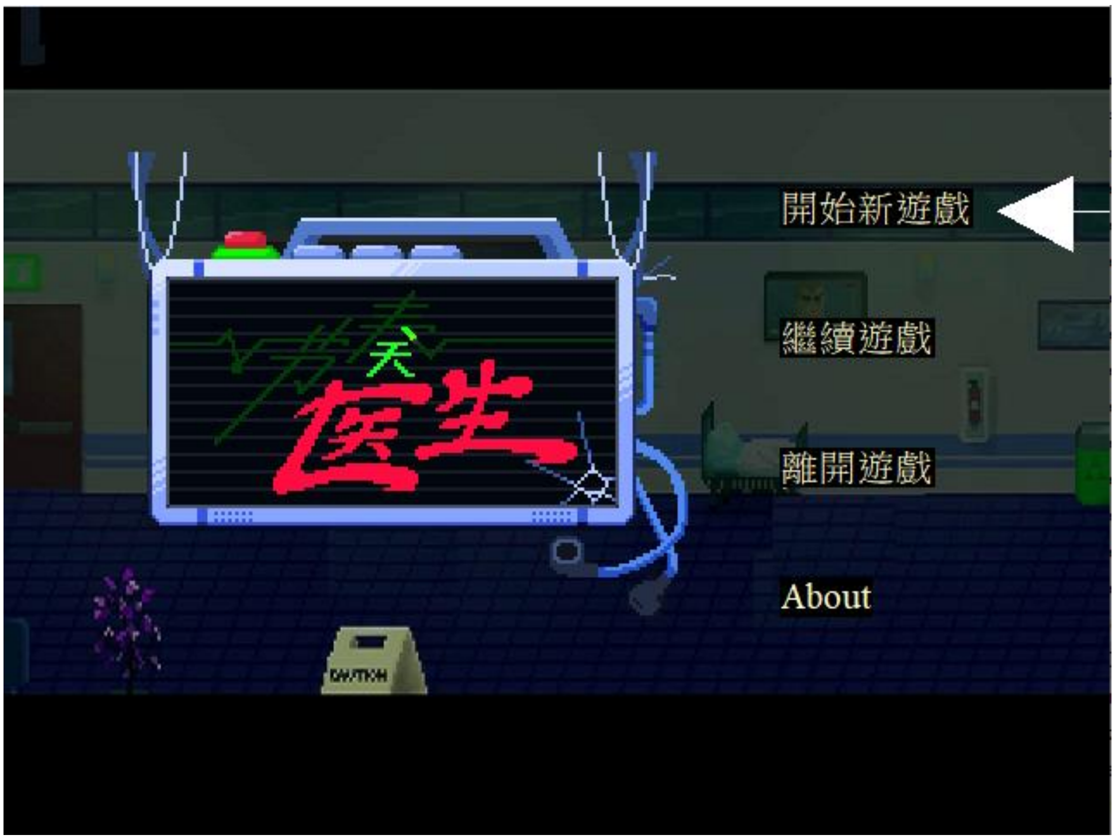
# 國立臺北科技大學

2021 Spring 資工系物件導向程式實習

期末報告

節奏醫生(Rhythm Doctor)



第 37 組

108590036 沈宗毅

108590044 何柏憲

## 目錄

## 一、 簡介

### 1. 動機

學期初的時候，聽到物件導向設計實習需要找一個遊戲來複製，我們第一個想到的就是節奏醫生，那時候節奏醫生的正式版正好剛出沒多久，看到遊戲裡面的各種特效，就讓人躍躍欲試，迫不及待的看能不能重現遊戲中各種繽紛的特效。另一方面，想到音樂遊戲就會想到需要多個按鍵去對應到各種節拍，不過節奏醫生只需要一個按鍵，實際上去設計按鍵就會比一般音樂遊戲更少。

### 2. 分工

| | |
|---|---|
| 何柏憲 | 負責大部分的介面與動畫顯示和一部分的遊戲功能。 |
| 沈宗毅 | 負責大部分的遊戲功能。 |

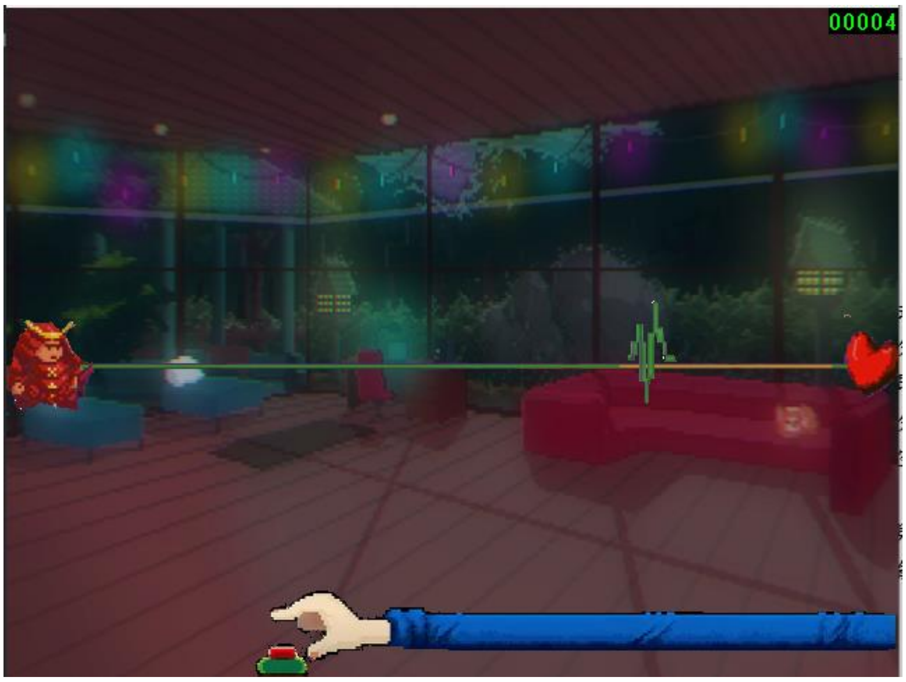
## 二、 遊戲介紹

1. 遊戲說明

(1) 遊玩方式

音樂部分：隨著音樂節奏會特別有一個重音拍（音效）提示，即可按下空白鍵。

動畫部分：中間會有心電圖圖示，當顯示到黃色區段即可按下空白鍵。如下圖所示



(2) 遊戲規則

按下空白鍵後，有對應到拍子和心電圖就會加分，否則扣分，分數會有預設值，並且在遊戲中會顯示於右上角。分數歸零則遊戲結束。如順利完成，遊戲結束後的評價由當前關卡的分數占總節拍比來決定。

(3) 遊戲動畫

各個關卡中有各種不同的動畫，還有一些干擾。

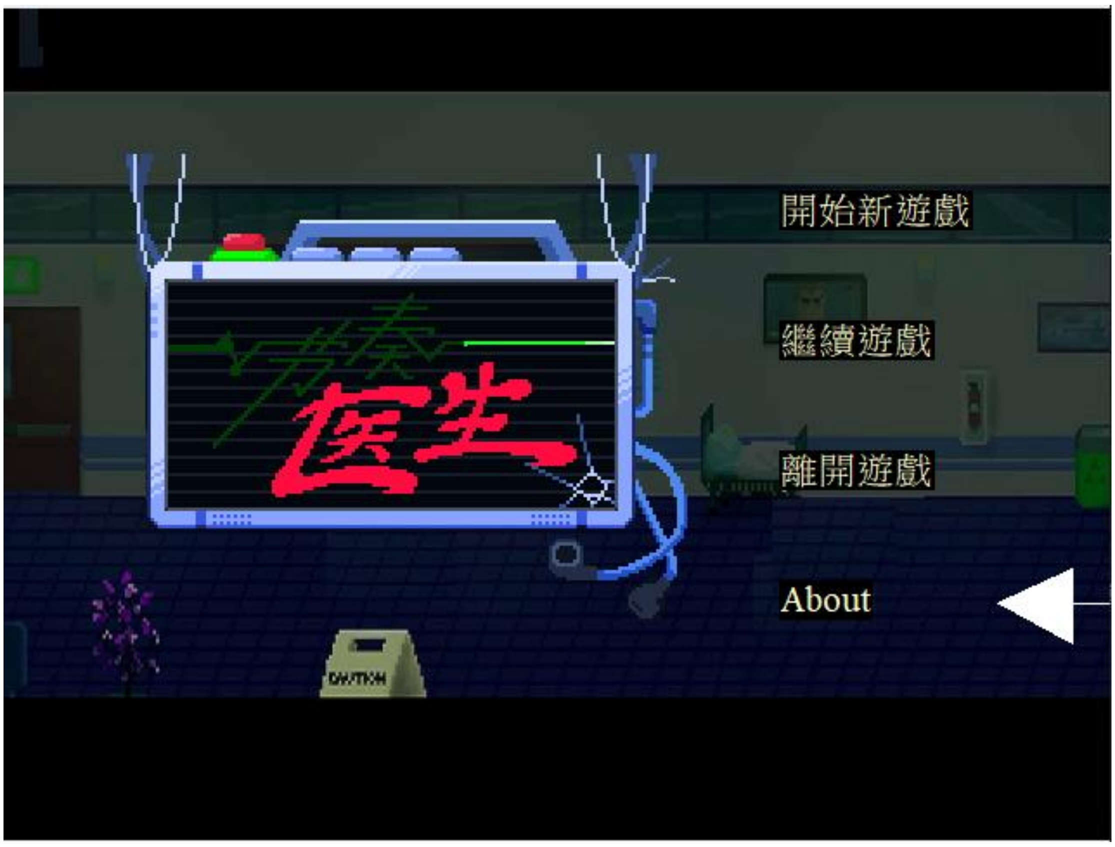
(4) 特殊功能

我們有實作存檔功能，開始新遊戲進入選關卡的界面按s即可存檔，有三個欄位可供玩家做存檔選擇，如欲刪除，直接覆蓋即可。除此之外，未完成前一關時下一關將不會解鎖。

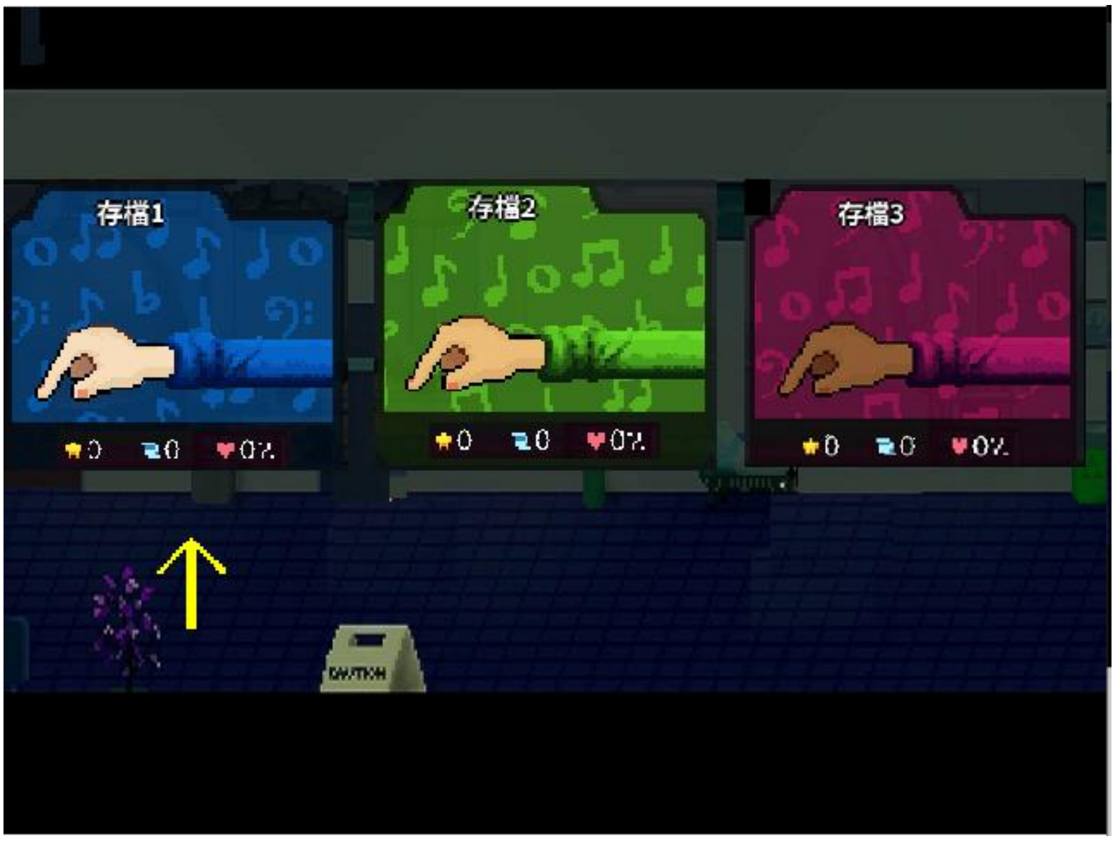
(5) 密技

按下S鍵即可跳關，並以最高評價S完成關卡。

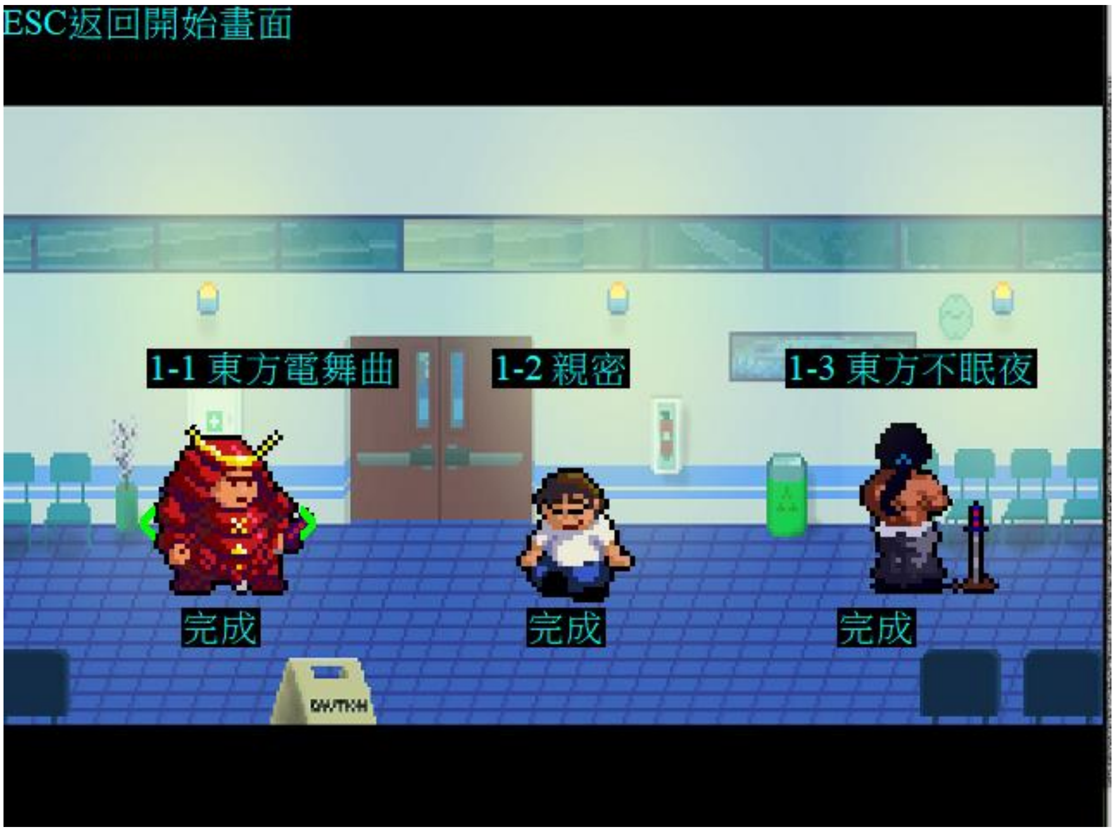
2.　遊戲圖形

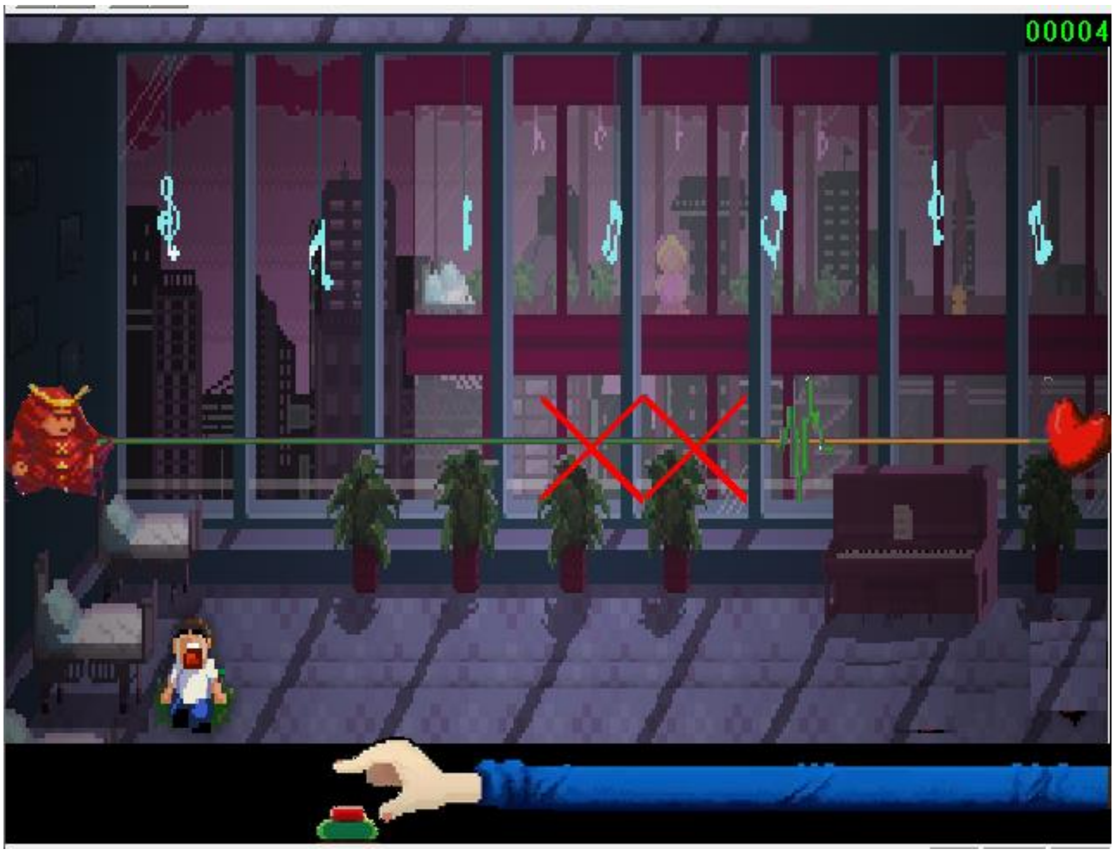


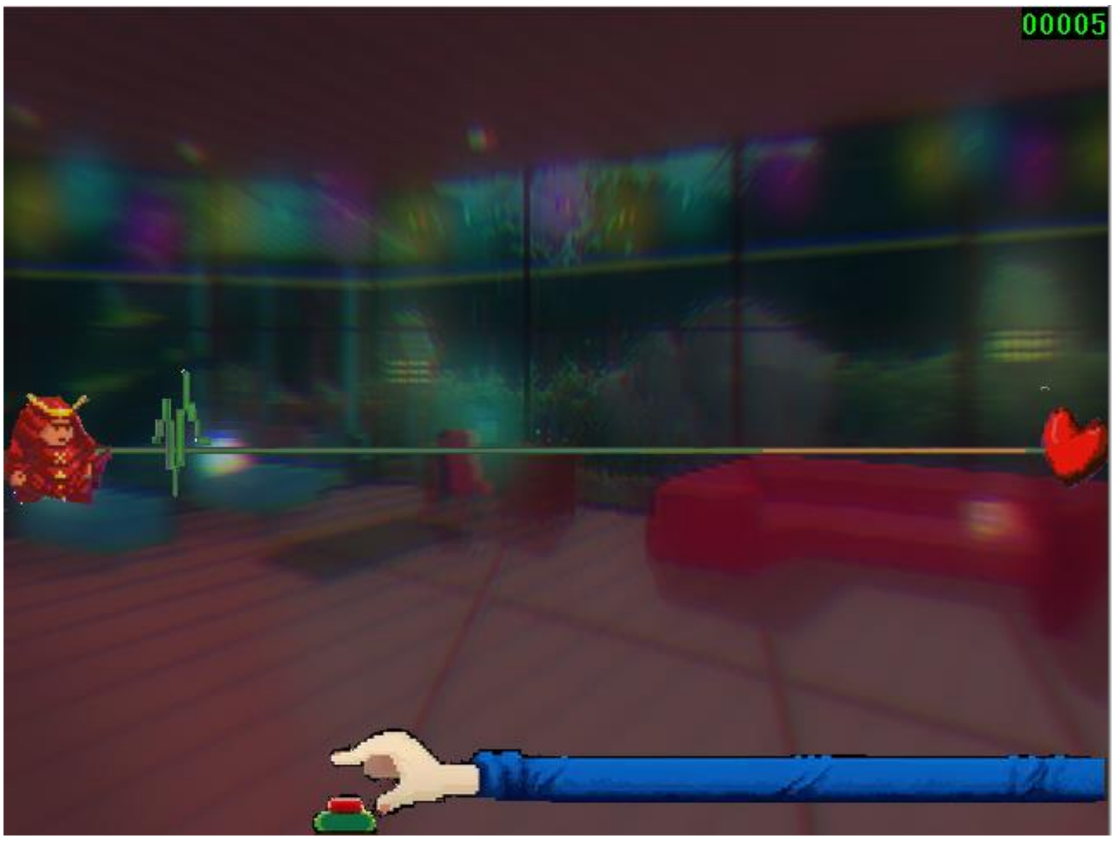
节奏医生
開始新遊戲
繼續遊戲
離開遊戲
About
CAUTION

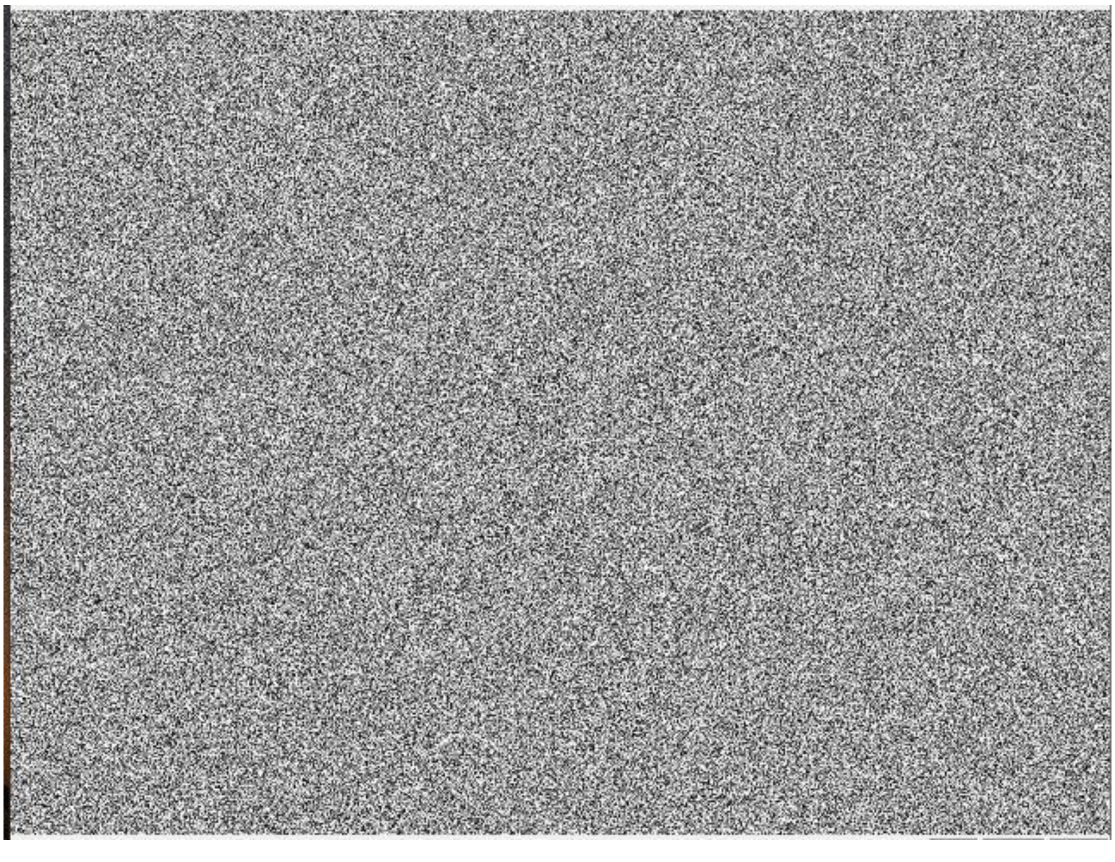


存檔1
0 0 0%
存檔2
0 0 0%
存檔3
0 0 0%
CAUTION


ESC返回開始畫面
1-1 東方電舞曲
1-2 親密
1-3 東方不眠夜
完成
完成
完成


00004


00005

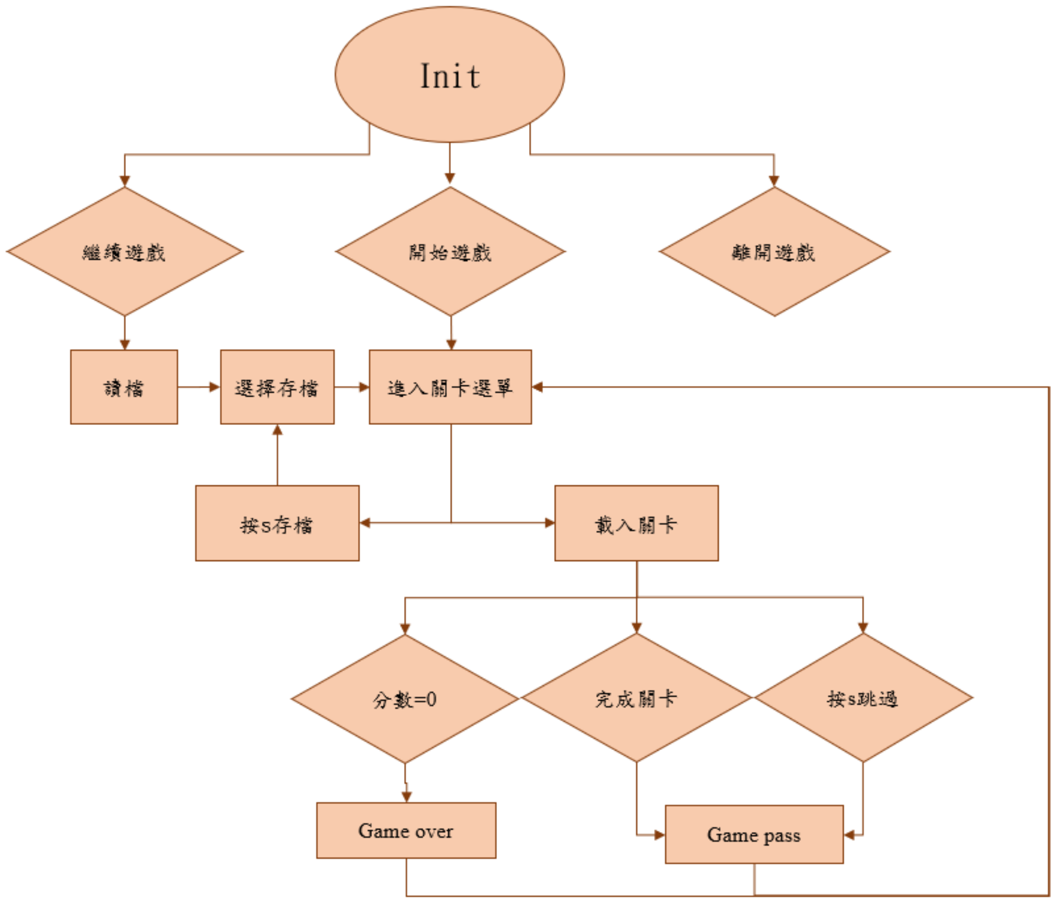


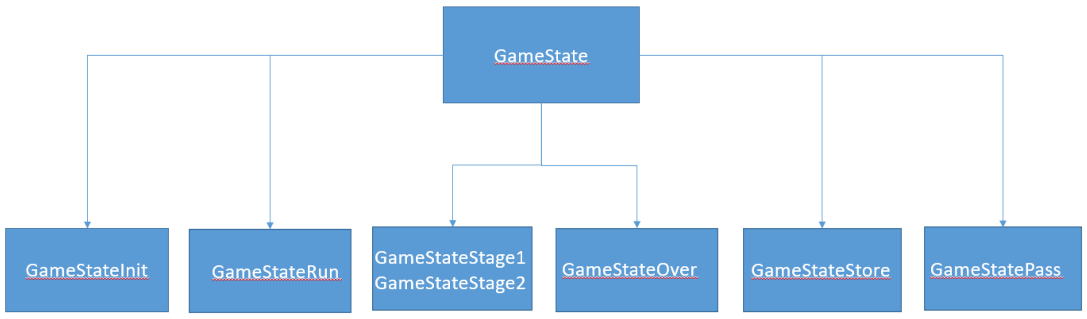
3. 遊戲音效

| 音樂檔名 | 說明 |
|---|---|
| 1.mp3 | 第一關音樂 |
| 2.mp3 | 第二關音樂 |
| 3.mp3 | 第三關音樂 |
| 4.mp3 | 第四關音樂 |
| 5.mp3 | 第五關音樂 |
| 6.mp3 | 第六關音樂 |
| dingT1.mp3 | 切換所選選單音效 |
| click.mp3 | 遊戲按空白鍵音效 |
| menu.mp3 | 主選單畫面音樂 |

## 三、 程式設計

### 1. 程式架構


Init
繼續遊戲
開始遊戲
離開遊戲
讀檔
選擇存檔
進入關卡選單
按s存檔
載入關卡
分數=0
完成關卡
按s跳過
Game over
Game pass


GameState
GameStateInit
GameStateRun
GameStateStage1
GameStateStage2
GameStateOver
GameStateStore
GameStatePass

2. 程式類別

| 類別名稱 | .h檔行數 | .cpp檔行數 | 說明 |
|---|---|---|---|
| ClongGray | 23 | 42 | 類似於CBall的class然後可以控制圖形是否顯示。 |
| mygame | 254 | 1782 | 兩個遊戲選單、存檔畫面、遊戲主要運作的程式碼和過關畫面。 |
| stage1 | 12 | 0 | 第一關節奏資料 |
| stage2 | 12 | 0 | 第二關節奏資料 |
| stage3 | 12 | 0 | 第三關節奏資料 |
| stage4 | 12 | 0 | 第四關節奏資料 |
| stage5 | 12 | 0 | 第五關節奏資料 |
| stage6 | 12 | 0 | 第六關節奏資料 |
| | | | |

3. 程式技術

我們有使用到vector，vector的表現一如資料結構中的陣列，又有很多額外的功能。

## 四、 結語

### 1. 問題及解決方法

(1) 按空白鍵的效果:

按空白鍵後會出現遊戲特有的長條，但他只會出現在那一瞬間，雖然現在想想其實蠻簡單的，但那時沒想到可以用一個布林值去控制他。

(2) 控制時間點:

因為這遊戲是節奏遊戲，所以我們要好好掌握什麼時間點按空白鍵會加分，我們有使用ctime的clock去幫助我們判斷時間點，這邊沒遇到什麼太多的阻礙。

(3) 讀寫檔:

我們用到之前學過的讀檔技巧幫助我們做存讀檔的動作，主要就是判斷什麼時候存檔，什麼時候讀檔，然後把一些關鍵值放到記事本裡面，當我們要讀檔時，我們把那些關鍵值取出來套用到遊戲上。

(4) 關卡設定:

我們用level來判斷目前要進入的關卡，好讓GameStateRun判斷現在的level等級載入相對應的關卡資訊，共同的關卡資訊用不同的stage.h存著，MaxLevel表示目前最多可以玩到什麼等級，以此來判斷哪些是通過關卡，哪些未解鎖，或還沒去完成的關卡，隨著通關數增加MaxLevel也會慢慢上升。

(5) 拍子顯示:

完成一些基本遊戲機制就是顯示問題，剛開始是有音樂，可是畫面完全沒有參考價值，這時候就要完善可以讓玩家參考的畫面，可是這遊戲一首歌拍子很多，不太可能把每個拍子的時間點還有位置抓出來，所以我們觀察了一下節奏，第一章每拍的時間都很平均，我們先把第一拍跟最後一拍的時間點抓出來，大部分的時候都是 7 拍，所以 7 等分切割，這樣就可以得到 1~7 拍的時間，很多時候位置也是 1 2 3 4 5 6 7 這樣的位置，這樣就可以獲得每個時間點跟位置，當然前兩關比較單純，是這樣，但 1-x 就不同了，他很多時候顯示的位置不是 1 2 3 4 5 6 7 那麼單純，可能是 1 3 1 2 3 2 4 6 7，而且也不是只有 7 拍，這關我們就花很久，因為他變化很多，所以我們真的是把每個時間點的變化都抓出來然後特別調整，第 2 章的節奏跟 1 不太一樣，那是 1 顯示一陣子然後很快到 7，有些是 1 後馬上到 7，這邊就是用迴圈去分割然後控制拍子在每個位置的時間比例，這個環節準備了 location 陣列存取每個拍子在甚麼時間點出現的位置是什麼，everytime 存取分割出來的時間好做後續判斷。

(6) 拍子抖動:

一開始拍子是不會跳動的，換位置也不會跳動，就看起來很不生動，但我們用了一個簡單的jump方法控制他jump，然後用jump_time_list紀錄什麼位置要跳動幾次，像1-x有些拍子可能會跳動兩次或三次，有的還會四次，所以才要用jump_time_list去存每個拍子在什麼時間點的跳動次數。

## 2. 時間表

| 週次 | 組員-何柏憲(小時) | 組員-沈宗毅(小時) | 說明 |
|---|---|---|---|
| 1 | 1 | 1 | 練習git上傳、tutorial |
| 2 | 3 | 3 | 練習git上傳、tutorial |
| 3 | 8 | 8 | 找素材、選單畫面設計 |
| 4 | 6 | 6 | 選單功能、音樂與畫面優化 |
| 5 | 6 | 6 | 做出第一版節拍判定、遊戲中物件的顯示及音效、選單音效 |
| 6 | 2 | 2 | 確定第一關的節拍點 |
| 7 | 3 | 3 | 做出第二版節奏判定 |
| 8 | 6 | 6 | 遊戲關卡畫面設計 |
| 9 | 2 | 2 | 篩選歌曲 |
| 10 | 6 | 6 | 做出第一關的雛形 |
| 11 | 9 | 9 | 選擇關卡畫面、功能與動畫 |
| 12 | 6 | 6 | 存檔畫面及功能 |
| 13 | 9 | 9 | 新增第二關、第三關 |
| 14 | 10 | 10 | 優化選擇關卡畫面 |
| 15 | 10 | 10 | 新增第四關、研發不同拍子的心電圖顯示 |
| 16 | 10 | 10 | 關卡畫面優化、套用心電圖顯示 |
| 17 | 20 | 20 | 新增兩個關卡、完成及優化六個關卡功能及特效 |

## 3. 貢獻比例

沈宗毅：50%、何柏憲：50%

## 4. 自我檢核表

| 項目 | 項目 | 完成否 | 無法完成原因 |
|---|---|---|---|
| 1 | 解決 Memory leak | ■已完成 | |
| 2 | 自定遊戲 Icon | ■已完成 | |
| 3 | 全螢幕啟動 | ■已完成 | |
| 4 | 有 About 畫面 | ■已完成 | |
| 5 | 初始畫面說明按鍵及滑鼠之用法與密技 | ■已完成 | |
| 7 | 上傳 setup/apk/source 檔 | ■已完成 | |
| 8 | setup 檔可正確執行 | ■已完成 | |
| 9 | 報告字型、點數、對齊、行距、頁碼等格式正確 | ■已完成 | |

## 5. 收穫

沈宗毅：更了解vector的用途，因為我們是節奏遊戲，要用到很多vector去紀錄各個節奏點，還有各個節奏的行為， 雖然vector很好用，但還是有很多事情要注意，其中最常遇到的就是vector subscript out of range，然後我就知道 不能直接賦值，還有一些邊界問題的錯誤也比較不會犯了。 除錯技巧大概會抓到底是哪塊出了問題，可能會先把一部份註解掉或是用其他方式代替，慢慢找出有問題的代碼。

何柏憲：在本次的實習中，我了解到遊戲中動畫製作相當的不容易，就算我們製作的只是2d的遊戲，圖形還是會非常的複雜，尤其是我們用這個框架下去製作，絕對不會比一般的遊戲引擎還要輕鬆，可能要去計算一些拍子上的顯示，還有一些不規則的拍子，會用到許多數學上的概念，在經過多次的微調後大概就可以讓音樂和畫面顯示同步。最主要判定的東西有用到time.h，來記錄時間的節奏，我們把紀錄時間的節奏在寫入檔案中就有用到ofstream，然後就使用這個檔案下去作為節拍的基準。

## 6. 心得

沈宗毅：這次oop實習是我第一次做的一個對我來說規模算大的專案，也讓我更了解一些遊戲設計者的心思，從一開始什麼 想法都沒有到，然後慢慢做，開始有越來越多想法，越來越了解程式架構，慢慢實踐一些心中的想法， 雖然我覺得這次沒有做到非常好，但這個過程讓我對物件導向程式設計的概念有很大的提升。

何柏憲：這次物件導向程式設計實習是我上大學以來花最多時間的專案，但實際上成果不甚滿意，覺得自己必須要積極一點，不然以後會在各種方面都很吃虧。不過經由這次的實習，真的學習到很多，起初一開始完全不知道怎麼架構整個遊戲，藉由一週一週的下去討論和分工，到期中時遊戲已經有基本的雛型，就覺得原來做遊戲就是這樣，不是一次直接完成，而是慢慢地開發，慢慢地增加東西，不要想著要做得多好，而是自己可以做到什麼，按部就班，就不會迷失方向。

## 五、 附錄

### mygame.cpp

```
/*
 * mygame.cpp: 本檔案儲遊戲本身的class的implementation
 * Copyright (C) 2002-2008 Woei-Kae Chen <wkc@csie.ntut.edu.tw>
 *
 * This file is part of game, a free game development framework for windows.
 *
 * game is free software; you can redistribute it and/or modify
 * it under the terms of the GNU General Public License as published by
 * the Free Software Foundation; either version 2 of the License, or
 * (at your option) any later version.
 *
 * game is distributed in the hope that it will be useful,
 * but WITHOUT ANY WARRANTY; without even the implied warranty of
 * MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
 * GNU General Public License for more details.
 *
 * You should have received a copy of the GNU General Public License
 * along with this program; if not, write to the Free Software
 * Foundation, Inc., 59 Temple Place, Suite 330, Boston, MA  02111-1307  USA
 *
 * History:
 *   2002-03-04 V3.1
 *          Add codes to demostrate the use of CMovingBitmap::ShowBitmap(CMovingBitmap &).
 *     2004-03-02 V4.0
 *      1. Add CGameStateInit, CGameStateRun, and CGameStateOver to
 *         demonstrate the use of states.
 *      2. Demo the use of CInteger in CGameStateRun.
 *   2005-09-13
 *      Rewrite the codes for CBall and CEraser.
 *   2005-09-20 V4.2Beta1.
 *   2005-09-29 V4.2Beta2.
 *      1. Add codes to display IDC_GAMECURSOR in GameStateRun.
 *   2006-02-08 V4.2
 *      1. Revise sample screens to display in English only.
 *      2. Add code in CGameStateInit to demo the use of PostQuitMessage().
 *      3. Rename OnInitialUpdate() -> OnInit().
 *      4. Fix the bug that OnBeginState() of GameStateInit is not called.
 *      5. Replace AUDIO_CANYON as AUDIO_NTUT.
 *      6. Add help bitmap to CGameStateRun.
 *   2006-09-09 V4.3
 *      1. Rename Move() and Show() as OnMove and OnShow() to emphasize that they are
 *         event driven.
 *   2006-12-30
 *      1. Bug fix: fix a memory leak problem by replacing PostQuitMessage(0) as
 *         PostMessage(AfxGetMainWnd()->m_hWnd, WM_CLOSE,0,0).
 *   2008-02-15 V4.4
 *      1. Add namespace game_framework.
 *      2. Replace the demonstration of animation as a new bouncing ball.
 *      3. Use ShowInitProgress(percent) to display loading progress.
 *   2010-03-23 V4.6
 *      1. Demo MP3 support: use lake.mp3 to replace lake.wav.
*/
#include "stdafx.h"
#include "Resource.h"
#include <mmsystem.h>
#include <ddraw.h>
#include "audio.h"
#include "gamelib.h"
#include "mygame.h"
#include <cstdlib>
#include <time.h>
#include <ctime>
#include <iostream>
#include <vector>
#include <fstream>
bool times = true;
int start,END =0;
int getscore; //獲得分數
int level;        //level選擇遊戲的難度 MaxLevel破解的最高難度
int MaxLevel;
bool write_load = false; //true是load false是write
namespace game_framework {
      CGameStateInit::CGameStateInit(CGame* g)
```

```
        : CGameState(g)
{
}
CPractice::CPractice(){
        //起始位置
        x = 85; //x end = 470
        y = 220;
}
int k,i = 0;
void CPractice::OnMove(int position) {
        //移動行為
        x = 85;
        for (int i = 1; i < position; i++) {
                x += 60;
        }
        if (x >= 470) {
                x = 85;
        }
}
void CPractice::OnJump() {
        //跳動行為
        if (y == 220) {
                y = 210;
        }
        else
                y = 220;
}
void CPractice::OnJump2() {
        if (y == 220) {
                y = 400;
        }
        else
                y = 220;
}
void CPractice::LoadBitmap() {
        pic.LoadBitmap(IDB_BITMAP42,RGB(255,255,255));
}
void CPractice::OnShow() {
	pic.SetTopLeft(x, y);
	pic.ShowBitmap();
}
int CPractice::getX() {
	return this->x;
}
void CBouncingBall::SetXY(int x, int y) {
	this->x = x;
	this->y = y;
}
void CBouncingBall::SetFloor(int floor) {
	this->floor = floor;
}
void CBouncingBall::SetVelocity(int velocity) {
	this->velocity = velocity;
	this->initial_velocity = velocity;
}
void CGameStateInit::OnInit()
{
	//
	// 當圖很多時，OnInit載入所有的圖要花很多時間。為避免玩遊戲的人
	//     等的不耐煩，遊戲會出現「Loading ...」，顯示Loading的進度。
	//
	ShowInitProgress(0);	// 一開始的loading進度為0%
	//
	// 開始載入資料
	//
	for (int i = IDB_BITMAP9; i <= IDB_BITMAP16; i++) {
		title1.AddBitmap(i,RGB(255,255,255));
	}
	title1.SetTopLeft(40, 80);
	about.LoadBitmapA(IDB_BITMAP75);
	x = 450;
	y = 70;
	title1.SetDelayCount(2);
	BG.LoadBitmap(IDB_BITMAP43);
	logo.AddBitmap(IDB_INITSELECTBOX,RGB(0,0,0));
	logo.AddBitmap(IDB_BITMAP44,RGB(0, 0, 0));
```

```
        logo.AddBitmap(IDB_BITMAP45,RGB(0, 0, 0));
        logo.SetTopLeft(x, 70);
        CAudio::Instance()->Load(AUDIO_DING, "sounds\\click.mp3");
        CAudio::Instance()->Load(AUDIO_CLICK, "sounds\\dingT1.mp3");
        about.SetIsShow(false);
}
void CGameStateInit::OnBeginState()
{
        if (times) {
                CAudio::Instance()->Load(AUDIO_LAKE, "sounds\\menu.mp3");
                times = false;
        }
        CAudio::Instance()->Play(AUDIO_LAKE, true);
}
void CGameStateInit::OnKeyUp(UINT nChar, UINT nRepCnt, UINT nFlags)
{
        const char KEY_ESC = 27;
        const char KEY_SPACE = ' ';
        const char KEY_ENTER = 13;
        const char KEY_LEFT = 0x25; // keyboard左箭頭
        const char KEY_UP = 0x26; // keyboard上箭頭
        const char KEY_RIGHT = 0x27; // keyboard右箭頭
        const char KEY_DOWN = 0x28; // keyboard下箭頭
        //const char KEY_ENTER = 0;
        if (nChar == KEY_ENTER) {
                if (y == 70) {
                        level = 1;
                        CAudio::Instance()->Play(AUDIO_DING);
                        MaxLevel = 0;
                        GotoGameState(GAME_STATE_STAGE);// 切換至GAME_STATE_STAGE 選關
                        END = clock();
                }
                if (y == 145) {
                        CAudio::Instance()->Play(AUDIO_DING);
                        GotoGameState(GAME_STATE_STORE);// 切換至GAME_STATE_STORE 讀檔畫面
                        END = clock();
                }
                else if (y == 220) {
```

```
                PostMessage(AfxGetMainWnd()->m_hWnd, WM_CLOSE, 0, 0); // 關閉遊戲
            }
            if (y == 295) {
                about.SetIsShow(true);
            }
            else about.SetIsShow(false);
        }
        else if (nChar == KEY_DOWN) {
            CAudio::Instance()->Play(AUDIO_DING);
            if (y < 295)
                y += 75;
            logo.SetTopLeft(450, y);
        }
        else if (nChar == KEY_UP) {
            CAudio::Instance()->Play(AUDIO_DING);
            if (y > 105)
                y -= 75;
            logo.SetTopLeft(450, y);
        }
        if (nChar == KEY_ESC && about.IsShow())
            about.SetIsShow(false);
        else if (nChar == KEY_ESC)
            PostMessage(AfxGetMainWnd()->m_hWnd, WM_CLOSE, 0, 0); // 關閉遊戲
}
void CGameStateInit::OnLButtonDown(UINT nFlags, CPoint point)
{
}
void CGameStateInit::OnMove() {
        title1.OnMove();
        logo.OnMove();
}
void CGameStateInit::OnShow()
{
        BG.ShowBitmap();
        logo.OnShow();
        title1.SetDelayCount(3);
        title1.OnShow();
        CDC* pDC = CDDraw::GetBackCDC();            // 取得 Back Plain 的 CDC
```

```
	CFont f, * fp;
	f.CreatePointFont(160, "Times New Roman");	// 產生 font f; 160表示16 point的字
	fp = pDC->SelectObject(&f);			// 選用 font f
	pDC->SetBkColor(RGB(0, 0, 0));
	pDC->SetTextColor(RGB(255, 255, 200));
	pDC->TextOut(450, 105, "開始新遊戲");
	pDC->TextOut(450, 180, "繼續遊戲");
	pDC->TextOut(450, 255, "離開遊戲");
	pDC->TextOut(450, 330, "About");
	pDC->SelectObject(fp);				// 放掉 font f
	CDDraw::ReleaseBackCDC();			// 放掉 Back Plain 的 CDC
	if (about.IsShow()) {
		about.OnShow();
	}
	about.SetIsAlive(true);
	about.SetXY(80, 60);
}
CGameStateStage::CGameStateStage(CGame* g)
	: CGameState(g)
{
}
void CGameStateStage::OnInit()
{
	//載入圖片
	bg.LoadBitmap(IDB_BITMAP46);
	select.LoadBitmap(IDB_BITMAP33,RGB(255,255,255));
	stage11.AddBitmap(IDB_BITMAP32, RGB(255, 255, 255));
	stage11.AddBitmap(IDB_BITMAP40, RGB(255, 255, 255));
	stage12.AddBitmap(IDB_BITMAP34, RGB(255, 255, 255));
	stage12.AddBitmap(IDB_BITMAP47, RGB(255, 255, 255));
	stage13.AddBitmap(IDB_BITMAP35, RGB(255, 255, 255));
	stage13.AddBitmap(IDB_BITMAP48, RGB(255, 255, 255));
	x = 80;
	y = 250;
}
void CGameStateStage::OnBeginState()
{
	if (times) {
			times = false;
		}
		CAudio::Instance()->Play(AUDIO_LAKE);
		select.SetTopLeft(x, y);
		stage11.SetTopLeft(85, 240);
		stage12.SetTopLeft(280, 260);
		stage13.SetTopLeft(485, 240);
	}
	void CGameStateStage::OnKeyUp(UINT nChar, UINT nRepCnt, UINT nFlags)
	{
		const char KEY_ESC = 27;       //esc鍵
		const char KEY_SPACE = ' ';    //空白鍵
		const char KEY_ENTER = 13;     //ENTER鍵
		const char KEY_LEFT = 0x25; // keyboard左箭頭
		const char KEY_UP = 0x26; // keyboard上箭頭
		const char KEY_RIGHT = 0x27; // keyboard右箭頭
		const char KEY_DOWN = 0x28; // keyboard下箭頭
		const char save = 83;     //存檔按鍵S
		//藉由位置 判斷level 進入各個關卡
		if (nChar == KEY_ENTER) {
			if (x == 80) {
				level = 1;
				CAudio::Instance()->Play(AUDIO_DING);
				CAudio::Instance()->Stop(AUDIO_LAKE);
				GotoGameState(GAME_STATE_RUN);// 切換至GAME_STATE_RUN
				END = clock();
			}
			else if (x == 280 && MaxLevel >= 1) {
				level = 2;
				CAudio::Instance()->Play(AUDIO_DING);
				CAudio::Instance()->Stop(AUDIO_LAKE);
				GotoGameState(GAME_STATE_RUN);// 切換至GAME_STATE_RUN
				END = clock();
			}
			else if (x == 480 && MaxLevel >= 2) {
				level = 3;
				CAudio::Instance()->Play(AUDIO_DING);
				CAudio::Instance()->Stop(AUDIO_LAKE);
```

```
                GotoGameState(GAME_STATE_RUN);// 切換至GAME_STATE_RUN
                END = clock();
            }
        }
        //向左向右的行為
        else if (nChar == KEY_LEFT) {
            if (x > 80)
                x -= 200;
            select.SetTopLeft(x, y);
        }
        else if (nChar == KEY_RIGHT) {
            if (MaxLevel >= 3 && 480 <=x) {
                GotoGameState(GAME_STATE_STAGE2);   //另一個選關畫面
            }
            else if (x < 480) {
                x += 200;
                select.SetTopLeft(x, y);
            }
        }
        else if (nChar == KEY_ESC)
            GotoGameState(GAME_STATE_INIT);// 切換至GAME_STATE_INIT
        else if (nChar == save) {
            write_load = true;
            GotoGameState(GAME_STATE_STORE);    //存檔
        }
    }
    void CGameStateStage::OnLButtonDown(UINT nFlags, CPoint point)
    {
    }
    void CGameStateStage::OnMove() {
        if (x == 80) {
            stage11.SetDelayCount(10);
            stage11.OnMove();
            stage12.Reset();
        }
        else if (x == 280) {
            stage12.SetDelayCount(10);
            stage12.OnMove();
            stage11.Reset();
            stage13.Reset();
        }
        else if (x == 480) {
            stage13.SetDelayCount(10);
            stage13.OnMove();
            stage12.Reset();
        }
}
void CGameStateStage::OnShow()
{
        bg.ShowBitmap();
        //根據目前的MaxLevel來設定各關卡下面顯示什麼
        string stage_state[3];
        if (MaxLevel > 3) {
            for (i = 0; i < 3; i++) {
                stage_state[i] = "完成";
            }
        }
        else {
            for (i = 0; i < MaxLevel; i++) {
                stage_state[i] = "完成";
            }
            if (MaxLevel != 3) {
                stage_state[MaxLevel] = "未完成";
                for (i = MaxLevel + 1; i < 3; i++) {
                    stage_state[i] = "未解鎖";
                }
            }
        }
        CDC* pDC = CDDraw::GetBackCDC();                // 取得 Back Plain 的 CDC
        CFont f, * fpq;
        f.CreatePointFont(160, "Times New Roman");      // 產生 font f; 160表示16 point的字
        fpq = pDC->SelectObject(&f);                            // 選用 font f
        pDC->SetBkColor(TRANSPARENT);
        pDC->SetTextColor(RGB(0, 255, 255));
        pDC->TextOut(0, 0, "ESC返回開始畫面");
        pDC->TextOut(85, 200, "1-1 東方電舞曲");
```

```
	pDC->TextOut(285, 200, "1-2 親密");
	pDC->TextOut(455, 200, "1-3 東方不眠夜");
	pDC->TextOut(105, 350, stage_state[0].c_str());
	pDC->TextOut(305, 350, stage_state[1].c_str());
	pDC->TextOut(485, 350, stage_state[2].c_str());
	pDC->SelectObject(fpq);                          // 放掉 font f
	CDDraw::ReleaseBackCDC();                        // 放掉 Back Plain 的 CDC
	stage11.OnShow();
	stage12.OnShow();
	stage13.OnShow();
	select.ShowBitmap();
}
//與stage1大同小異
CGameStateStage2::CGameStateStage2(CGame* g)
	: CGameState(g)
{
}
void CGameStateStage2::OnInit()
{
	bg.LoadBitmap(IDB_BITMAP46);
	select.LoadBitmap(IDB_BITMAP33, RGB(255, 255, 255));
	stage11.LoadBitmap(IDB_BITMAP72, RGB(255, 255, 255));
	stage12.LoadBitmap(IDB_BITMAP73, RGB(255, 255, 255));
	stage13.LoadBitmap(IDB_BITMAP74, RGB(255, 255, 255));
	x = 80;
	y = 250;
}
void CGameStateStage2::OnBeginState()
{
	CAudio::Instance()->Play(AUDIO_LAKE);
	if (times) {
		times = false;
	}
	select.SetTopLeft(x, y);
	stage11.SetTopLeft(90, 250);
	stage12.SetTopLeft(285, 240);
	stage13.SetTopLeft(475, 240);
}
```

```
void CGameStateStage2::OnKeyUp(UINT nChar, UINT nRepCnt, UINT nFlags)
{
	const char KEY_ESC = 27;
	const char KEY_SPACE = ' ';
	const char KEY_ENTER = 13;
	const char KEY_LEFT = 0x25; // keyboard左箭頭
	const char KEY_UP = 0x26; // keyboard上箭頭
	const char KEY_RIGHT = 0x27; // keyboard右箭頭
	const char KEY_DOWN = 0x28; // keyboard下箭頭
	const char save = 83;
	if (nChar == KEY_ENTER) {
		if (x == 80 && MaxLevel >= 3) {
			level = 4;
			CAudio::Instance()->Play(AUDIO_DING);
			CAudio::Instance()->Stop(AUDIO_LAKE);
			GotoGameState(GAME_STATE_RUN);// 切換至GAME_STATE_RUN
			END = clock();
		}
		else if (x == 280 && MaxLevel >= 4) {
			level = 5;
			CAudio::Instance()->Play(AUDIO_DING);
			CAudio::Instance()->Stop(AUDIO_LAKE);
			GotoGameState(GAME_STATE_RUN);// 切換至GAME_STATE_RUN
			END = clock();
		}
		else if (x == 480 && MaxLevel >= 5) {
			level = 6;
			CAudio::Instance()->Play(AUDIO_DING);
			CAudio::Instance()->Stop(AUDIO_LAKE);
			GotoGameState(GAME_STATE_RUN);// 切換至GAME_STATE_RUN
			END = clock();
		}
	}
	else if (nChar == KEY_LEFT) {
		if (x <= 80) {
			GotoGameState(GAME_STATE_STAGE);
		}
		else if (x > 80) {
```

```
                x -= 200;
                select.SetTopLeft(x, y);
            }
        }
        else if (nChar == KEY_RIGHT) {
            if (x < 480)
                x += 200;
            select.SetTopLeft(x, y);
        }
        else if (nChar == KEY_ESC)
            GotoGameState(GAME_STATE_INIT);// 切換至GAME_STATE_RUN
        else if (nChar == save) {
            write_load = true;
            GotoGameState(GAME_STATE_STORE);
        }
}
void CGameStateStage2::OnLButtonDown(UINT nFlags, CPoint point)
{
}
void CGameStateStage2::OnMove() {
        if (x == 80) {
        }
        else if (x == 280) {
        }
        else if (x == 480) {
        }
}
void CGameStateStage2::OnShow()
{
        bg.ShowBitmap();
        string stage_state[3];
        int M2 = MaxLevel - 3;
        for (i = 0; i < M2; i++) {
            stage_state[i] = "完成";
        }
        if (M2 != 3) {
            stage_state[M2] = "未完成";
            for (i = M2 + 1; i < 3; i++) {
```

```
				stage_state[i] = "未解鎖";
			}
		}
		CDC* pDC = CDDraw::GetBackCDC();			// 取得 Back Plain 的 CDC
		CFont f, * fpq;
		f.CreatePointFont(160, "Times New Roman");	// 產生 font f; 160表示16 point的字
		fpq = pDC->SelectObject(&f);				// 選用 font f
		pDC->SetBkColor(TRANSPARENT);
		pDC->SetTextColor(RGB(0, 255, 255));
		pDC->TextOut(0, 0, "ESC返回開始畫面");
		pDC->TextOut(85, 200, "2-1");
		pDC->TextOut(285, 200, "2-2");
		pDC->TextOut(455, 200, "2-3");
		pDC->TextOut(105, 350, stage_state[0].c_str());
		pDC->TextOut(305, 350, stage_state[1].c_str());
		pDC->TextOut(485, 350, stage_state[2].c_str());
		pDC->SelectObject(fpq);						// 放掉 font f
		CDDraw::ReleaseBackCDC();					// 放掉 Back Plain 的 CDC
		stage11.ShowBitmap();
		stage12.ShowBitmap();
		stage13.ShowBitmap();
		select.ShowBitmap();
}
CGameStateStore::CGameStateStore(CGame* g)
		: CGameState(g)
{
}
void CGameStateStore::OnInit()
{
		bg.LoadBitmap(IDB_BITMAP43);
		store1.LoadBitmap(IDB_BITMAP36, RGB(255, 0, 255));
		store2.LoadBitmap(IDB_BITMAP37, RGB(255, 0, 255));
		store3.LoadBitmap(IDB_BITMAP38, RGB(255, 10, 255));
		select.LoadBitmap(IDB_BITMAP41, RGB(255,255,255));
		x = 85;
		y = 300;
}
void CGameStateStore::OnBeginState()
```

```
{
      if (times) {
            times = false;
      }
      select.SetTopLeft(x, y);
      store1.SetTopLeft(0, 100);
      store2.SetTopLeft(215, 100);
      store3.SetTopLeft(430, 100);
}

void CGameStateStore::OnKeyUp(UINT nChar, UINT nRepCnt, UINT nFlags)
{
      const char KEY_ESC = 27;
      const char KEY_SPACE = ' ';
      const char KEY_ENTER = 13;
      const char KEY_LEFT = 0x25; // keyboard左箭頭
      const char KEY_UP = 0x26; // keyboard上箭頭
      const char KEY_RIGHT = 0x27; // keyboard右箭頭
      const char KEY_DOWN = 0x28; // keyboard下箭頭
      if (nChar == KEY_ENTER) {
            //判斷存檔位置 寫入或讀取不同記事本
            if (!write_load) {
                  if (x == 85) {
                        ifstream ofs("store1.txt");
                        string l;
                        getline(ofs, l);
                        MaxLevel = atoi(l.c_str());
                        ofs.close();
                        GotoGameState(GAME_STATE_STAGE);// 切換至GAME_STATE_STAGE
                  }
                  else if (x == 285) {
                        ifstream ofs("store2.txt");
                        string l;
                        getline(ofs, l);
                        MaxLevel = atoi(l.c_str());
                        ofs.close();
                        GotoGameState(GAME_STATE_STAGE);// 切換至GAME_STATE_STAGE
                  }
```

```
                else {
                      ifstream ofs("store3.txt");
                      string l;
                      getline(ofs, l);
                      MaxLevel = atoi(l.c_str());
                      ofs.close();
                      GotoGameState(GAME_STATE_STAGE);// 切換至GAME_STATE_STAGE
                }
          }
          else {
                if (x == 85) {
                      ofstream ofs;
                      ofs.open("store1.txt");
                      ofs.ios_base::trunc;
                      ofs << MaxLevel << endl;
                      ofs.close();
                      GotoGameState(GAME_STATE_STAGE);// 切換至GAME_STATE_STAGE
                }
                else if (x == 285) {
                      ofstream ofs;
                      ofs.open("store2.txt");
                      ofs.ios_base::trunc;
                      ofs << MaxLevel << endl;
                      ofs.close();
                      GotoGameState(GAME_STATE_STAGE);// 切換至GAME_STATE_STAGE
                }
                else {
                      ofstream ofs;
                      ofs.open("store3.txt");
                      ofs.ios_base::trunc;
                      ofs << MaxLevel << endl;
                      ofs.close();
                      GotoGameState(GAME_STATE_STAGE);//切換至GAME_STATE_STAGE
                }
          }
    }
    else if (nChar == KEY_LEFT) {
          if (x > 85)
				x -= 200;
			select.SetTopLeft(x, y);
		}
		else if (nChar == KEY_RIGHT) {
			if (x < 485)
				x += 200;
			select.SetTopLeft(x, y);
		}
		else if (nChar == KEY_ESC)
			GotoGameState(GAME_STATE_INIT);// 切換至GAME_STATE_INIT
}
void CGameStateStore::OnLButtonDown(UINT nFlags, CPoint point)
{
}
void CGameStateStore::OnMove() {
}
void CGameStateStore::OnShow()
{
		CDC* pDC = CDDraw::GetBackCDC();
		CFont f, * fpq;
		f.CreatePointFont(160, "Times New Roman");	// 產生 font f; 160表示16 point的字
		fpq = pDC->SelectObject(&f);				// 選用 font f
		pDC->SetBkColor(RGB(0, 0, 0));
		pDC->SetTextColor(RGB(255, 255, 200));
		pDC->TextOut(0, 0, "ESC返回開始畫面");
		pDC->SelectObject(fpq);					// 放掉 font f
		CDDraw::ReleaseBackCDC();					// 放掉 Back Plain 的 CDC
		bg.ShowBitmap();
		select.ShowBitmap();
		store1.ShowBitmap();
		store2.ShowBitmap();
		store3.ShowBitmap();
}
/////////////////////////////////////////////////////////////////////////////
// 這個class為遊戲的結束狀態(Game Over)
/////////////////////////////////////////////////////////////////////////////
CGameStateOver::CGameStateOver(CGame* g)
		: CGameState(g)
```

```
{
}

void CGameStateOver::OnMove()
{
	counter--;
	if (counter < 0)
		GotoGameState(GAME_STATE_STAGE);
}

void CGameStateOver::OnBeginState()
{
	counter = 30 * 5; // 5 seconds
}
void CGameStateOver::OnInit()
{
	//
	// 當圖很多時，OnInit載入所有的圖要花很多時間。為避免玩遊戲的人
	//     等的不耐煩，遊戲會出現「Loading ...」，顯示Loading的進度。
	//
	ShowInitProgress(66);	// 接個前一個狀態的進度，此處進度視為66%
	//
	// 開始載入資料
	//
	Sleep(300);				// 放慢，以便看清楚進度，實際遊戲請刪除此Sleep
	//
	// 最終進度為100%
	//
	ShowInitProgress(100);
}
void CGameStateOver::OnShow()
{
	CDC* pDC = CDDraw::GetBackCDC();			// 取得 Back Plain 的 CDC
	CFont f, * fp;
	f.CreatePointFont(160, "Times New Roman");	// 產生 font f; 160表示16 point的字
	fp = pDC->SelectObject(&f);					// 選用 font f
	pDC->SetBkColor(RGB(0, 0, 0));
	pDC->SetTextColor(RGB(255, 255, 0));
```

```
        char str[80];                                       // Demo 數字對字串的轉換
        sprintf(str, "廢物! (%d)", counter / 30);
        pDC->TextOut(240, 210, str);
        pDC->SelectObject(fp);                          // 放掉 font f (千萬不要漏了放掉)
        CDDraw::ReleaseBackCDC();                           // 放掉 Back Plain 的 CDC
}
CGameStatePass::CGameStatePass(CGame* g)
        : CGameState(g)
{
}
void CGameStatePass::OnMove()
{
        counter--;
        if (counter < 0)
                GotoGameState(GAME_STATE_STAGE);
}
void CGameStatePass::OnBeginState()
{
        counter = 30 * 5; // 5 seconds
        if (MaxLevel <= level) {
                MaxLevel = level;
        }
}
void CGameStatePass::OnInit()
{
        ShowInitProgress(66);
        Sleep(300);
        ShowInitProgress(100);
}
void CGameStatePass::OnShow()
{
        CDC* pDC = CDDraw::GetBackCDC();                // 取得 Back Plain 的 CDC
        CFont f, * fp;
        f.CreatePointFont(160, "Times New Roman");      // 產生 font f; 160表示16 point的字
        fp = pDC->SelectObject(&f);                         // 選用 font f
        pDC->SetBkColor(RGB(0, 0, 0));
        pDC->SetTextColor(RGB(255, 255, 0));
        char str[80];
```

```
	//藉由分數顯示不同評級
	if(getscore == 100)
		sprintf(str, "你的評級為S ");
	else if(getscore >90)
		sprintf(str, "你的評級為A ");
	else if(getscore >70)
		sprintf(str, "你的評級為B ");
	else if(getscore >50)
		sprintf(str, "你的評級為C ");
	else
		sprintf(str, "你好爛 " );
	pDC->TextOut(240, 210, str);
	pDC->SelectObject(fp);					// 放掉 font f
	CDDraw::ReleaseBackCDC();					// 放掉 Back Plain 的 CDC
}
/////////////////////////////////////////////////////////////////////////////
// 這個class為遊戲的遊戲執行物件，主要的遊戲程式都在這裡
/////////////////////////////////////////////////////////////////////////////
CGameStateRun::CGameStateRun(CGame* g)
	: CGameState(g)
{
}
CGameStateRun::~CGameStateRun()
{
}
void CGameStateRun::OnBeginState()
{
	LoadKeyboardLayout("0x0409", KLF_ACTIVATE | KLF_SETFORPROCESS);
	const int BALL_GAP = 90;
	const int BALL_XY_OFFSET = 45;
	const int BALL_PER_ROW = 7;
	const int HITS_LEFT = 5; //初始分數
	int CLOCK = start;	//時間
	const int HITS_LEFT_X = 590;
	const int HITS_LEFT_Y = 0;
	const int BACKGROUND_X = 60;
	const int ANIMATION_SPEED = 15;
	//一開始清除所有上一次關卡的資料
```

```
beat_x = 0;
clap.clear();
first.clear();
everytime.clear();
location.clear();
jump_time_list.clear();
noise.SetXY(0, 0);
noise.SetIsAlive(true);
noise.SetIsShow(false);
test1.SetXY(425, 0);
test1.SetIsAlive(true);
test1.SetIsShow(false);
bg1.SetDelayCount(3);
hand.SetDelayCount(1);
background.SetTopLeft(BACKGROUND_X, 0);                     // 設定背景的起始座標
clocktime.SetInteger(CLOCK);
clocktime.SetTopLeft(0, 400);
hits_left.SetInteger(HITS_LEFT);                            // 指定剩下的撞擊數
hits_left.SetTopLeft(HITS_LEFT_X, HITS_LEFT_Y);       // 指定剩下撞擊數的座標
CAudio::Instance()->Play(AUDIO_DING, false);          // 撥放 WAVE
//判斷屬於什麼關卡 載入不同資料
//一開始先設定location 每次音符出現的位置
//jump_time_list 每次音符的跳動次數
//everytime 分割出的時間陣列
if (level == 1) {
      CAudio::Instance()->Play(AUDIO_ONE, false);                 // 撥放 MIDI
      stage1 data;
      for (int i = 0; i < data.total_tap; i++) {
            clap.push_back(data.clap[i]-250);
            first.push_back(data.first[i]-250);
      }
      total_tap = data.total_tap;
      for (int i = 0; i < total_tap; i++) {
            for (int j = 1; j <= 7; j++) {
                  location.push_back(j);
                  jump_time_list.push_back(1);
            }
      }
```

```
        for (int i = 0; i < total_tap; i++)
        {
            int interval = (clap[i] - first[i]) / 6;
            int s = first[i];
            for (int j = 0; j < 6; j++)
            {
                everytime.push_back(s);
                s += interval;
            }
            everytime.push_back(clap[i]);
        }
        everytime.push_back(999999999);
    }
    else if (level == 2) {
        CAudio::Instance()->Play(AUDIO_TWO, false);                 // 撥放 MIDI
        stage2 data;
        for (int i = 0; i < data.total_tap; i++) {
            clap.push_back(data.clap[i]-100);
            first.push_back(data.first[i]-100);
        }
        total_tap = data.total_tap;
        for (int i = 0; i < total_tap; i++) {
            for (int j = 1; j <= 7; j++) {
                location.push_back(j);
                jump_time_list.push_back(1);
            }
        }
        for (int i = 0; i < total_tap; i++)
        {
            int interval = (clap[i] - first[i]) / 6;
            int s = first[i];
            for (int j = 0; j < 6; j++)
            {
                everytime.push_back(s);
                s += interval;
            }
            everytime.push_back(clap[i]);
        }
```

```
		everytime.push_back(999999999);
	}
	else if (level == 3) {
		//level 3特別複雜 很多特殊狀況 需要特別設定
		CAudio::Instance()->Play(AUDIO_THREE, false);			// 撥放 MIDI
		stage3 data;
		for (int i = 0; i < data.total_tap; i++) {
			clap.push_back(data.clap[i]-100);
			first.push_back(data.first[i]-100);
		}
		total_tap = data.total_tap;
		for (int i = 0; i < total_tap; i++) {
			if (i == 3) {
				for (int j = 1; j <= 7; j++) {
					location.push_back(j);
					if (j == 3)
						jump_time_list.push_back(12);
					else if(j == 7)
						jump_time_list.push_back(4);
					else
						jump_time_list.push_back(1);
				}
			}
			else if (i == 4) {
				for (int j = 1; j <= 7; j++) {
					location.push_back(j);
					if (j == 6)
						jump_time_list.push_back(12);
					else if (j == 7)
						jump_time_list.push_back(16);
					else
						jump_time_list.push_back(1);
				}
			}
			else if (i == 6) {
				int lo[] = { 1,2,3,4,5,4,5,7 };
				for (int j = 0; j <8; j++) {
					location.push_back(lo[j]);
```

```
                jump_time_list.push_back(1);
            }
        }
        else if (i == 7) {
            int lo[] = { 1,2,3,5,7 };
            for (int j = 0; j <5; j++) {
                location.push_back(lo[j]);
                if(3== lo[j])
                    jump_time_list.push_back(8);
                else if(5 == lo[j])
                    jump_time_list.push_back(8);
                else if(7 == lo[j])
                    jump_time_list.push_back(16);
                else
                    jump_time_list.push_back(1);
            }
        }
        else if (i == 11) {
            for (int j = 1; j <= 7; j++) {
                location.push_back(j);
                if (j == 3)
                    jump_time_list.push_back(12);
                else if (j == 6)
                    jump_time_list.push_back(8);
                else
                    jump_time_list.push_back(1);
            }
        }
        else if (i == 12) {
            int lo[] = { 1,2,3,2,4,5,6,7 };
            for (int j = 0; j <8; j++) {
                location.push_back(lo[j]);
                if (j == 6)
                    jump_time_list.push_back(8);
                else if (j == 7)
                    jump_time_list.push_back(8);
                else
                    jump_time_list.push_back(1);
```

```
          }
    }
    else if (i == 13) {
          int lo[] = { 1,3,1,2,4,2,5,6,7 };
          for (int j = 0; j < 9; j++) {
                location.push_back(lo[j]);
                if (j == 8)
                      jump_time_list.push_back(8);
                else
                      jump_time_list.push_back(1);
          }
    }
    else if (i == 14) {
          int lo[] = { 1,3,1,2,3,2,4,6,7 };
          for (int j = 0; j < 9; j++) {
                location.push_back(lo[j]);
                      jump_time_list.push_back(1);
          }
    }
    else if (i == 15) {
          int lo[] = { 1,2,3,2,1,4,5,6,7 };
          for (int j = 0; j < 9; j++) {
                location.push_back(lo[j]);
                jump_time_list.push_back(1);
          }
    }
    else if (i == 19) {
          int lo[] = { 1,2,3,4,5,3,6,7 };
          for (int j = 0; j < 8; j++) {
                location.push_back(lo[j]);
                if( j == 2 || j == 5)
                      jump_time_list.push_back(8);
                else
                      jump_time_list.push_back(1);
          }
    }
    else if (i == 23) {
          int lo[] = { 1,5,7 };
```

```
        for (int j = 0; j < 3; j++) {
            location.push_back(lo[j]);
            if (j ==0)
                jump_time_list.push_back(24);
            else if ( j ==1)
                jump_time_list.push_back(8);
            else
                jump_time_list.push_back(1);
        }
    }
    else if (i == 26) {
        int lo[] = { 1,2,3,1,4,5,6,7 };
        for (int j = 0; j < 8; j++) {
            location.push_back(lo[j]);
            if (j == 1)
                jump_time_list.push_back(8);
            else
                jump_time_list.push_back(1);
        }
    }
    else if (i == 27 || i == 28) {
        int lo[] = { 1,2,3,1,4,1,6,7 };
        for (int j = 0; j < 8; j++) {
            location.push_back(lo[j]);
            if (j == 7)
                jump_time_list.push_back(8);
            else
                jump_time_list.push_back(1);
        }
    }
    else if (i == 31) {
        int lo[] = { 1,2,3,1,4,1,6,7 };
        for (int j = 0; j < 8; j++) {
            location.push_back(lo[j]);
            jump_time_list.push_back(1);
        }
    }
    else if (i == 32) {
        int lo[] = { 1,2,1,1,4,5,6,7 };
        for (int j = 0; j < 8; j++) {
            location.push_back(lo[j]);
            jump_time_list.push_back(1);
        }
    }
    else if (i == 33) {
        int lo[] = { 1,5,4,5,6,7 };
        for (int j = 0; j < 6; j++) {
            if (j == 0) {
                jump_time_list.push_back(24);
            }
            else {
                jump_time_list.push_back(1);
            }
            location.push_back(lo[j]);
        }
    }
    else if (i == 34) {
        int lo[] = { 1,1,2,3,4,1,5,6,7 };
        for (int j = 0; j < 9; j++) {
            location.push_back(lo[j]);
            jump_time_list.push_back(1);
        }
    }
    else {
        for (int j = 1; j <= 7; j++) {
            if (i == 5 && j == 6) {
                location.push_back(5);
                jump_time_list.push_back(1);
            }
            else if (i == 9 && j == 7) {
                location.push_back(j);
                jump_time_list.push_back(12);
            }
            else if (i == 10 && j == 7) {
                location.push_back(j);
                jump_time_list.push_back(8);
```

```
                        }
                        else if (i == 17 && j == 7) {
                            location.push_back(j);
                            jump_time_list.push_back(20);
                        }
                        else if (i == 24 && j == 7) {
                            location.push_back(j);
                            jump_time_list.push_back(8);
                        }
                        else if (i == 25 && j == 3) {
                            location.push_back(j);
                            jump_time_list.push_back(12);
                        }
                        else if (i == 30 && j == 5) {
                            location.push_back(1);
                            jump_time_list.push_back(1);
                        }
                        else {
                            location.push_back(j);
                            jump_time_list.push_back(1);
                        }
                    }
                }
            }
            for (int i = 0; i < total_tap; i++)
            {
                int len = 6;
                if (i == 6 || i ==12 || i == 19 || i ==26 || i == 27 || i == 28 || i ==31 || i
==32) {
                    len = 7;
                }
                else if (i == 13 || i == 14 || i == 15 || i == 34) {
                    len = 8;
                }
                else if (i == 23) {
                    len = 2;
                }
                else if (i == 33) {
```

```
                len = 5;
            }
            else if (i == 7) {
                len = 4;
            }
            int interval = (clap[i] - first[i]) / len;
            int s = first[i];
            for (int j = 0; j < len; j++)
            {
                everytime.push_back(s);
                s += interval;
            }
            everytime.push_back(clap[i]);
        }
        everytime.push_back(999999999);
    }
    else if (level == 4) {
        CAudio::Instance()->Play(AUDIO_FOUR, false);                // 撥放 MIDI
        stage4 data;
        for (int i = 0; i < data.total_tap; i++) {
            clap.push_back(data.clap[i]);
            first.push_back(data.first[i]);
        }
        total_tap = data.total_tap;
        for (int i = 0; i < total_tap; i++) {
            for (int j = 1; j <= 30; j++) {
                if (j < 21)
                    location.push_back(1);
                else if (j < 26)
                    location.push_back(2);
                else
                    location.push_back(j-25+2);
                if (j == 1)
                    jump_time_list.push_back(2);
                else
                    jump_time_list.push_back(1);
            }
        }
        for (int i = 0; i < total_tap; i++)
        {
              int interval = (clap[i] - first[i]) / 29;
              int s = first[i];
              for (int j = 0; j < 29; j++)
              {
                    everytime.push_back(s);
                    s += interval;
              }
              everytime.push_back(clap[i]);
        }
        everytime.push_back(999999999);
  }
  else if (level == 5) {
        CAudio::Instance()->Play(AUDIO_FIVE, false);                // 撥放 MIDI
        stage5 data;
        for (int i = 0; i < data.total_tap; i++) {
              clap.push_back(data.clap[i]-100);
              first.push_back(data.first[i]-100);
        }
        total_tap = data.total_tap;
        for (int i = 0; i < total_tap; i++) {
              if (i < 21) {
                    for (int j = 1; j <= 30; j++) {
                          if (j < 21)
                                location.push_back(1);
                          else if (j < 26)
                                location.push_back(2);
                          else
                                location.push_back(j - 25 + 2);
                          if (j == 1)
                                jump_time_list.push_back(2);
                          else
                                jump_time_list.push_back(1);
                    }
              }
              else{
                    for (int j = 1; j <= 10; j++) {
```

```
                if (j < 5)
                    location.push_back(1);
                else if (j < 6)
                    location.push_back(2);
                else
                    location.push_back(j - 5 + 2);
                if (j == 1)
                    jump_time_list.push_back(2);
                else
                    jump_time_list.push_back(1);
            }
        }
    }
    for (int i = 0; i < total_tap; i++)
    {
        if (i < 21) {
            int interval = (clap[i] - first[i]) / 29;
            int s = first[i];
            for (int j = 0; j < 29; j++)
            {
                everytime.push_back(s);
                s += interval;
            }
            everytime.push_back(clap[i]);
        }
        else {
            int interval = (clap[i] - first[i]) / 9;
            int s = first[i];
            for (int j = 0; j < 9; j++)
            {
                everytime.push_back(s);
                s += interval;
            }
            everytime.push_back(clap[i]);
        }
    }
    everytime.push_back(999999999);
}
```

```
	else if (level == 6) {
		CAudio::Instance()->Play(AUDIO_SIX, false);					// 撥放 MIDI
		stage6 data;
		for (int i = 0; i < data.total_tap; i++) {
			clap.push_back(data.clap[i]-100);
			first.push_back(data.first[i]-100);
		}
		total_tap = data.total_tap;
		for (int i = 0; i < total_tap; i++) {
			for (int j = 1; j <= 20; j++) {
				if (j < 11)
					location.push_back(1);
				else if (j < 16)
					location.push_back(2);
				else
					location.push_back(j - 15 + 2);
				if (j == 1)
					jump_time_list.push_back(2);
				else
					jump_time_list.push_back(1);
			}
		}
		for (int i = 0; i < total_tap; i++)
		{
			int interval = (clap[i] - first[i]) / 19;
			int s = first[i];
			for (int j = 0; j < 19; j++)
			{
				everytime.push_back(s);
				s += interval;
			}
			everytime.push_back(clap[i]);
		}
		everytime.push_back(999999999);
	}
}
ofstream ofs;
int tt = 210;
```

```
void CGameStateRun::OnMove()                                                    // 移動遊戲元素
{
     //各關卡內一些動畫的行為
     if(level==1)background1.OnMove();
     if (level == 3 && c>=30 && c<31 && start<clap[31] ) {
          noise.SetIsShow(true);
     }
     if (level == 3) {
          bg1.OnMove();
          if (tt == 210 || start < clap[c])
               tt = 220;
          else
               tt = 210;
     }
     if (level == 5) {

          bg3.OnMove();

          if (tt == 210 || start<clap[c])
               tt = 220;
          else
               tt = 210;
     }
     if (level == 6) {

          if (tt == 210 || start < clap[c])
               tt = 220;
          else
               tt = 210;
          if (c > 74 && c < 109) {
               c_practice.OnJump2();
          }
     }
     if (level == 6)bg4.OnMove();
     start = (clock()-END)-600;
     int const min = 20;
     int const max = 480;
     int const minx = 0;
```

```
		int const maxx = 300;
		//如果時間到一個時間點 音符就會換位置
		if (start > everytime[beat_x]-100) {
			c_practice.OnMove(location[beat_x]);
			jump_time = jump_time_list[beat_x]*2;
			beat_x++;
		}
		if (jump_time) {
			//jump方式
			c_practice.OnJump();
			jump_time--;
		}
	}
	void CGameStateRun::OnInit()                                                   // 遊戲的初值及圖形
設定
	{
		ShowInitProgress(33);   // 接個前一個狀態的進度，此處進度視為33%
		//load遊戲共同動畫還有各關動畫 圖片
		noise.LoadBitmapA(IDB_BITMAP61);
		isClick = false;
		test1.LoadBitmap(177);
		bg.LoadBitmap(IDB_BITMAP49);
		for (int i = IDB_BITMAP62; i <= IDB_BITMAP71; i++) {
			bg1.AddBitmap(i);
		}
		bg2.LoadBitmap(IDB_BITMAP52);
		bg3.AddBitmap(IDB_BITMAP52);
		bg3.AddBitmap(IDB_BITMAP53);
		for (int i = IDB_BITMAP54; i <= IDB_BITMAP59; i++) {
			bg4.AddBitmap(i);
		}
		bg3.SetDelayCount(2);
		bg4.SetDelayCount(2);
		background.LoadBitmap(IDB_BACKGROUND);                             // 載入背景的圖形
		background1.AddBitmap(IDB_BG1);
		background1.AddBitmap(IDB_BG2);
		background1.SetDelayCount(7);
		ShowInitProgress(50);
```

```
        bar.LoadBitmap(IDB_BITMAP17,RGB(255, 255, 255));
        hand.AddBitmap(IDB_HAND1,RGB(255, 255, 255));
        hand.AddBitmap(IDB_HAND2, RGB(255, 255, 255));
        test.LoadBitmap(IDB_INITSELECTBOX);
        xx1.LoadBitmap(IDB_BITMAP30,RGB(0,0,0));
        xx2.LoadBitmap(IDB_BITMAP30, RGB(0, 0, 0));
        help.LoadBitmap(IDB_HELP, RGB(255, 255, 255));                    // 載入說明的圖形
        corner.LoadBitmap(IDB_CORNER);                                        // 載入角落圖形
                                            // 載入圖形
        hits_left.LoadBitmap();
        c_practice.LoadBitmap();
        //載入各關音樂
        CAudio::Instance()->Load(AUDIO_ONE, "sounds\\1.mp3");
        CAudio::Instance()->Load(AUDIO_TWO, "sounds\\2.mp3");
        CAudio::Instance()->Load(AUDIO_THREE, "sounds\\3.mp3");
        CAudio::Instance()->Load(AUDIO_FOUR, "sounds\\4.mp3");
        CAudio::Instance()->Load(AUDIO_FIVE, "sounds\\5.mp3");
        CAudio::Instance()->Load(AUDIO_SIX, "sounds\\6.mp3");
}
void CGameStateRun::OnKeyDown(UINT nChar, UINT nRepCnt, UINT nFlags)
{
        const char KEY_LEFT = 0x25; // keyboard左箭頭
        const char KEY_UP = 0x26; // keyboard上箭頭
        const char KEY_RIGHT = 0x27; // keyboard右箭頭
        const char KEY_DOWN = 0x28; // keyboard下箭頭
        const char KEY_SPACE = ' ';
        if (nChar == KEY_SPACE) {
                hand.OnMove();
        }
}
bool H = false;
void CGameStateRun::OnKeyUp(UINT nChar, UINT nRepCnt, UINT nFlags)
{
        const char KEY_LEFT = 0x25; // keyboard左箭頭
        const char KEY_UP = 0x26; // keyboard上箭頭
        const char KEY_RIGHT = 0x27; // keyboard右箭頭
        const char KEY_DOWN = 0x28; // keyboard下箭頭
        const char KEY_SPACE = ' '; //空白鍵
        const char skip = 83; //SKIP 按s使用跳關密技
        if (nChar == KEY_SPACE) {
                //按空白鍵後判斷時間有沒有在評分範圍
                isClick = true;
                if (start - 300 < clap[c] && clap[c] < start + 300) {
                      isGet = true;
                }
                else {
                      isGet = false;
                }
                test1.SetIsShow(true);
                hand.OnMove();
                hand.Reset();
                int x = rand() % (400 - 20 + 1) + 20;
                int y = rand() % (480 + 1) + 0;
                background.SetTopLeft(x, y);
        }
        else if (nChar == skip) {
                getscore = 100;
                if (level == 1) {
                      CAudio::Instance()->Stop(AUDIO_ONE);      // 停止 MIDI
                }
                else if (level == 2) {
                      CAudio::Instance()->Stop(AUDIO_TWO);      // 停止 MIDI
                }
                else if (level == 3) {
                      CAudio::Instance()->Stop(AUDIO_THREE);    // 停止 MIDI
                }
                else if (level == 4) {
                      CAudio::Instance()->Stop(AUDIO_FOUR);     // 停止 MIDI
                }
                else if (level == 5) {
                      CAudio::Instance()->Stop(AUDIO_FIVE);     // 停止 MIDI
                }
                else if (level == 6) {
                      CAudio::Instance()->Stop(AUDIO_SIX);      // 停止 MIDI
                }
                c = 0;
```

```
            GotoGameState(GAME_STATE_PASS);
        }
}
void CGameStateRun::OnLButtonDown(UINT nFlags, CPoint point)  // 處理滑鼠的動作
{
}
void CGameStateRun::OnLButtonUp(UINT nFlags, CPoint point)  // 處理滑鼠的動作
{
}
void CGameStateRun::OnMouseMove(UINT nFlags, CPoint point)  // 處理滑鼠的動作
{
}
void CGameStateRun::OnRButtonDown(UINT nFlags, CPoint point)  // 處理滑鼠的動作
{
}
void CGameStateRun::OnRButtonUp(UINT nFlags, CPoint point)  // 處理滑鼠的動作
{
}
void CGameStateRun::OnShow()
{
        if (level == 1) {
            background1.OnShow();
        }
        else if(level ==2) {
            bg.ShowBitmap();
        }
        else if(level == 3){
            bg1.OnShow();
        }
        else if (level == 4) {
            bg2.ShowBitmap();
        }
        else if (level == 5) {
            bg3.OnShow();
        }
        else if (level == 6) {
            bg4.OnShow();
        }
```

```
if (level != 5)bar.SetTopLeft(0, 210);
else if(level ==5 || level==6) bar.SetTopLeft(0, tt);
hits_left.ShowBitmap();
bar.ShowBitmap();
if (test1.IsShow()) {
      test1.OnShow();
}
if (clap[c]+100 <= start) { //到了一個時間點才會做判斷 而不是按空白鍵做判斷
      if (!isClick) {
            hits_left.Add(-1); //如果沒按空白鍵就會扣分
      }
      else {
            if (isGet) {
                  hits_left.Add(1); //如果按在正確的時間則會加分
            }
            else
            {
                  hits_left.Add(-1); //否則扣分
            }
      }
      c++;
      isClick = false;
      if (hits_left.GetInteger() <= 0) { //分數被扣光
            if (level == 1) {
                  CAudio::Instance()->Stop(AUDIO_ONE);      // 停止 MIDI
            }
            else if (level == 2) {
                  CAudio::Instance()->Stop(AUDIO_TWO);      // 停止 MIDI
            }
            else if (level == 3) {
                  CAudio::Instance()->Stop(AUDIO_THREE);    // 停止 MIDI
            }
            else if (level == 4) {
                  CAudio::Instance()->Stop(AUDIO_FOUR);     // 停止 MIDI
            }
            else if (level == 5) {
                  CAudio::Instance()->Stop(AUDIO_FIVE);     // 停止 MIDI
            }
            else if (level == 6) {
                  CAudio::Instance()->Stop(AUDIO_SIX);      // 停止 MIDI
            }
            c = 0;
            GotoGameState(GAME_STATE_OVER);
      }
      if (c == total_tap) { //時間跑到遊戲結束
            if (level == 1) {
                  CAudio::Instance()->Stop(AUDIO_ONE);      // 停止 MIDI
            }
            else if (level == 2) {
                  CAudio::Instance()->Stop(AUDIO_TWO);      // 停止 MIDI
            }
            else if (level == 3) {
                  CAudio::Instance()->Stop(AUDIO_THREE);    // 停止 MIDI
            }
            else if (level == 4) {
                  CAudio::Instance()->Stop(AUDIO_FOUR);     // 停止 MIDI
            }
            else if (level == 5) {
                  CAudio::Instance()->Stop(AUDIO_FIVE);     // 停止 MIDI
            }
            else if (level == 6) {
                  CAudio::Instance()->Stop(AUDIO_SIX);      // 停止 MIDI
            }
            getscore = (hits_left.GetInteger() * 100 / (total_tap+5)); //結算獲得的分數
            c = 0;
            GotoGameState(GAME_STATE_PASS);//到gamestatepass
      }
}
test1.SetIsShow(false);
if (start > everytime[0]) //到第一個時間點才顯示音符
      c_practice.OnShow();
if (start > everytime[28] - 100 && level == 2) { //level2的特別畫面
      xx1.SetTopLeft(310, 220);
      xx1.ShowBitmap();
      xx2.SetTopLeft(370, 220);
      xx2.ShowBitmap();
```

```
            }
            hand.SetTopLeft(640 - 479, 480 - 75);
            hand.OnShow();
            if (noise.IsShow()) {
                noise.OnShow();
            }
            noise.SetIsShow(false);
            corner.SetTopLeft(0, 0);
            corner.SetTopLeft(SIZE_X - corner.Width(), SIZE_Y - corner.Height());
        }
}
```

## mygame.h

```
/*
 * mygame.h: 本檔案儲遊戲本身的class的interface
 * Copyright (C) 2002-2008 Woei-Kae Chen <wkc@csie.ntut.edu.tw>
 *
 * This file is part of game, a free game development framework for windows.
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 *
 *     2004-03-02 V4.0
 *      1. Add CGameStateInit, CGameStateRun, and CGameStateOver to
 *         demonstrate the use of states.
 *   2005-09-13
 *      Rewrite the codes for CBall and CEraser.
 *   2005-09-20 V4.2Beta1.
 *   2005-09-29 V4.2Beta2.
 *   2006-02-08 V4.2
 *      1. Rename OnInitialUpdate() -> OnInit().
 *      2. Replace AUDIO_CANYON as AUDIO_NTUT.
 *      3. Add help bitmap to CGameStateRun.
 *   2006-09-09 V4.3
 *      1. Rename Move() and Show() as OnMove and OnShow() to emphasize that they are
 *         event driven.
 *   2008-02-15 V4.4
 *      1. Add namespace game_framework.
 *      2. Replace the demonstration of animation as a new bouncing ball.
 *      3. Use ShowInitProgress(percent) to display loading progress.
*/
#include "CEraser.h"
#include "CBall.h"
#include "CBouncingBall.h"
#include "ClongGray.h"
#include "stage1.h"
#include "stage2.h"
#include "stage3.h"
#include "stage4.h"
#include "stage5.h"
#include "stage6.h"
namespace game_framework {
      enum AUDIO_ID {                    // 定義各種音效的編號
            AUDIO_DING,                  // 0
            AUDIO_LAKE,                  // 1
            AUDIO_NTUT,                  // 2
            AUDIO_CLICK,
            AUDIO_TEST,
            AUDIO_ONE,                   //關卡音樂1~6
            AUDIO_TWO,
            AUDIO_THREE,
            AUDIO_FOUR,
            AUDIO_FIVE,
            AUDIO_SIX
```

```
};
class CBouncingBall;
class CPractice {
public:
	CPractice();
	void LoadBitmap();
	void OnMove(int );
	void OnShow();
	void OnJump();
	void OnJump2();
	int getX();
private:
	CMovingBitmap pic;
	int x, y;
};
/////////////////////////////////////////////////////////////////////////////
// 這個class為遊戲的遊戲開頭畫面物件
// 每個Member function的Implementation都要弄懂
/////////////////////////////////////////////////////////////////////////////
class CGameStateInit : public CGameState {
public:
	CGameStateInit(CGame *g);
	void OnInit();                                  // 遊戲的初值及圖形設定
	void OnBeginState();                            // 設定每次重玩所需的變數
	void OnKeyUp(UINT, UINT, UINT);             // 處理鍵盤Up的動作
	void OnLButtonDown(UINT nFlags, CPoint point);  // 處理滑鼠的動作
protected:
	void OnShow();                                        // 顯示這個狀態的遊戲畫面
	void OnMove();
private:
	CAnimation logo;                                // csie的logo
	CMovingBitmap title;
	CMovingBitmap BG;
	ClongGray about;
	CAnimation title1;
	int x,y;
};
class CGameStateStage : public CGameState {
```

```
public:
      CGameStateStage(CGame* g);
      void OnInit();                                    // 遊戲的初值及圖形設定
      void OnBeginState();                              // 設定每次重新載入所需的變數
      void OnKeyUp(UINT, UINT, UINT);                 // 處理鍵盤Up的動作
      void OnLButtonDown(UINT nFlags, CPoint point);   // 處理滑鼠的動作
protected:
      void OnShow();                                          // 顯示這個狀態的遊戲畫面
      void OnMove();
private:
      CMovingBitmap bg;                                 //背景圖片
      CAnimation stage11;                                     //關卡1~3的動畫
      CAnimation stage12;
      CAnimation stage13;
      CMovingBitmap select;
      CPractice test11;                                 //選擇關卡的圖示
      int x, y;                                               //選擇關卡的座標
};
class CGameStateStage2 : public CGameState {
public:
public:
      CGameStateStage2(CGame* g);
      void OnInit();                                    // 遊戲的初值及圖形設定
      void OnBeginState();                              // 設定每次重新載入所需的變數
      void OnKeyUp(UINT, UINT, UINT);                 // 處理鍵盤Up的動作
      void OnLButtonDown(UINT nFlags, CPoint point);  // 處理滑鼠的動作
protected:
      void OnShow();                                          // 顯示這個狀態的遊戲畫面
      void OnMove();
private:
      CMovingBitmap bg;                                 //背景圖片
      CMovingBitmap stage11;                                  //關卡4~6的圖片
      CMovingBitmap stage12;
      CMovingBitmap stage13;
      CMovingBitmap select;
      CPractice test11;                                 //選擇關卡的圖示
      int x, y;                                               //選擇關卡的座標
};
```

```
class CGameStateStore : public CGameState {
public:
      CGameStateStore(CGame* g);
      void OnInit();                                        // 遊戲的初值及圖形設定
      void OnBeginState();                                  // 設定每次載入所需的變數
      void OnKeyUp(UINT, UINT, UINT);                   // 處理鍵盤Up的動作
      void OnLButtonDown(UINT nFlags, CPoint point);    // 處理滑鼠的動作
protected:
      void OnShow();                                            // 顯示這個狀態的遊戲畫面
      void OnMove();
private:
      CMovingBitmap bg;                                     //背景圖片
      CMovingBitmap store1;                                     //關卡1~3的動畫
      CMovingBitmap store2;
      CMovingBitmap store3;
      CMovingBitmap select;
      CPractice test11;                                     //選擇關卡的圖示
      int x, y;                                                 //選擇關卡的座標
};
/////////////////////////////////////////////////////////////////////////////
// 這個class為遊戲的遊戲執行物件，主要的遊戲程式都在這裡
// 每個Member function的Implementation都要弄懂
/////////////////////////////////////////////////////////////////////////////
class CGameStateRun : public CGameState {
public:
      CGameStateRun(CGame *g);
      ~CGameStateRun();
      void OnBeginState();                                  // 設定每次重玩所需的變數
      void OnInit();                                        // 遊戲的初值及圖形設定
      void OnKeyDown(UINT, UINT, UINT);
      void OnKeyUp(UINT, UINT, UINT);
      void OnLButtonDown(UINT nFlags, CPoint point);  // 處理滑鼠的動作
      void OnLButtonUp(UINT nFlags, CPoint point);    // 處理滑鼠的動作
      void OnMouseMove(UINT nFlags, CPoint point);    // 處理滑鼠的動作
      void OnRButtonDown(UINT nFlags, CPoint point);  // 處理滑鼠的動作
      void OnRButtonUp(UINT nFlags, CPoint point);    // 處理滑鼠的動作
protected:
      void OnMove();                                            // 移動遊戲元素
```

```
	void OnShow();                                                  // 顯示這個狀態的遊戲畫面
private:
	CMovingBitmap	background;	// 背景圖
	CMovingBitmap	bg;			//關卡背景1~6
	CAnimation	bg1;
	CMovingBitmap	bg2;
	CAnimation	bg3;
	CAnimation	bg4;
	CMovingBitmap	bg5;
	CMovingBitmap	help;		// 說明圖
	CMovingBitmap	test;
	CMovingBitmap	corner;		// 角落圖
	CMovingBitmap	hand1;
	CMovingBitmap	xx1;
	CMovingBitmap	xx2;
	ClongGray	noise;
	ClongGray	hand2;
	CInteger	hits_left;	// 分數
	CInteger	num;
	CInteger	clocktime;
	CMovingBitmap long_gray;	//案空白鍵會出現的長條
	CPractice c_practice;		//音符
	ClongGray test1;
	vector<int> everytime;		//時間列表
	vector<int> location;		//位置列表
	vector<int> jump_time_list;	//跳動次數列表
	bool isClick;			//是否在判斷分數範圍及有沒有獲得分數
	bool isGet;
	CAnimation hand;		//關卡內部動畫
	CMovingBitmap bar;
	CAnimation background1;
	CAnimation tempo;
	int beat_x = 1;			//時間陣列的index
	int c = 0;	//遊戲總時間位置
	vector<int> clap; //第7拍時間
	vector<int> first;	//第1拍時間
	int total_tap;		//總分
	int jump_time=2;  //預設跳動數
	};
	/////////////////////////////////////////////////////////////////////////////
	// 這個class為遊戲的結束狀態(Game Over)
	// 每個Member function的Implementation都要弄懂
	/////////////////////////////////////////////////////////////////////////////
	class CGameStateOver : public CGameState {
	public:
		CGameStateOver(CGame *g);
		void OnBeginState();							// 設定每次重玩所需的變數
		void OnInit();
	protected:
		void OnMove();									// 移動遊戲元素
		void OnShow();									// 顯示這個狀態的遊戲畫面
	private:
		int counter;	// 倒數之計數器
	};
	class CGameStatePass : public CGameState {
	public:
		CGameStatePass(CGame* g);
		void OnBeginState();							// 設定每次重玩所需的變數
		void OnInit();
	protected:
		void OnMove();									// 移動遊戲元素
		void OnShow();									// 顯示這個狀態的遊戲畫面
	private:
		int counter;	// 倒數之計數器
	};
}
```

## stage1.h

```
namespace game_framework {
	//儲存關卡1資訊
	class stage1
	{
	public:
		int total_tap = 44;
		int clap[44] =
{ 11008,13416,15823,17111,18266,20691,23069,25519,26706,27896,29349,30570,31792,32951,34207,35364,36555
,37780,38968,40120,41313,42538,43761,44917,45969,47365,48622,49776,51032,52219,53411,54535,55728,56917,
58110,59506,60587,61908,62962,64253,66323,67518,68676,72779 };
		int first[44] = { 9512, 11955, 14295, 16454, 17744, 19168, 21541, 23916, 26083, 27299, 
28757, 30077, 31194, 32413, 33601, 34818, 35999, 37258, 38408, 39592, 40812, 41962, 43251, 44432, 
45619, 46809, 47997, 49213, 50397, 51623, 52816, 54031, 55215, 56434, 57620, 58942, 60131, 61419, 
62572, 63961, 66026, 67144, 68366, 71924 };

	protected:
	};
}
```

## stage2.h

```
namespace game_framework {
	//儲存關卡2資訊
	class stage2
	{
	public:
		int total_tap = 23;
		int clap[44] = 
{ 14127,16740,19441,22086,24788,28755,31436,34077,36819,39453,42059,44599,46464,50021,52794,55440,57100
,60791,63428,66096,67751,71441,73166 };
		int first[44] = 
{ 12105,14778,17448,20092,22798,26932,29403,32084,34793,37438,40051,42798,45028,48310,50775,53413,55342
,58769,61406,64088,66015,69595,71864 };

	protected:
	};
}
```

## stage3.h

```
namespace game_framework {
	//儲存關卡3資訊
	class stage3
	{
	public:
		int total_tap = 44;
		int clap[44] =
{ 18006,20749,23395,26112,28617,31358,33961,36702,39303,41971,44677,47350,50015,52720,55433,58036,71374
,74046,76764,79431,103425,106000,108745,111417,113989,116731,119334,122041,124578,127388,129998,132639,
135316,138155,140763,143437 };
		int first[44] =
{ 15928,18735,21381,24058,26630,29412,32016,34688,37329,40034,42640,45381,48022,50665,53336,56071,69560
,72036,74677,77355,101290,104096,106698,109375,112015,114695,117406,120015,122721,125331,127294,130645,
133313,136021,138725,141364 };

	protected:
	};
}
```

## stage4.h

```
namespace game_framework {
	//儲存關卡4資訊
	class stage4
	{
	public:
		int total_tap = 59;
		int clap[59] =
{ 8737,10291,11915,13471,15093,16649,18308,19873,21466,23089,24715,26305,27963,29519,31111,32664,34323,
35881,37509,39069,40727,42284,43905,45530,47118,48740,50365,51923,53519,55077,56698,58285,71175,72739,7
4337,75892,77518,79147,80740,82329,83921,85474,87038,88660,90319,91949,93473,95092,96676,98367,99929,10
1523,103177,104764,106354,107909,109496,111224,112781 };
		int first[59] =
{ 8012,9504,11093,12483,14275,15903,17467,18684,20610,22140,23867,25224,27080,28681,30234,31553,33483,3
5008,36634,38231,39859,41381,43040,44354,46322,47884,49474,50895,52622,53979,55709,57169,70430,71956,73
380,75044,76395,78250,79570,81497,82823,84623,85938,87871,89123,90879,92332,94095,95582,97443,98834,100
530,101954,103748,105138,107069,108050,110253,111907 };
		protected:
	};
}
```

## stage5.h

```
namespace game_framework {
	//儲存關卡5資訊
	class stage5
	{
	public:
		int total_tap = 114;
		int first[114] =
{ 12420,15098,17798,20510,23257,24645,26001,27365,28658,30079,31506,32802,34154,35545,36835,38225,39547
,40973,42299,43721,45073,45818,46496,47177,47853,48528,49201,49882,50596,51274,51922,52634,53313,53985,
54663,55337,56049,56726,57438,58083,58760,59476,60155,60800,61512,62156,62831,63513,64191,64906,65588,6
6266,66943,68330,69652,71040,72395,73755,75080,76500,77795,78541,79218,79930,80605,81283,81962,82608,83
320,83962,84673,85355,86033,86708,87416,88129,88671,89150,89487,89825,90128,90469,90773,91149,91521,918
27,92166,92507,92814,93117,93422,93728,94066,94442,94781,95120,95458,95797,96135,96473,96777,97116,9745
3,97760,98102,98408,98813,99150,100000,102404,105150,106220,107190,109000 };
		int clap[114] =
{ 13710,16358,19103,21779,23822,25241,26631,27954,29348,30742,32094,33412,34832,36182,37542,38870,40255
,41582,43013,44308,45430,46106,46782,47459,48135,48811,49488,50134,50844,51489,52165,52876,53592,54263,
54941,55615,56293,57008,57683,58366,59009,59690,60368,61078,61722,62402,63045,63793,64472,65152,65829,6
6506,67689,68872,70226,71580,72974,74294,75650,77072,78116,78725,79444,80125,80805,81522,82237,82918,83
562,84238,84952,85667,86308,87022,87697,88307,88782,89157,89565,89939,90279,90616,90955,91262,91603,919
41,92281,92624,92927,93220,93540,94848,94206,94580,94900,95240,95578,95917,96255,96593,96897,97236,9757
3,97883,98222,98553,98923,99258,101174,103665,106406,107722,109022,110000 };
	protected:
	};
}
```

## stage6.h

```
namespace game_framework {
	//儲存關卡4資訊
	class stage6
	{
	public:
		int total_tap = 118;
		int first[118] =
{ 14297,15922,17540,19234,20834,22463,24091,25786,27408,29067,30696,32457,34083,35637,37295,38992,40678
,42342,43967,45594,47285,48911,50538,52266,53857,55556,57176,58841,60498,62234,63928,65521,67208,68870,
70507,72204,73801,75425,77087,78705,80395,82089,83725,85379,87004,88734,90352,91879,95337,97031,98588,1
00318,101946,103536,105197,106889,108511,110136,111829,113522,115113,116801,118594,120150,121807,123470
,125131,126787,128440,130139,131770,133358,135087,136680,138342,140001,141659,143318,144945,146585,1615
37,162419,163234,164011,164824,165674,166522,167369,168244,169057,169869,170714,171526,171966,172407,17
2814,173219,173590,173996,174369,175505,176435,178095,179720,181384,183007,184734,186361,187989,189617,
191273,192940,194603,196324,197917,199476,201203,202867 };
            int clap[118] =
{ 15079,16670,18301,19992,21586,23214,24938,26532,28227,29892,31522,33183,34846,36439,38135,39794,41459
,43152,44778,46410,48040,49799,51359,53058,54717,56374,57970,59664,61256,62984,64681,66307,67932,69629,
71252,72947,74613,76276,77939,79607,81206,82935,84596,86249,87914,89541,91169,92774,96135,97798,99392,1
01053,102714,104379,106047,107713,109367,110995,112614,114311,115871,117672,119298,120990,122615,124275
,125871,127538,129234,130825,132488,134187,135889,137618,139177,140842,142505,144098,145827,147384,1619
87,162835,163651,164467,165276,166053,166832,167681,168595,169406,170288,170999,171747,172219,172692,17
3100,173506,173948,174354,175004,176012,177164,178894,180488,182189,183882,185544,187171,188765,190424,
192116,193775,195469,197030,198723,200414,201974,203666};
      protected:
      };
}
```

## ClongGray.h

```
namespace game_framework {
      //節奏醫生中按空白鍵會跑出來的物件
      class ClongGray
      {
      public:
            ClongGray();
            bool IsAlive();                                                          // 是否活著
            bool IsShow();
            void LoadBitmap(int x);                                                  // 載入圖形
            //void OnMove();                                                         // 移動
            void OnShow();                                                           // 將圖形貼到
畫面
            void SetXY(int nx, int ny);                                        // 設定座標
            void SetIsAlive(bool alive);                                 // 設定是否活著
            void SetIsShow(bool show);
            //void SetDelay(int d);
      protected:
            CMovingBitmap bmp;                    // 圖
            //CMovingBitmap bmp_center;   // 圓心的圖
            int x, y;                             // 圖的座標
```

```
		bool is_alive;				// 是否活著
		bool is_show;
	};
}
```

## CloneGray.cpp

```
#include "stdafx.h"
#include "Resource.h"
#include <mmsystem.h>
#include <ddraw.h>
#include "audio.h"
#include "gamelib.h"
#include "CEraser.h"
#include "CBall.h"
#include "ClongGray.h"
namespace game_framework {
	ClongGray::ClongGray() {
		is_alive = true;
		x = y = 0;
	}
	bool ClongGray::IsAlive() {
		return is_alive;
	}
	bool ClongGray::IsShow() {
		return is_show;
	}
	void ClongGray::LoadBitmap(int x) {
		bmp.LoadBitmap(x);
	}
	void ClongGray::SetIsAlive(bool alive)
	{
		is_alive = alive;
	}
	void ClongGray::SetIsShow(bool show) {
		is_show = show;
	}
	void ClongGray::SetXY(int nx, int ny)
	{
		x = nx; y = ny;
```

```
        }
        void ClongGray::OnShow()
        {
                if (is_alive) {
                        bmp.SetTopLeft(x, y);
                        bmp.ShowBitmap();
                }
        }
}
```