Programming Report

1. Class for food

```
class CBean
{
public:
	CBean(void);
	~CBean(void);
public:
	int i;//豆子所在行
	int j;//豆子所在列
	int s;//豆子的种类

};
```

2. Class for snake

```
class CSnake
{
private:

public:
	CSnake(void);
	virtual ~CSnake(void);
public:
	CString mm_string;
	int Time;//定时倒计时参数
	int power;//功能参数，吃食物暂停时用到
	int m_marks;//分数
	CString m_string;//字符串
	int n;//蛇身长度
	CGe body[600];//蛇身数组
	int direction;//蛇前进方向：1代表向上，2代表向右，3代表向下，4代表向左
public:
	CGe forwardup();//向上前进
	CGe forwardright();//向右前进
	CGe forwarddown();//向下前进
	CGe forwardleft();//向左前进
	bool IsBeanInSnake(int, int);//判断随机产生的种子是否在蛇身上
	bool SnakeEatBean(int, int);//判断蛇是否吃到食物
	bool GameLose(CSnake);//判断游戏是否结束
	bool IsHeadPengShen(CSnake);//判断蛇是否碰到自己
};
```

3. Class for mesh

```
class CGe
{
public:
	CGe(void);
	virtual ~CGe(void);
public:
	int i;//小格所在行数
	int j;//小格所在列数

};
```

FUNCTION

1. Function for snake direction

```
CGe CSnake::forwardup()
{
    CGe ret = body[n - 1];
    for (int i = n - 1; i >= 1; i--)
    {
        body[i].i = body[i - 1].i, body[i].j = body[i - 1].j;
    }
    body[0].i--;
    return ret;
}

CGe CSnake::forwardright()
{
    CGe ret = body[n - 1];
    for (int i = n - 1; i >= 1; i--)
    {
        body[i].i = body[i - 1].i, body[i].j = body[i - 1].j;
    }
    body[0].j++;
    return ret;
}

CGe CSnake::forwarddown()
{
    CGe ret = body[n - 1];
    for (int i = n - 1; i >= 1; i--)
    {
        body[i].i = body[i - 1].i, body[i].j = body[i - 1].j;
    }
    body[0].i++;
    return ret;
}

CGe CSnake::forwardleft()
{
    CGe ret = body[n - 1];
    for (int i = n - 1; i >= 1; i--)
    {
        body[i].i = body[i - 1].i, body[i].j = body[i - 1].j;
    }
    body[0].j--;
    return ret;
}
```

2. Function for failure or continue

```
bool  CSnake::IsBeanInSnake(int m, int n)
{
    bool flag = false;
    for (int i = 0; i<n; i++)
    {
        if (m == body[i].i&&n == body[i].j)
        {
            flag = true;
            break;
        }

    }
    return flag;
}
```

3. Function for eating bean

```
bool CSnake::SnakeEatBean(int m, int n)
{
    bool flag = false;
    if (body[0].i == m&&body[0].j == n)
    {
        flag = true;
        //this->m_marks+=100;
    }
    else
    {
        flag = false;
    }
    return flag;
}
```

4. Function for game over

```
bool CSnake::GameLose(CSnake snake)
{
    if (body[0].i == -1 || body[0].i == 21 || body[0].j == -1 || body[0].j == 31 ||
IsHeadPengShen(snake) == true)                    //设定边界
    {
        return true;
    }
    else
    {
        return false;
    }
}
```

5. Function for killing self

```
bool CSnake::IsHeadPengShen(CSnake snake)
{
    bool flag = false;
    for (int i = 1; i<n; i++)
    {
        if (body[0].i == body[i].i&&body[0].j == body[i].j)
        {
            flag = true;
            break;
        }
        if (body[0].i == snake.body[i].i&&body[0].j == snake.body[i].j){
            flag = true;
            break;
        }
    }
    return flag;
}
```

6. Draw function

```
void CMyView::OnDraw(CDC* pDC)
{
    int k = 1;    //动态效果
    CMyDoc* pDoc = GetDocument();
    ASSERT_VALID(pDoc);
    if (!pDoc)
        return;
    // TODO: 在此处为本机数据添加绘制代码
    //画背景
    CDC dcmemory;
    dcmemory.CreateCompatibleDC(pDC);
    CBitmap bitmap;
    bitmap.LoadBitmapA(IDB_BITMAP1);//加载位图资源
    dcmemory.SelectObject(&bitmap);
    int i, j;
    for (i = 0; i <= 30; i++)
    {
        for (j = 0; j <= 20; j++)
        {
            pDC->StretchBlt(0 + 30 * i, 0 + 30 * j, 30, 30, &dcmemory, 0, 0, 48, 48, SRCCOPY);
        }
    }
    bitmap.Detach();  //画背景

    //画蛇头1
    bitmap.LoadBitmapA(IDB_BITMAP2);
    dcmemory.SelectObject(&bitmap);
    pDC->StretchBlt(0 + 30 * snake1.body[0].j, 0 + 30 * snake1.body[0].i, 30, 30, &dcmemory, 0,
0, 48, 48, SRCCOPY);
    bitmap.Detach();
    //画蛇身1
    bitmap.LoadBitmapA(IDB_BITMAP3);
    dcmemory.SelectObject(&bitmap);
    for (i = 1; i <= snake1.n; i++)
    {
        pDC->StretchBlt(0 + 30 * snake1.body[i].j, 0 + 30 * snake1.body[i].i, 30, 30, &dcmemory,
0, 0, 48, 48, SRCCOPY);
    }

    bitmap.Detach();

    //画蛇头2
    bitmap.LoadBitmapA(IDB_BITMAP7);
    dcmemory.SelectObject(&bitmap);
    pDC->StretchBlt(0 + 30 * snake2.body[0].j, 0 + 30 * snake2.body[0].i, 30, 30, &dcmemory, 0,
0, 48, 48, SRCCOPY);
    bitmap.Detach();
    //画蛇身2
    bitmap.LoadBitmapA(IDB_BITMAP3);
    dcmemory.SelectObject(&bitmap);
    for (i = 1; i <= snake2.n; i++)
    {
        pDC->StretchBlt(0 + 30 * snake2.body[i].j, 0 + 30 * snake2.body[i].i, 30, 30, &dcmemory,
0, 0, 48, 48, SRCCOPY);
    }

    bitmap.Detach();

    //画豆子
    switch (bean.s){   //三种食物
    case 0:
        bitmap.LoadBitmapA(IDB_BITMAP4);
        break;
    case 1:
        bitmap.LoadBitmapA(IDB_BITMAP5);
        break;
    case 2:
        bitmap.LoadBitmapA(IDB_BITMAP6);
        break;
    }
    dcmemory.SelectObject(&bitmap);
    pDC->StretchBlt(0 + 30 * bean.j, 0 + 30 * bean.i, 30, 30, &dcmemory, 0, 0, 48, 48,
SRCCOPY);
	bitmap.Detach();

	//显示得分与时间
	pDC->TextOutA(980, 20, snake1.m_string);
	pDC->TextOutA(980, 40, snake2.m_string);
	pDC->TextOutA(980, 60, snake1.mm_string);//显示时间
}
```

7. Function for reaction of function keys

```
void CMyView::OnStart()
{
	// TODO: 在此添加命令处理程序代码
	this->m_start = true;
	this->m_pause = false;//暂停后，可以按开始继续
	SetTimer(1, 100, NULL);
}
void CMyView::OnPause()
{
	// TODO: 在此添加命令处理程序代码
	this->m_pause = true;
}
```

8. Function for reaction of controller keys

```
void CMyView::OnKeyDown(UINT nChar, UINT nRepCnt, UINT nFlags)
{
	// TODO: 在此添加消息处理程序代码和/或调用默认值
	if (nChar == VK_UP&&snake2.direction != 3)
	{
		snake2.direction = 1;
	}
	if (nChar == VK_RIGHT&&snake2.direction != 4)
	{
		snake2.direction = 2;
	}
	if (nChar == VK_DOWN&&snake2.direction != 1)
	{
		snake2.direction = 3;
	}
	if (nChar == VK_LEFT&&snake2.direction != 2)
	{
		snake2.direction = 4;
	}				//蛇1的方向



	if (nChar == 'W'&&snake1.direction != 3)
	{
		snake1.direction = 1;
	}
	if (nChar == 'D'&&snake1.direction != 4)
	{
		snake1.direction = 2;
	}
	if (nChar == 'S'&&snake1.direction != 1)
	{
		snake1.direction = 3;
	}
	if (nChar == 'A'&&snake1.direction != 2)
	{
		snake1.direction = 4;
	}
```

```
    CView::OnKeyDown(nChar, nRepCnt, nFlags);
}
```

Main function

```
void CMyView::OnTimer(UINT_PTR nIDEvent)
{
    // TODO: 在此添加消息处理程序代码和/或调用默认值
    if (this->m_start == true && this->m_pause == false)//开始键响应后游戏开始
    {
        CGe temp;
        CClientDC dc(this);
        CDC dcmemory;
        dcmemory.CreateCompatibleDC(&dc);
        CBitmap bitmap;
        //显示时间
        COLORREF clr = dc.SetTextColor(dc.GetBkColor());
        dc.TextOutA(980, 60, snake1.mm_string);
        snake1.Time = snake1.Time - 1;
        CString m4;
        m4.Format("%d", snake1.Time/10 );//调用一次函数约0.1s

        if (snake1.Time >= 100){  //页面优化
            snake1.mm_string = "剩余时间： " + m4;
        }
        else snake1.mm_string = "剩余时间：   " + m4;
        dc.SetTextColor(clr);
        dc.TextOutA(980, 60, snake1.mm_string);


        if (snake2.power<0){ //判断蛇1有没有被暂停
            switch (snake1.direction)
            {
            case 1:
                temp = snake1.forwardup();
                break;
            case 2:
                temp = snake1.forwardright();
                break;
            case 3:
                temp = snake1.forwarddown();
                break;
            case 4:
                temp = snake1.forwardleft();
                break;
            }
            bitmap.LoadBitmapA(IDB_BITMAP9);        //蛇1的方向
            dcmemory.SelectObject(&bitmap);
            dc.StretchBlt(0 + 30 * temp.j, 0 + 30 * temp.i, 30, 30, &dcmemory, 0, 0, 48, 48, 
SRCCOPY);
            bitmap.Detach();
        }
        else snake2.power--;


        if (snake1.power < 0){  //判断蛇1有没有被暂停
            switch (snake2.direction)
            {
            case 1:
                temp = snake2.forwardup();
                break;
            case 2:
                temp = snake2.forwardright();
                break;
            case 3:
                temp = snake2.forwarddown();
                break;
            case 4:
                temp = snake2.forwardleft();
                break;
            }               //蛇2的方向
            bitmap.LoadBitmapA(IDB_BITMAP8);
            dcmemory.SelectObject(&bitmap);
            dc.StretchBlt(0 + 30 * temp.j, 0 + 30 * temp.i, 30, 30, &dcmemory, 0, 0, 48, 48,
SRCCOPY);
            bitmap.Detach();
        }
        else snake1.power--;




        if (snake1.SnakeEatBean(bean.i, bean.j) == true)
        {
            if (bean.s == 0){
                PlaySound("e:\\贪吃蛇\\音效\\1.wav", NULL, SND_FILENAME | SND_ASYNC |
SND_LOOP);
                snake1.n++;
                snake1.body[snake1.n - 1].i = temp.i;
                snake1.body[snake1.n - 1].j = temp.j;
            }
            else if (bean.s == 1){
                snake1.power = 15;
                PlaySound("e:\\贪吃蛇\\音效\\2.wav", NULL, SND_FILENAME | SND_ASYNC |
SND_LOOP);
            }
            else if (bean.s == 2){
                PlaySound("e:\\贪吃蛇\\音效\\3.wav", NULL, SND_FILENAME | SND_ASYNC |
SND_LOOP);
                if (snake2.n >= 2){
                    snake1.power += 5;

                    if(snake2.m_marks>0)snake2.m_marks--;
                }

            }
            //重新生成豆子
            unsigned int seed = time(NULL);
            srand(seed);
            do
            {
                bean.i = rand() % 21;
                bean.j = rand() % 31;
                bean.s = rand() % 3;
            } while (snake1.IsBeanInSnake(bean.i, bean.j) == true &&
snake2.IsBeanInSnake(bean.i, bean.j) == true);
            switch (bean.s){
            case 0:
                bitmap.LoadBitmapA(IDB_BITMAP4);
                break;
            case 1:
                bitmap.LoadBitmapA(IDB_BITMAP5);
                break;
            case 2:
                bitmap.LoadBitmapA(IDB_BITMAP6);
                break;
            }
            dcmemory.SelectObject(&bitmap);
            dc.StretchBlt(0 + 30 * bean.j, 0 + 30 * bean.i, 30, 30, &dcmemory, 0, 0, 48, 48,
SRCCOPY);
            bitmap.Detach();
            //显示得分
            COLORREF clr = dc.SetTextColor(dc.GetBkColor());
            dc.TextOutA(980, 60, snake1.m_string);
            snake1.m_marks += 1;
            CString m1;
            m1.Format("%d", snake1.m_marks);
            snake1.m_string = "玩家1的得分是：" + m1;
            dc.SetTextColor(clr);
            dc.TextOutA(980, 20, snake1.m_string);
            CString m2;
            m2.Format("%d", snake2.m_marks);
            snake2.m_string = "玩家2的得分是：" + m2;
            dc.SetTextColor(clr);
            dc.TextOutA(980, 40, snake2.m_string);

        }

        if (snake2.SnakeEatBean(bean.i, bean.j) == true)
        {

            if (bean.s == 0){
                PlaySound("e:\\贪吃蛇\\音效\\1.wav", NULL, SND_FILENAME | SND_ASYNC |
SND_LOOP);
                snake2.n++;
                snake2.body[snake2.n - 1].i = temp.i;
                snake2.body[snake2.n - 1].j = temp.j;
            }
            else if (bean.s == 1){
                snake2.power = 15;
                PlaySound("e:\\贪吃蛇\\音效\\2.wav", NULL, SND_FILENAME | SND_ASYNC |
SND_LOOP);
            }
            else if (bean.s == 2){
                PlaySound("e:\\贪吃蛇\\音效\\3.wav", NULL, SND_FILENAME | SND_ASYNC |
SND_LOOP);
                if (snake1.n >= 2){
                  snake2.power += 5;
                    if (snake1.m_marks>0)snake1.m_marks--;
                }
            }
            //重新生成豆子
            unsigned int seed = time(NULL);
            srand(seed);
            do
            {
                bean.i = rand() % 21;
                bean.j = rand() % 31;
                bean.s = rand() % 3;
            } while (snake1.IsBeanInSnake(bean.i, bean.j) == true &&
snake2.IsBeanInSnake(bean.i, bean.j) == true);

            switch (bean.s){
            case 0:
                bitmap.LoadBitmapA(IDB_BITMAP4);
                break;
            case 1:
                bitmap.LoadBitmapA(IDB_BITMAP5);
                break;
            case 2:
                bitmap.LoadBitmapA(IDB_BITMAP6);
                break;
            }
            dcmemory.SelectObject(&bitmap);
            dc.StretchBlt(0 + 30 * bean.j, 0 + 30 * bean.i, 30, 30, &dcmemory, 0, 0, 48, 48,
SRCCOPY);
            bitmap.Detach();
            //显示得分
            COLORREF clr = dc.SetTextColor(dc.GetBkColor());
            dc.TextOutA(10, 620, snake2.m_string);
            snake2.m_marks += 1;
            CString m2;
            m2.Format("%d", snake2.m_marks);
            snake2.m_string = "玩家2的得分是： " + m2;
            dc.SetTextColor(clr);
            dc.TextOutA(980, 40, snake2.m_string);
            CString m1;
            m1.Format("%d", snake1.m_marks);
            snake1.m_string = "玩家1的得分是： " + m1;
            dc.SetTextColor(clr);
            dc.TextOutA(980, 20, snake1.m_string);
        }

        if (snake1.GameLose(snake2) == true || snake2.GameLose(snake1) == true)
        {
            m_start = false;
            PlaySound("e:\\贪吃蛇\\音效\\I Still Believe In Love-Jenny Hyun.wav", NULL,
SND_FILENAME | SND_ASYNC | SND_LOOP);
            if (snake1.GameLose(snake2) == true && snake2.GameLose(snake1) == true){
                MessageBox("平局");
            }
            else
            {

                if (snake1.GameLose(snake2) == true){
                    MessageBox("玩家2赢了");
                }
                if (snake2.GameLose(snake1) == true){
                    MessageBox("玩家1赢了!");
                }
            }


        }


        //画蛇
        //画蛇1头

        bitmap.Detach();
        bitmap.LoadBitmapA(IDB_BITMAP2);
        dcmemory.SelectObject(&bitmap);
        dc.StretchBlt(0 + 30 * snake1.body[0].j, 0 + 30 * snake1.body[0].i, 30, 30, &dcmemory, 0,
0, 48, 48, SRCCOPY);
        bitmap.Detach();
        //画蛇1身
        if (k % 2 == 0){
            bitmap.LoadBitmapA(IDB_BITMAP3);
        }
        else bitmap.LoadBitmapA(IDB_BITMAP10);
        k++;
        dcmemory.SelectObject(&bitmap);
        for (int i = 1; i <= snake1.n; i++)
        {
            dc.StretchBlt(0 + 30 * snake1.body[i].j, 0 + 30 * snake1.body[i].i, 30, 30,
&dcmemory, 0, 0, 48, 48, SRCCOPY);
        }

        bitmap.Detach();

        //画蛇2头
        bitmap.LoadBitmapA(IDB_BITMAP7);
        dcmemory.SelectObject(&bitmap);
        dc.StretchBlt(0 + 30 * snake2.body[0].j, 0 + 30 * snake2.body[0].i, 30, 30, &dcmemory, 0,
0, 48, 48, SRCCOPY);
        bitmap.Detach();
        //画蛇2身
        if (l % 2 == 0){
            bitmap.LoadBitmapA(IDB_BITMAP10);
        }
        else bitmap.LoadBitmapA(IDB_BITMAP3);
        l++;
        dcmemory.SelectObject(&bitmap);
        for (int i = 1; i <= snake2.n; i++)
        {
            dc.StretchBlt(0 + 30 * snake2.body[i].j, 0 + 30 * snake2.body[i].i, 30, 30,
&dcmemory, 0, 0, 48, 48, SRCCOPY);
        }

        bitmap.Detach();

        if (snake1.Time == 0){
            MessageBox("时间到！");
            PlaySound("e:\\贪吃蛇\\音效\\I Still Believe In Love-Jenny Hyun.wav", NULL,
SND_FILENAME | SND_ASYNC | SND_LOOP);
            if (snake1.m_marks > snake2.m_marks){
                MessageBox("玩家1获胜");
            }
            if (snake2.m_marks > snake1.m_marks){
                MessageBox("玩家2获胜");
            }
            if (snake2.m_marks == snake1.m_marks){
                MessageBox("平局");
            }


        }

    }
    CView::OnTimer(nIDEvent);
}
```