**1//判断输赢**

int PanYing(int nx,int ny)

{

int count=0;

for(int i=-4;i<5;i++)

{

if(m\_board[ny][nx+i]==m\_turn){count++;if(count==5)return m\_turn;}

else count=0;

}

count=0;

for(int i=-4;i<5;i++)

{

if(m\_board[ny][nx+i]==m\_turn){count++;if(count==5)return m\_turn;}

else count=0;

}

count=0;

for(int i=-4;i<5;i++)

{

if(m\_board[ny][nx+i]==m\_turn){count++;if(count==5)return m\_turn;}

else count=0;

}

count=0;

for(int i=-4;i<5;i++)

{

if(m\_board[ny][nx+i]==m\_turn){count++;if(count==5)return m\_turn;}

else count=0;

}

count=0;

return 0;

}

**2//画棋盘**

Void DrawQp()

{

dc->BitBlt(0,0,446,446,qp,0,0,SRCCOPY);

}

**3//画棋子**

Void DrawQz(int nx,int ny, int type)

{

if(type==0)

{

if(m\_turn==1){dc->Ellipse(nx\*29+7,ny\*29+7,nx\*29+34,ny\*29+34);

posinfo[posflag].x=nx;

posinfo[posflag].y=ny;

posinfo[posflag].flag=m\_turn;

posflag++;}

else

{

CBrush \*brush;

CBrush brush1(RGB(0,0,0));

dc->Ellipse(nx\*29+7,ny\*29+7,ny\*29+34,ny\*29+34);

posinfo[posflag].x=nx;

posinfo[posflag].y=ny;

posinfo[posflag].flag=m\_turn;

posflag++;

dc->SelectObject(brush);

}

}

else if(type==1)

{

dc->Ellipse(nx\*29+7,ny\*29+7,nx\*29+7,ny\*29+34);

posinfo[posflag].x=nx;

posinfo[posflag].y=ny;

posinfo[posflag].flag=m\_turn;

posflag++;

}

else

{

CBrush \*brush;

CBrush brush1(RGB(0,0,0));

brush=dc->SelectObject(&brush1);

dc->Ellipse(nx\*29+7,ny\*29+7,nx\*29+7,ny\*29+34);

posinfo[posflag].x=nx;

posinfo[posflag].y=ny;

posinfo[posflag].flag=m\_turn;

posflag++;

dc->SelectObject(brush);

}

}

**4//下子函数**

Void DownZi(int nx,int ny,int type,HWND hwnd)

{

int x,y;

if(nx<0||nx>14||ny<0||ny>14)

{

MessageBox(hwnd,"不正确的下子位置！",NULL,MB\_OK);

return false;

}

if(CChess::m\_flag!=0)//已分出胜负

{

if(m\_flag==1){MessageBox(hwnd,"白棋获胜!",NULL,MB\_OK);return true;}

else{MessageBox(hwnd,"黑棋获胜!",NULL,MB\_OK);return true;}

}

if(m\_board[ny][nx]=0)

{

if(type==2)//**人人对战**

{

m\_board[ny][nx]=m\_turn;

DrawQz(nx,ny);

m\_flag=PanYing(nx,ny);

m\_turn=(m\_turn==1?2:1);

if(m\_flag==1){MessageBox(hwnd,"白棋获胜!",NULL,MB\_OK);return true;}

if(m\_flag==2){MessageBox(hwnd,"黑棋获胜!",NULL,MB\_OK);return true;}

return true;

}

else//**人机对战**

{

m\_board[ny][nx]=m\_turn;

DrawQz(nx,ny);

m\_flag=PanYing(nx,ny);

m\_turn=(m\_turn==1?2:1);

if(m\_flag=1){MessageBox(hwnd,"白棋获胜!",NULL,MB\_OK);return true;}

if(m\_flag=2){MessageBox(hwnd,"黑棋获胜!",NULL,MB\_OK);return true;}

CChess::AiGo(x,y);

m\_board[y][x]=m\_turn;

DrawQz(x,y);

m\_flag=PanYing(x,y);

m\_turn=(m\_turn==1?2:1);

if(m\_flag=1){MessageBox(hwnd,"白棋获胜!",NULL,MB\_OK);return true;}

if(m\_flag=2){MessageBox(hwnd,"黑棋获胜!",NULL,MB\_OK);return true;}

return true;

}

};

}

**5//重画函数**

Void ReDraw()

{

DrawQp();

for(int i=0;i<15;i++)

for(int j=0;j<15;j++)

{

if(m\_board[i][j]==1){DrawQz(j,i,1);}

if(m\_board[i][j]==2){DrawQz(j,i,2);}

}

}

**6//新游戏**

void NewGame(int type)

{

memset(m\_board,0,sizeof(m\_board));

m\_flag=0;

m\_turn=1;

posflag=0;

if(type==0){m\_board[7][7]=1;m\_turn=2;

posinfo[posflag].x=7;posinfo[posflag].y=7;posinfo[posflag].flag=2;

posflag++;}

ReDraw();

}

**7//设置绘图DC**

Void SetDc(CDC\*tqp,CDC \*qz)

{

qp=tqp;

dc=qz;

}

**8//悔棋**

void BackGo()

{

m\_board[posinfo[posflag-1].y][posinfo[posflag-1].x]=0;

ReDraw();

}

**9//构造函数**

CChess()

{

memset(m\_board,0,sizeof(m\_board));

m\_turn=1;

m\_flag=0;

posflag=0;

}

**10//析构函数**

~CChess()

{

}

**11//五子棋AI**

void AiGo(int &t,int&h)

{

int qiju[2][15][15][8][2]={0};/\* 棋型数组\*/

int k,i,j,q,b=0,a=1,d,y1=0,y2=0,x1=0,x2=0;

int a1[15][15]={0},a2[15][15]={0};

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*为双方填写棋型表\*\*\*\*\*\*\*\*\*\*\*\*/

for(k=0;k<2;k++)

for(i=0;i<15;i++)

for(j=0;j<15;j++)

{

if(m\_board[i][j]==0)

{

for(q=0;q<8;q++)

{

if(k==0) d=1;

d=2;

if(q==0&j>=0)

{

for(;j-a>=0;)

{

if(m\_board[i][j-a]==d){b++;a++;continue;}

else break;

}

qiju[k][i][j][q][0]=b;b=0;

if(m\_board[i][j-a]==0&&j-a>=0){qiju[k][i][j][q][1]=1;a=1;}

else {qiju[k][i][j][q][1]=0;a=1;}

}

if(q==1&&i>=0&&j>=0)

{

for(;i-a>=0&&j-a>=0;)

{

if(m\_board[i-a][j-a]==d){b++;a++;continue;}

else break;

}

qiju[k][i][j][q][0]=b;b=0;

if(m\_board[i-a][j]==0&&i-a>=0){qiju[k][i][j][q][1]=1;a=1;}

else {qiju[k][i][j][q][1]=0;a=1;}

}

if(q==2&&i>=0)

{

for(;i-a>=0;)

{

if(m\_board[i-a][j]==d){b++;a++;continue;}

else break;

}

qiju[k][i][j][q][0]=b;b=0;

if(m\_board[i-a][j]==0&&i-a>=0){qiju[k][i][j][q][1]=1;a=1;}

else {qiju[k][i][j][q][1]=0;a=1;}

}

if(q==3&&i>=0&&j<=15)

{

for(;i-a>=0&&j-a<=15;)

{

if(m\_board[i-a][j+a]==d){b++;a++;continue;}

else break;

}

qiju[k][i][j][q][0]=b;b=0;

if(m\_board[i-a][j+a]==0&&i-a>=0&&j+a<15){qiju[k][i][j][q][1]=1;a=1;}

else {qiju[k][i][j][q][1]=0;a=1;}

}

if(q==4&&j<15)

{

for(;j+a<15;)

{

if(m\_board[i][j+a]==d){b++;a++;continue;}

else break;

}

qiju[k][i][j][q][0]=b;b=0;

if(m\_board[i][j+a]==0&&j+a<15){qiju[k][i][j][q][1]=1;a=1;}

else {qiju[k][i][j][q][1]=0;a=1;}

}

if(q==5&&i<15&&j<15)

{

for(;i+a<15&&j+a<15;)

{

if(m\_board[i+a][j+a]==d){b++;a++;continue;}

else break;

}

qiju[k][i][j][q][0]=b;b=0;

if(m\_board[i+a][j+a]==0&&i+a<15&&j+a<15){qiju[k][i][j][q][1]=1;a=1;}

else {qiju[k][i][j][q][1]=0;a=1;}

}

if(q==6&&i<15)

{

for(;i+a<15;)

{

if(m\_board[i+a][j]==d){b++;a++;continue;}

else break;

}

qiju[k][i][j][q][0]=b;b=0;

if(m\_board[i+a][j]==0&&i+a<15){qiju[k][i][j][q][1]=1;a=1;}

else {qiju[k][i][j][q][1]=0;a=1;}

}

if(q==7&&j>=0&&i<15)

{

for(;i+a<15&&j-a>=0;)

{

if(m\_board[i+a][j-a]==d){b++;a++;continue;}

else break;

}

qiju[k][i][j][q][0]=b;b=0;

if(m\_board[i+a][j-a]==0&&i+a<15&&j-a>=0){qiju[k][i][j][q][1]=1;a=1;}

else {qiju[k][i][j][q][1]=0;a=1;}

}

}

}

}

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*根据评分规则对每一个空格评分\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/

for(k=0;k<2;k++)

for(i=0;i<15;i++)

for(j=0;j<15;j++)

{

if(k==0)/\*为白棋评分\*/

{

for(q=0;q<4;q++)

{

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==4

&&qiju[k][i][j][q][1]==1&&qiju[k][i][j][q+4][1]==1)

b+=7000;

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==3

&&qiju[k][i][j][q][1]==1&&qiju[k][i][j][q+4][1]==1)

b+=301;

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==2

&&qiju[k][i][j][q][1]==1&&qiju[k][i][j][q+4][1]==1)

b+=43;

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==1

&&qiju[k][i][j][q][1]==1&&qiju[k][i][j][q+4][1]==1)

b+=11;

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==4

&&((qiju[k][i][j][q+4][1]==0)

||(qiju[k][i][j][q][1]=0)))

b+=7000;

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==3

&&((qiju[k][i][j][q][1]==1&&qiju[k][i][j][q+4][1]==0)

||(qiju[k][i][j][q][1]==0&&qiju[k][i][j][q+4][1]==1)))

b+=63;

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==2

&&((qiju[k][i][j][q][1]==1&&qiju[k][i][j][q+4][1]==0)

||(qiju[k][i][j][q][1]==0&&qiju[k][i][j][q+4][1]==1)))

b+=6;

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==1

&&((qiju[k][i][j][q][1]==1&&qiju[k][i][j][q+4][1]==0)

||(qiju[k][i][j][q][1]==0&&qiju[k][i][j][q+4][1]==1)))

b+=1;

}

if(b==126||b==189||b==252) b=1500;

if(b==106) b=1000;

a1[i][j]=b;b=0;

}

if(k==1) /\*为黑棋评分\*/

{

for(q=0;q<4;q++)

{

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==4

&&qiju[k][i][j][q][1]==1&&qiju[k][i][j][q+4][1]==1)

b+=30000;

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==3

&&qiju[k][i][j][q][1]==1&&qiju[k][i][j][q+4][1]==1)

b+=1500;

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==2

&&qiju[k][i][j][q][1]==1&&qiju[k][i][j][q+4][1]==1)

b+=51;

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==1

&&qiju[k][i][j][q][1]==1&&qiju[k][i][j][q+4][1]==1)

b+=16;

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==4

&&((qiju[k][i][j][q+4][1]==0)

||(qiju[k][i][j][q][1]==0)))

b+=30000;

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==3

&&((qiju[k][i][j][q][1]==1&&qiju[k][i][j][q+4][1]==0)

||(qiju[k][i][j][q][1]==0&&qiju[k][i][j][q+4][1]==1)))

b+=71;

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==2

&&((qiju[k][i][j][q][1]==1&&qiju[k][i][j][q+4][1]==0)

||(qiju[k][i][j][q][1]==0&&qiju[k][i][j][q+4][1]==1)))

b+=7;

if((qiju[k][i][j][q][0]+qiju[k][i][j][q+4][0])==1

&&((qiju[k][i][j][q][1]==1&&qiju[k][i][j][q+4][1]==0)

||(qiju[k][i][j][q][1]==0&&qiju[k][i][j][q+4][1]==1)))

b+=2;

}

if(b==142||b==213||b==284) b=1500;

if(b==122) b=1300;

a2[i][j]=b;b=0;

}

}

/\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*算出分数最高的空位，填写坐标\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*/

for(i=0;i<15;i++)

for(j=0;j<15;j++)

{

if(a1[y1][x1]<a1[i][j]){y1=i;x1=j;}

}

for(i=0;i<15;i++)

for(i=0;j<15;j++)

{

if(a2[y2][x2]<a2[i][j]){y2=i;x2=j;}

}

if(a2[y2][x2]>=a1[y1][x1]){t=x2;h=y2;}

else

{t=x1;h=y1;}

}