-i);  c--;
```

```
        }
```

```
        c='B';
```

```
        for(j=0;j<4-i;j++){
```

```
            cout<<c;  c++;
```

```
        }
```

```
        cout<<endl;
```

```
    }
```

```
    for(i=2;j<4;i++){
```

```
        c='A';
```

```
        for(j=0;j<5-i;j++){
```

```
            cout<<" ";
```

```
        for(j=0;j<i;j++){
```

```
            cout<<(char)(c+i-1);  c--;
```

```
        }
```

```
        c='B';
```

```
        for(j=0;j<i-1;j++){
```

```
            cout<<c;  c++;
```

```
        }cout<<endl;
```

```
    }
```

```
}
```

EDCBABCDE

DCBABCD

CBABC

BAB

A

BAB

CBABC

DCBABCD

EDCBABCDE

Press any key to continue

e.日历方式的输出

```
#include<iostream.h>
```

```
void main(){
```

```
    int w=6,m,n;
```

```
    cout<<"请输入月份: ";
```

```
    cin>>m;
```

```
    cout<<"2011."<<m<<endl;
```

```
    int mday[13]={0,31,28,31,30,31,30,31,31,30,31,30,31};
```

```
    for(int i=0;i<m;i++){
```

```
        w+=mday[i];
```

```
    w%=7;
```

```

cout<<"SUN\t"<<"MON\t"<<"TUE\t"<<"WED\t"<<"THU\t"<<"FRI\t"<<"SAT"<<endl;
for(i=0;i<w;i++)
    cout<<"\t";cout<<"1\t";
for(i=0;i<6-w;i++)
    cout<<i+2<<"\t";cout<<endl;
i=i+2;
while (i<=mday[m]){
    for(n=0;n<7;n++){
        if(i<=mday[m]){
            cout<<i<<"\t";
            i++;
        }
        }cout<<endl;
    }
}

```

请输入月份: 2

2011.2

SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28					

Press any key to continue

}”

f.课程表问题 “\t”

```
#include<iostream.h>
```

```
#include<iomanip.h>
```

```
void main(){
```

```
    cout<<"                                课程表                                "<<endl;
```

```
    cout<<"===== "<<endl;
```

```
    cout.setf(ios::left);
```

```
    cout<<setw(10)<<"时间"<<setw(15)<<"星期一"<<setw(15)<<"星期二"<<setw(15)<<"星期三"
```

```
<<setw(15)<<"星期四"<<setw(15)<<"星期五"<<endl;
```

```
    cout<<"----- "<<endl;
```

```
    cout<<setw(10)<<"8:00"<<setw(15)<<"高等数学"<<setw(15)<<" "<<setw(15)<<"高等数学"
```

```
<<setw(15)<<"线性代数"<<setw(15)<<" "<<endl;
```

```
    cout<<"----- "<<endl;
```

```
    cout<<setw(10)<<"10:00"<<setw(15)<<"政治"<<setw(15)<<"线性代数"
```

```
<<setw(15)<<" "<<setw(15)<<"习题课"<<setw(15)<<"英语"<<endl;
```

```
    cout<<"----- "<<endl;
```

```
    cout<<setw(10)<<"14:00"<<setw(15)<<" "<<setw(15)<<"体育"<<setw(15)<<"英语"
```

```
<<setw(15)<<" "<<setw(15)<<"习题课"<<endl;
```

```
    cout<<"----- "<<endl;
```

```
    cout<<setw(10)<<"16:00"<<setw(15)<<" "<<setw(15)<<" "<<setw(15)<<" "<<setw(15)<<" "<<setw(15)
```

```
<<"实验课"<<endl;
```

```
    cout<<"----- "<<endl;
```

```
    cout<<setw(10)<<"18:30"<<setw(15)<<"实验课"
```

```
<<setw(15)<<" "<<setw(15)<<" "<<setw(15)<<" "<<setw(15)<<" "<<endl;
```

```
    cout<<"===== "
```

```
== "<<endl;
```

```
}
```

B. 一般数学问题

a. 级数求和(泰勒,等比,费波纳切等)

//等比数列求和

```
#include<iostream.h>
```

```
#include<math.h>
```

```
void main(){
```

```
int q,n,a1;
```

```
cout<<"a1=";
```

```
cin>>a1;
```

```
cout<<"q=";
```

```
cin>>q;
```

```
cout<<"n=";
```

```
cin>>n;
```

```
double val=(a1*(1-pow(q,n)))/(1-q);
```

```
cout<<"等比数列第 n 项为: "<<a1*pow(q,(n-1))<<endl;
```

```
cout<<"等比数列和为: "<<val<<endl;
```

```
}
```

a1=1

q=2

n=5

等比数列第n项为: 16

等比数列和为: 31

Press any key to continue

//斐波那契

```
#include<iostream.h>
```

```
#include<iomanip.h>
```

```
void main(){
```

```
long f1,f2;
```

```
int i;
```

```
f1=f2=1;
```

```
for(i=1;i<=20;i++){
```

```
cout<<setw(12)<<f1<<setw(12)<<f2;
```

```
if(i%2==0)cout<<endl;
```

```
f1=f1+f2;
```

```
f2=f2+f1;
```

```
}
```

```
}
```

1

1

2

3

5

8

13

21

34

55

89

144

233

377

610

987

1597

2584

4181

6765

10946

17711

28657

46368

75025

121393

196418

317811

514229

832040

1346269

2178309

3524578

5702887

9227465

14930352

24157817

39088169

63245986

102334155

Press any key to continue

b. 数制转换(十六进制与 N 进制的互转)

//bug: x TO y 函数调用(若前两个函数不设置输出, 在主函数内输出则可改动后调用); check;

大小写;

```
#include<iostream.h>
```

```
void Ch10Tox(int n,int x);
```

```
void ChxTo10(char n[],int x);
```

```
void ChxToy(char n[],int x,int y);
```

```

void main(){
    char q;
    do{
        int a;
        cout<<"请选择数制转换类型：（1.十进制转为 x 进制； 2.x 进制转为十进制； 3.x 进制转为
y 进制） "<<endl;    cin>>a;
        switch(a){
            case 1:{
                int n,x;
                cout<<"请输入十进制数： ";
                cin>>n;
                cout<<"请输入您要转换的进制： ";
                cin>>x;
                Ch10Tox(n,x);
                break;
            }
            case 2:{
                int x;
                char n[80];
                cout<<"请输入 x 进制数： ";
                cin>>n;
                cout<<"请输入进制 x： ";
                cin>>x;
                ChxTo10(n,x);
                break;
            }
            case 3:{
                int x,y;
                char n[80];
                cout<<"请输入 x 进制数： ";
                cin>>n;
                cout<<"请输入进制 x： ";
                cin>>x;
                cout<<"请输入进制 y： ";
                cin>>y;
                ChxToy(n,x,y);
                break;
            }
            default: cout<<"ERROR!";
        }
        cout<<"是否继续？（y/n） "<<endl;
        cin>>q;
    }while(q=='y');
}

```

```

void Ch10Tox(int n,int x){
    int k=n;
    char ch16Table[16]={'0','1','2','3','4','5','6','7','8','9','A','B','C','D','E','F'};
    int a[50];
    for(int i=0;k!=0;i++){
        a[i]=k%x;
        k/=x;
    }
    cout<<n<<"(10)=";
    for(i--;i>=0;i--){
        cout<<ch16Table[a[i]];
    }
    cout<<"("<<x<<")"<<endl;
}

```

```

void ChxTo10(char n[],int x){
    char ch16Table[16]={'0','1','2','3','4','5','6','7','8','9','A','B','C','D','E','F'};
    int value=0;
    for(int i=0;n[i]!='\0';i++){
        for(int j=0;j<x;j++){
            if(n[i]==ch16Table[j])
                value=value*x+j;
        }
    }
    cout<<n<<"("<<x<<")="<<value<<"(10)"<<endl;
}

```

```

void ChxToy(char n[],int x,int y){
    char ch16Table[16]={'0','1','2','3','4','5','6','7','8','9','A','B','C','D','E','F'};
    int value=0;
    for(int i=0;n[i]!='\0';i++){
        for(int j=0;j<x;j++){
            if(n[i]==ch16Table[j])
                value=value*x+j;
        }
    }
    int k=value;
    int a[50];
    for(i=0;k!=0;i++){
        a[i]=k%x;
        k/=x;
    }
    cout<<n<<"("<<x<<")=";
    for(i--;i>=0;i--){
        cout<<ch16Table[a[i]];
    }
    cout<<"("<<y<<")"<<endl;}

```

请选择数制转换类型：（1.十进制转为x进制；2.x进制转为十进制；3.x进制转为y进制）
 1
 请输入十进制数：6
 请输入您要转换的进制：2
 6<10>=110<2>
 是否继续？（y/n）
 y
 请选择数制转换类型：（1.十进制转为x进制；2.x进制转为十进制；3.x进制转为y进制）
 2
 请输入x进制数：101
 请输入进制x：2
 101<2>=5<10>
 是否继续？（y/n）
 y
 请选择数制转换类型：（1.十进制转为x进制；2.x进制转为十进制；3.x进制转为y进制）
 3
 请输入x进制数：105
 请输入进制x：6
 请输入进制y：2
 105<6>=105<2>
 是否继续？（y/n）
 n
 Press any key to continue

c.因式分解(质数分解)

```
#include<iostream.h>
void main(){
    int n;
    cout<<"请输入一个整数: ";
    cin>>n;  int k=n;
    int a[80]={0},c=0;
    for(int i=2;i<=k/2;i++){
        while(n%i==0){
            a[c]=i;
            c++;
            n/=i;
        }
    }
    cout<<k<<"="<<a[0];
    for(c=1;a[c]!=0;c++)
        cout<<"*"<<a[c];  cout<<endl;
}
```

请输入一个整数: 24
24=2*2*2*3
Press any key to continue,

d.回文数

```
#include<iostream.h>
void main(){
    cout<<"1000 以内的全部回文数为: "<<endl;
    for(int i=1;i<1000;i++){
        int t=i,l=0;
        while(t){
            l=l*10+t%10;
            t/=10;
        }
        if(l==i)
            cout<<i<<"\t";
    }
    cout<<endl;
}
```

1000以内的全部回文数为:

1	2	3	4	5	6	7	8	9	11
22	33	44	55	66	77	88	99	101	111
121	131	141	151	161	171	181	191	202	212
222	232	242	252	262	272	282	292	303	313
323	333	343	353	363	373	383	393	404	414
424	434	444	454	464	474	484	494	505	515
525	535	545	555	565	575	585	595	606	616
626	636	646	656	666	676	686	696	707	717
727	737	747	757	767	777	787	797	808	818
828	838	848	858	868	878	888	898	909	919
929	939	949	959	969	979	989	999		

Press any key to continue

e.复数的结构和模的计算

```
#include<iostream.h>
#include<math.h>
struct complex{
    double r;
    double i;
};
```



```

complex add(complex c1,complex c2){
    complex tmp;
    tmp.r=c1.r+c2.r;
    tmp.i=c1.i+c2.i;
    return tmp;
}
complex sub(complex c1,complex c2){
    complex tmp;
    tmp.r=c1.r-c2.r;
    tmp.i=c1.i-c2.i;
    return tmp;
}
double M(complex c1){
    double tmp1;
    tmp1=sqrt(c1.r*c1.r+c1.i*c1.i);
    return tmp1;
}
void out(complex c){
    cout<<"("<<c.r<<","<<c.i<<")";
}
void main(){
    complex c1={1,2},c2={3,4};
    out(c1);  cout<<"+";
    out(c2);  cout<<="";
    out(add(c1,c2));  cout<<endl;
    out(c1);  cout<<"-";
    out(c2);  cout<<="";
    out(sub(c1,c2));  cout<<endl;
    cout<<"m1="<<M(c1);  cout<<endl;
}

```

```

<1,2>+<3,4>=<4,6>
<1,2>-<3,4>=<-2,-2>
m1=2.23607
Press any key to continue.

```

f. 人民币兑换问题(用 1 元 5 角 1 角的硬币表示某个币值)

```
#include<iostream.h>
```

```

void main(){
    int Y,J,j,w=0;
    cout<<"? 角:";
    cin>>j;
    Y=j/10;
    J=j%10;
    if(J>5){
        w=1;
        J%=5;
    }
    cout<<j<<"角:  "<<Y<<"个 1 元, "<<w<<"个 5 角, "<<J<<"个 1 角"<<endl;
}

```

```

? 角:597
597角:  59个1元, 1个5角, 2个1角
Press any key to continue

```

C. 数组与字符串问题

a. 排序问题(正序, 逆序, ASCII 码序, 字母表序)

//冒泡排序

//N 个数的冒泡排序

//外层 N-1 次循环

//内层 N-1-i 次循环

//两两比较

```
#include<iostream.h>
```

```
#include<stdlib.h>
```

```
void main(){
```

```
    srand(0);
```

```
    int a[10];
```

```
    for(int i=0;i<10;i++){
```

```
        a[i]=rand()%1000;
```

```
    for(i=0;i<10;i++){
```

```
        cout<<a[i]<<" ";
```

```
    cout<<endl;
```

```
    for(i=0;i<10-1;i++){
```

```
        for(int j=0;j<10-1-i;j++){
```

```
            if(a[j]>a[j+1]){
```

```
                int t=a[j];
```

```
                a[j]=a[j+1];
```

```
                a[j+1]=t;
```

```
            }
```

```
    for(i=0;i<10;i++){
```

```
        cout<<a[i]<<" ";
```

```
    cout<<endl;
```

```
}
```

```
38 719 238 437 855 797 365 285 450 612
38 238 285 365 437 450 612 719 797 855
Press any key to continue
```

b. 二次排序（去掉高低分的排序、插入排序）

```
#include<iostream.h>
```

```
#include<stdlib.h>
```

```
void main(){
```

```
    srand(0); //随机数
```

```
    int a[10];
```

```
    for(int i=0;i<9;i++){
```

```
        a[i]=rand()%100;
```

```
    for(i=0;i<9;i++){
```

```
        cout<<a[i]<<" ";
```

```
    cout<<endl;
```

```

for(i=0;i<8;i++){//冒泡排序
    for(int j=0;j<8-i;j++){
        if(a[j]>a[j+1]){
            int t=a[j+1];
            a[j+1]=a[j];
            a[j]=t;
        }
    }
}
for(i=0;i<9;i++)
    cout<<a[i]<<" ";
cout<<endl;
int n; //插入
cout<<"n=";  cin>>n;
for(i=8;i!=0;i--){
    if(n<a[i])
        a[i+1]=a[i];
    else{
        a[i+1]=n;
        break;
    }
}
if(n<a[0]){
    a[1]=a[0];
    a[0]=n;
}
for(i=0;i<10;i++)
    cout<<a[i]<<" ";
}

```

```

38 19 38 37 55 97 65 85 50
19 37 38 38 50 55 65 85 97
n=13
13 19 37 38 38 50 55 65 85 97 Press any key to continue

```

c.密码本问题(+4)

```
#include<iostream.h>
```

```
void main(){
```

```
    char c;
```

```
    while((c=getchar())!='\n'){
```

```
        if((c>='a'&&c<='z') || (c>='A'&&c<='Z')){
```

```
            c=c+4;
```

```
            if(c>'z'&&c<='z'+4 || c>'Z'&&c<='Z'+4)
```

```
                c=c-26;
```

```
        }
```

```
        cout<<c;
```

```
    }cout<<endl;
```

```
}
```

```
ASDaff
```

```
EWHejj
```

```
Press any key to continue
```

d.字符串拼接(直接条件拼接,交替条件拼接,条件拼接)

//字符串正序拼接

```
#include<iostream.h>
```

```
void main(){
```

```
    char a[80],b[80];
```

```
    cout<<"请输入字符串 a 和字符串 b: "<<endl;
```

```
    cin>>a>>b;
```

```
    int n=0;
```

```
    for(int i=0;a[i];i++);
```

```
    for(int j=0;b[j];j++);
```

```
    for(int m=i;m<i+j;m++)
```

```
        a[m]=b[n++];
```

```
    a[m]=0;
```

```
    cout<<a<<endl;
```

```
}
```

//字符串反序拼接

```
#include<iostream.h>
```

```
void main(){
```

```
    cout<<"请输入字符串 a 和字符串 b: "<<endl;
```

```
    char a[80],b[80];
```

```
    cin>>a>>b;
```

```
    for(int i=0;a[i];i++);
```

```
    for(int j=0;b[j];j++);
```

```
    j--;
```

```
    for(;j>=0;j--)
```

```
        a[i++]=b[j];
```

```
    a[i]='\0';
```

```
    cout<<a<<endl;
```

```
}
```

e.字符串比较异同字符

```
#include<iostream>
```

```
using namespace std;
```

```
void main(){
```

```
    char s1[80],s2[80];
```

```
    cout<<"Input 2 strings:"<<endl;
```

```
    cin>>s1>>s2;
```

```
    int a1[26]={0};
```

```
    int a2[26]={0};
```

```
    for(int i=0;s1[i]!=0;i++){//s1 字符串内出现哪些字母，不分大小写
```

```
        if(s1[i]>='a'&& s1[i]<='z')//若为小写
```

```
            a1[s1[i]-'a']++;//则该元素加 1
```

```
        if(s1[i]>='A'&& s1[i]<='Z')//若为大写
```

```
            a1[s1[i]-'A']++;//则该元素小写加 1
```

```
}
```

```
请输入字符串a和字符串b:
```

```
abc
```

```
def
```

```
abcdef
```

```
Press any key to continue,
```

```
请输入字符串a和字符串b:
```

```
asd
```

```
fgh
```

```
asdhgf
```

```
Press any key to continue
```

```
Input 2 strings:
```

```
hellomyc
```

```
yestoday
```

```
s1&s2:e o y
```

```
Press any key to continue,
```

```

for(i=0;s2[i]!='\0';i++){//s2 字符串内出现哪些字母，不分大小写
    if(s2[i]>='a'&&s2[i]<='z')//若为小写
        a2[s2[i]-'a']++;//则该元素加 1
    if(s2[i]>='A'&&s2[i]<='Z')//若为大写
        a2[s2[i]-'A']++;//则该元素小写加 1
}
cout<<"-----"<<endl;
cout<<"s1&s2:";
for(int n=0;n<26;n++){
    if(a1[n]>0&&a2[n]>0)
        cout<<char(n+'a')<<" ";
    }
cout<<endl;
}
f.字符串包含判定(??~!!)

```

g.字符串扫描统计(图形化输出统计结果 2 种方式)

```

#include<iostream.h>
void main(){
    char str[80];
    cout<<"input"<<endl;
    cin>>str;
    int a[26];
    for(int i=0;i<26;i++){
        a[i]=0;
    }
    while(str[i]!='\0'){
        a[str[i]-'a']++;
        i++;
    }
    for(i=0;i<26;i++){
        if(a[i]>0){
            cout<<(char)(i+'a')<<" occurs: "<<a[i];
            for(int j=0;j<a[i];j++){
                cout<<"*";
            }
            cout<<endl;
        }
    }
}

```

```

input
asdsdfgfdgh
a  occurs: 1*
d  occurs: 3***
f  occurs: 2**
g  occurs: 2**
h  occurs: 1*
s  occurs: 2**
Press any key to continue

```