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一、簡介

1.動機

我們從寒假開始構思 OOP 實習題目，考慮範圍涵蓋網頁 FLASH 遊戲及任天堂經典遊戲。我們希望選定的題目能夠支援 2P 模式以增加趣味性並且能夠充分發揮 OOP 物件導向的精神以便讓我們在修習完這門 OOP 物件導向實習課程能夠獲得良好的學習成果。

Chip 'n Dale Rescue Rangers 這款遊戲能夠滿足我們的需求，並且具有鮮明的遊戲特色。不僅是單純俱有玩家與怪物間的互動，更有玩家跟玩家之間的互動關係。因此，我們決定選擇 Chip 'n Dale Rescue Rangers 作為此次課程的主題。

2.分工

學習前期主要以共同開發程式碼為主，後期分工越趨專業。

遊戲分工共分為三項，以下分別詳述：

- 遊戲圖檔
  - 謝宗廷：遊戲截圖、圖片去背
  - 陳科銘：圖片調整大小、背景組合與調整、背景裁切
- 遊戲音效
  - 謝宗廷：遊戲音樂擷取、音樂剪接
  - 陳科銘：音效尋找
- 程式設計
  - 謝宗廷 ：
    - 音效控制
    - 人物控制、動畫處理
    - 分數顯示
    - STATE 架構

- 陳科銘：
  - 怪物 AI 設計
  - 地圖管理
  - 轉場特效
  - 遊戲物件設計
  - 地圖編輯器模式

二、遊戲介紹

1.遊戲說明

Chip 'n Dale Rescue Rangers 是一款經典超任遊戲。遊戲是以雙向 2D 捲軸方式呈現。玩家可以扮演奇奇與蒂蒂開始救援隊的冒險之旅。

- 遊戲開始畫面可以選擇玩家人數及扮演角色

  以左右方向鍵選擇、Enter 鍵為確認，按下空白鍵可以查看遊戲說明

- 1P 模式

  1P：上下左右：方向鍵　A 鍵：Z　B 鍵：X　查看分數：TAB

- 2P 模式

  1P：上下左右：方向鍵　A 鍵：N　B 鍵：M

  2P：上下左右：WASD　A 鍵：Z　B 鍵：X　查看分數：TAB

- 地圖編輯器模式

  上下左右：方向鍵　切換模式：TAB

  切換物件：Z , X　放置：ENTER

  儲存：ESC (若不儲存而離開，所做的更動只有一次性的效果)

- 密技

  密技只支援 1P 模式，且無分大小寫。

  - GOD：切換到 GOD 模式，取消物件和怪物對人物的互動關係，人物可以騰空飛翔並且為無敵狀態。
  - EDIT　　：切換地圖編輯器模式 / 一般模式
  - NTUT：遵循傳統將 BOSS 頭像更換為老師的頭像
  - 9999：人物生命值上限由 3 改為 9999

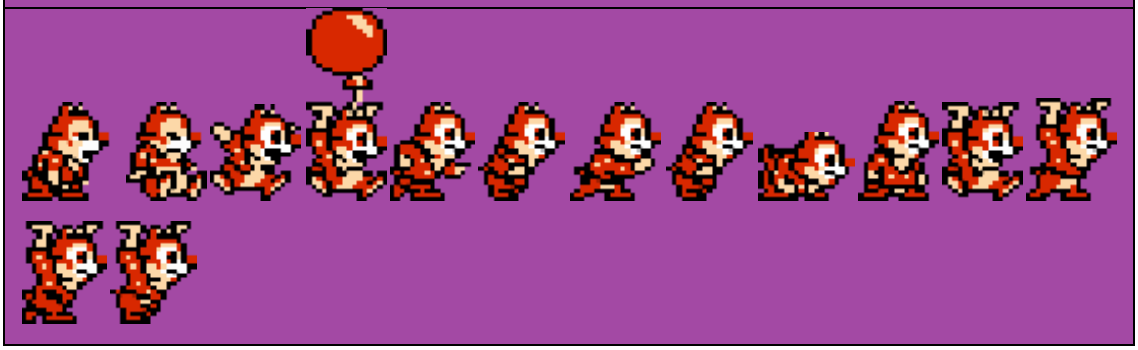
- 快捷鍵

  - Ctrl + Q：暫停
  - Ctrl + F：切換全螢幕 / 視窗模式

2.遊戲圖形

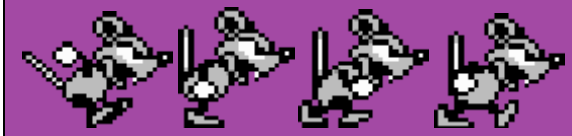
Chip

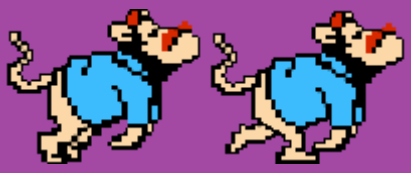
Dale



MachineDog

Mouse



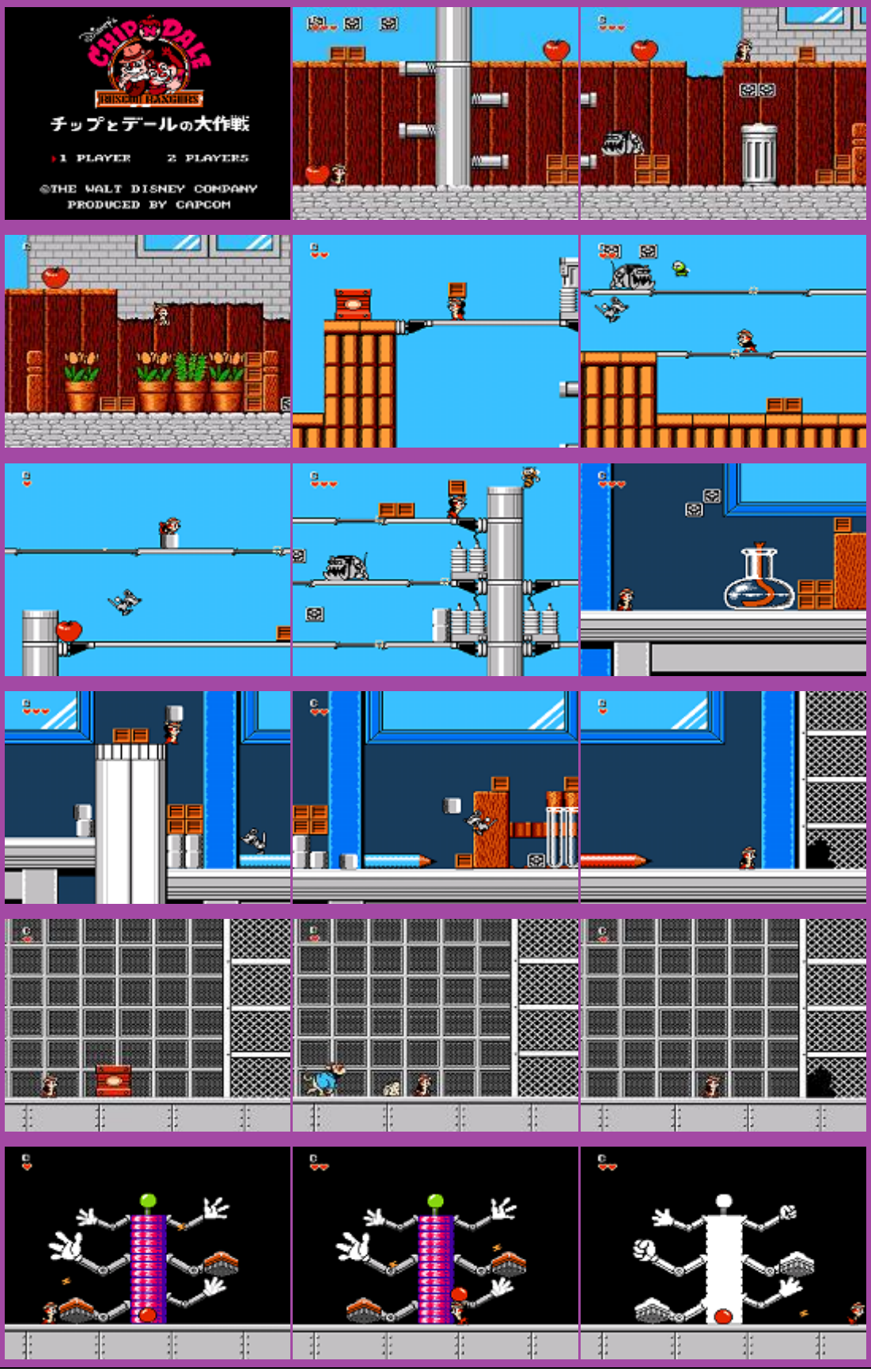
Greedy	Wasp	Explosion
		

Centipede

Angel	Electric
	

一般物件

單人遊戲截圖


CHIP 'N DALE
RESCUE RANGERS
チップとデールの大作戦
1 PLAYER
2 PLAYERS
©THE WALT DISNEY COMPANY
PRODUCED BY CAPCOM

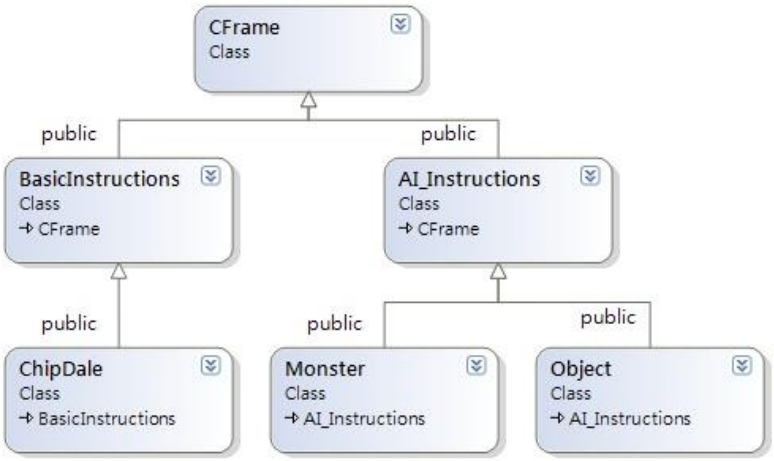
雙人遊戲截圖

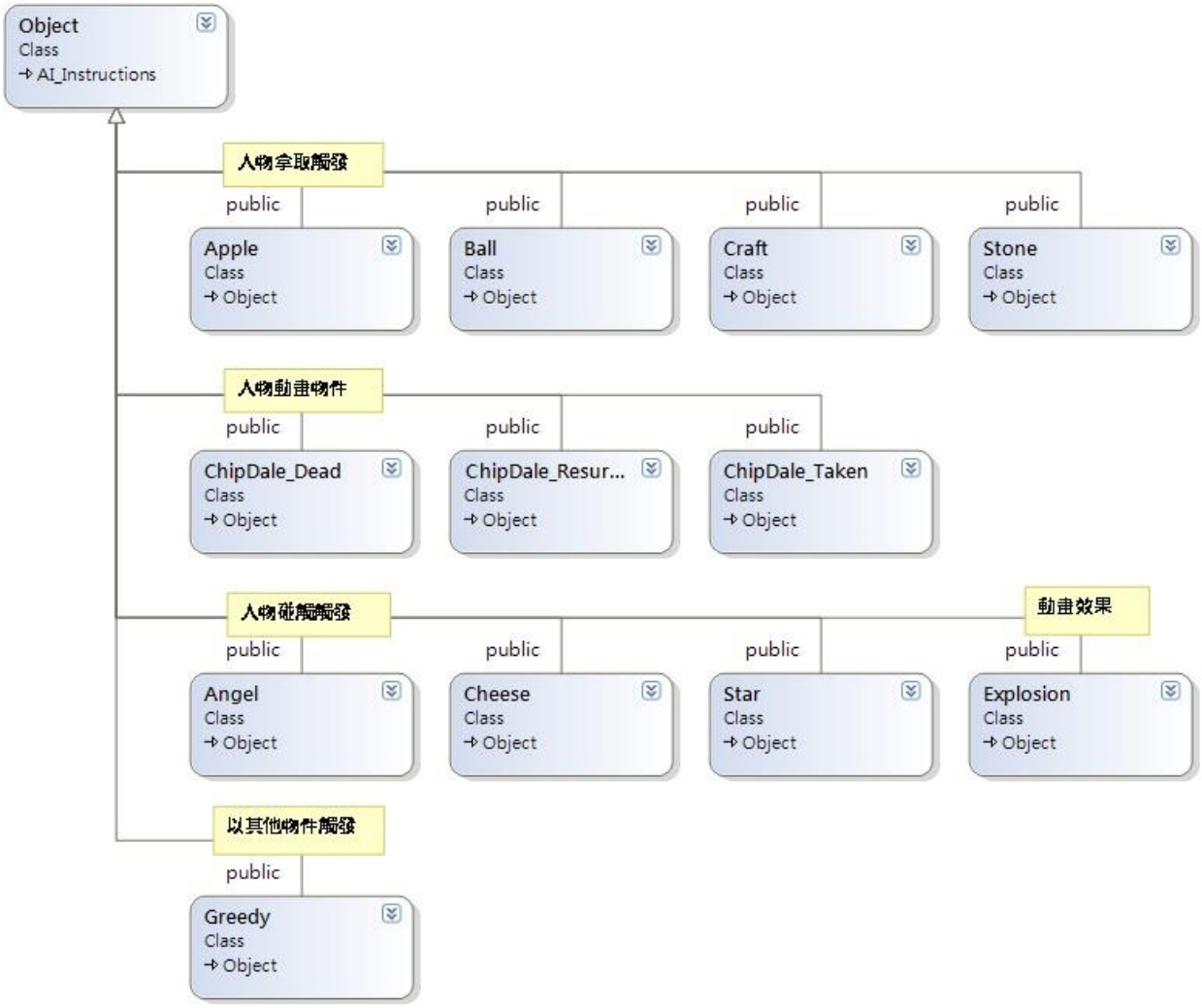
3.遊戲音效

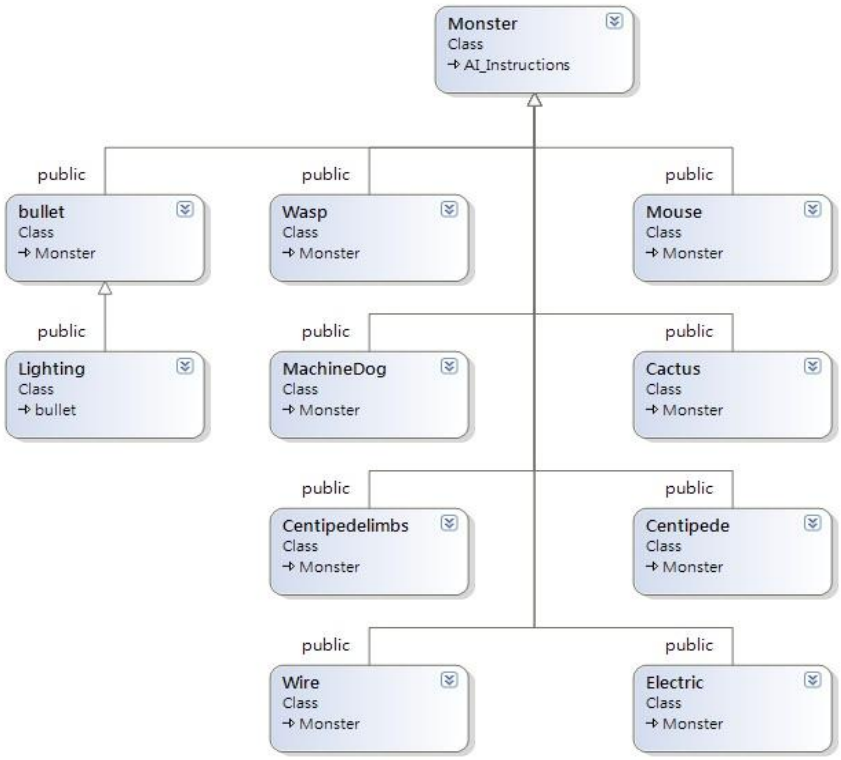
音效	來源
遊戲開場音樂	原作截取
關卡 A 背景音樂(A 段)	原作截取
關卡 A 背景音樂(B 段)	原作截取
關卡 A BOSS 音樂	原作截取
地圖編輯器模式音樂	Rag Time On the Rag (黃金傳說料理背景音樂)
遊戲結束音樂	原作截取
按鈕音效	網路搜尋
死亡音效	原作截取
過關音效	原作截取

三、程式設計

1.程式架構


CFrame
Class
public
public
BasicInstructions
Class
→ CFrame
AI_Instructions
Class
→ CFrame
public
public
public
ChipDale
Class
→ BasicInstructions
Monster
Class
→ AI_Instructions
Object
Class
→ AI_Instructions


Object
Class
→ AI_Instructions
人物拿取觸發
public
public
public
public
Apple
Class
→ Object
Ball
Class
→ Object
Craft
Class
→ Object
Stone
Class
→ Object
人物動畫物件
public
public
public
ChipDale_Dead
Class
→ Object
ChipDale_Resur...
Class
→ Object
ChipDale_Taken
Class
→ Object
人物碰觸觸發
動畫效果
public
public
public
public
Angel
Class
→ Object
Cheese
Class
→ Object
Star
Class
→ Object
Explosion
Class
→ Object
以其他物件觸發
public
Greedy
Class
→ Object

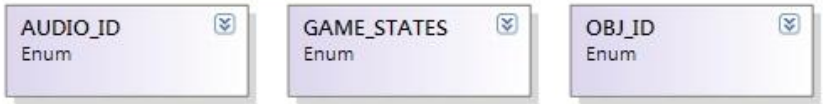


此部分為Game Framework 4.6遊戲架框 (CAudio 作了大幅度修改)

地圖相關類別

singleton 類別

遊戲相關編號



2.程式類別

類別名稱	.h 檔行數	.cpp 檔行數	說明
CGameStateInit	12	70	遊戲的開頭畫面
CGameStateRun	29	432	遊戲的執行主要物件
CGameStateBonus	10	19	遊戲的獎勵狀態
CGameStateOver	11	43	遊戲的結束畫面
CAudio	15	86	音效介面及掌管遊戲音效控制
ToolCDC	24	96	提供介面處理畫面淡出淡入
GameMapEdit	23	148	地圖編輯器
GameScore	16	75	遊戲計分器
MapManage	38	442	地圖移動及碰撞系統
CFrame	24	99	基礎框架物件(抽象類別)
AI_Instructions	16	88	AI 指令集(設計怪物 AI)
BasicInstructions	20	245	基本指令集(按鍵觸發)
ChipDale	69	609	遊戲人物
Object	20	77	遊戲物件(抽象類別)
ChipDale_Dead	14	81	人物死亡動畫物件
ChipDale_Resurrect	11	59	人物復活狀態物件
ChipDale_Taken	11	69	人物被抓狀態物件
Angel	13	94	小天使(人物觸發後無敵)
Apple	10	49	蘋果物件(可拿起)
Ball	11	111	球物件(可拿起)
Cheese	10	53	起司物件(可吃，觸發 Greedy)
Craft	12	65	小箱子(可拿起)

Explosion	11	82	爆炸物件(觸發後 new 新物件)
Greedy	13	79	貪婪老鼠(觸發後在地圖鑽洞)
Star	10	40	星星(分數物件，可吃)
Stone	17	126	石頭(可拿起)
Monster	20	75	遊戲怪物(抽象類別)
Bullet	9	32	子彈(抽現類別)
Cactus	8	28	仙人掌
Centipede	16	93	蜈蚣本體(第一關 BOSS)
Centipedelimbs	14	125	蜈蚣四肢
Electric	13	44	電(本體為 Wasp)
Lighting	8	22	閃電(繼承子彈)
MachineDog	10	102	機器狗
Mouse	11	144	老鼠
Wire	13	52	線圈(界定 Electric 移動範圍)
Wasp	11	86	虎頭蜂
總計	603	4240	

3.程式技術

- 移動運算帶動二維螢幕
  - 建立 10x10 的二維陣列(MapXY) ，其 Index 以地圖格座標運算。此陣列記錄地圖移動路線，預設值為 0。螢幕需要帶動的地方則須先轉換成地圖格座標並在 MapXY 對應地方的填入介於 1~15 之數字。
  - MapXY 陣列每格所代表的意義是一張螢幕，大小為 640x480。換言之，每個物件的絕對座標介於(0,0)~(6400x4800,6400x480)。
  - 絕對座標(x,y) 轉地圖格座標(Mx,My)的算法為

    Mx = x / 640 , My = y / 480 。
  - 螢幕顯示主要以絕對座標進行運算。考量硬體配備，一次最多只顯示四張地圖(左上、左下、右上、右下)。根據螢幕左上角之絕對座標計算出需顯示之地圖，若對應之 MapXY 陣列值為 0 或地圖格座標超出 10x10 的範圍則不顯示該背景圖片。
  - MapXY 所記錄的地圖移動方向值介於 0~15，編碼方式以 bit 為單位。使用 1,2,4,8 進行編碼，其代表意義分別為，上、下、左、右。Ex：(5&1==1)為 true，以及 (5&4==4)為 true，所以在 MapXY 填入 5 表示該處可以向上及向左移動。

    如此一來，不需要重複寫八個 if 判斷，只需得到對應的 MapXY 值就可以得知 MapXY 的移動方向。
- 物件資訊建立
  - 物件資訊主要由兩種資料組成，物件格座標-(MapObjXY) 與 碰撞資料陣列表-(Obstacle)組成。

- 物件格座標每單位為 8x3，每格代表此物件在絕對座標系統上的位置。物件格座標(ox,oy)轉絕對座標(x,y)之轉換方式為

  x=ox*8 ,y=oy*3。

- 碰撞資料表記錄物件格座標體系的物件資訊，每格儲存物件代碼、以及該物件整體的左上角格座標。其運算方式為

  [(物件代碼)*(2^22)+(oy+1)*(2^11)+(ox+1)] 。

  記錄左上角格座標是為了判斷物件與人物碰撞之後的後續處理動作。採用這樣的編碼能讓傳值與儲存更為方便，一個 int 就記錄所有物件資訊。

- 由於物件格座標介於(0,0)~(640*10/8,480*10/3), 記錄與儲存物件碰撞表消耗資源過大。所以我們讀取採用讀寫檔的方式進行，並且先從 MapXY 判斷該位置是否有地圖路線。只有大於零的情況，才從 Binary 檔案中讀入或寫入資訊。

- CFrame Class
  - 定義一個物件的框架，有記錄最基本的 wx,wy,width,height。
  - FixXY 函式，做出相對運動的效果。當地圖被帶動後，此函式會依據地圖移動的方向與距離，對人物、物件、怪物做適當的修正。
  - IfCollision 函式，傳入 twx,twy,twidth,theight，傳回是否與自己有發生碰撞。由傳入的的資訊算出四個角的座標，與自己做四次判斷，如果有任何一次點座標在自己的方框內，則傳回 true 否則還要再判斷自己的四個角與對方是否在他方框內，如果有則傳回 true；沒有則傳回 false。
- AI_Instruction 提供基本移動指令集以便於設計 Object 和怪物 AI。

- Object Class

  未被觸發之前的物件都是以資料的形式儲存在 Map 碰撞表，觸發之後會轉為 object class。

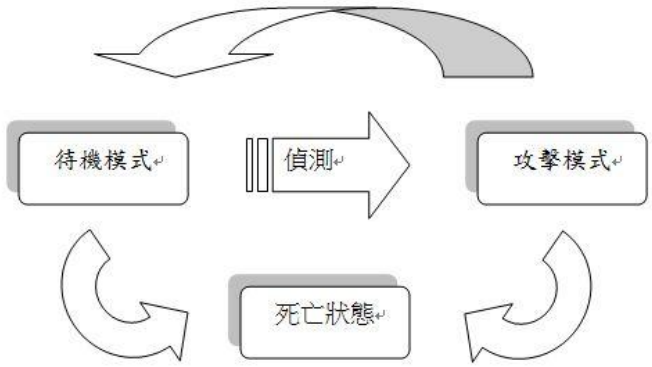
  特性：Object 都具有自己的主人(Owner)

  每個物件都有基本的變數 Direct, CanAttackMode, NowAct。

  - Direct 變數，記錄物件該往那個方向移動，一樣採用 1,2,4,8 編碼。Object 會自動依據 Direct 來呼叫相對應的 AI_Instruction 指令。
  - CanAttackMode 表示此物件可以攻擊的對象，搭配 NowAct 以產生物件的行為模式。
    - CanAttackMode = 0 => 任何人 + 怪物
    - CanAttackMode = 1 => 除了自己的擁有者外
    - CanAttackMode = 2 => 不攻擊任何人跟怪物
    - CanAttackMode = 3 => 只攻擊怪物
  - NowAct 記錄物件的狀態
    - NowAct = 0 => 停屍間。

      直接操作 delete 物件指標若有其他物件參考此物件則會有程式崩潰的危險。加入停屍間的緩衝區可以避免此情況。

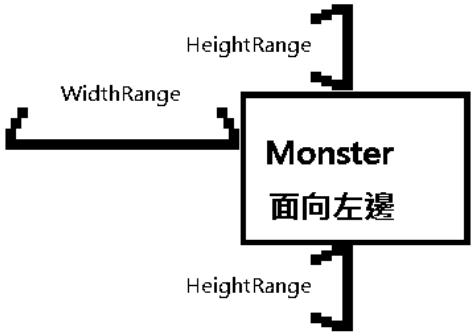
      在 CGameStateRun 中如果發現 NowAct = 0 再統一做 delete 指標的動作，並把參考指標轉向 NULL。
    - NowAct = 1 => 表示拿在人物手中。
    - NowAct = 2 or 4 => 表示此物體正處於運動狀態。其差別為 NowAct = 2 物件顯示順序在怪物之前 NowAct = 4 顯示在怪物之後。
    - NowAct = 3 => 表示此物件靜止在地上，該狀態會把物件加入物件碰撞表中進行碰撞判斷。

- Monster Class
  - 

  - 怪物使用螢幕格座標(wx,wy)進行運算。一開始建構時，會由目前螢幕位置去換算怪物的相對螢幕位置，並把 NowAct 設為 0，而遊戲在執行的時候 Monster.OnMove()每次都會呼叫 FixXY()，當怪物自己發現自己的 wx ,wy 皆在 640x480 內的話，則會把 NowAct 設為 1。
  - 怪物類別中提供 Detect 函式給怪物偵測人物的運算。呼叫時傳入 *player[]、WidthRange、HeightRange，並與怪物面向方向運算即可判斷並傳回離怪物最近的人物指標並傳回 xy 座標及距離，若沒有則傳回 NULL。

    P.S. ：WidthRange < 0 則偵測怪物前後半個螢幕寬，而 HeightRange < 0 則偵測怪物目前所在地圖格座標中的一張螢幕高度範圍。

    Ex ：



- NowAct = 0 => 怪物尚未真實出現在遊戲中。
- NowAct = 1 => 表示怪物活起來，並開始有各種行為。
- NowAct 1~99 => 可以自行設計怪物。

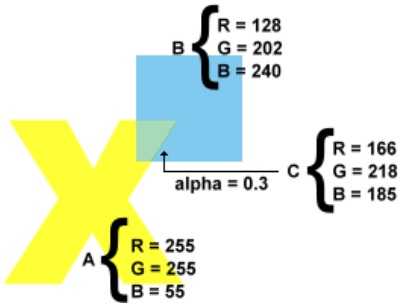
  Ex：NowAct 為多少時，會有甚麼樣的動作？並呼叫相對應的 AI_Instruct 函式。
- NowAct 100 , 101 => 可自行設計怪物死亡之後的該做的事情。100 為怪物右邊被擊中死亡，101 為怪物左邊被擊中死亡。
- NowAct = -1 => 表示怪物死去。

➢ ToolCDC

Static 介面以提供 fade in、fade out 轉場效果。

以半透明演算法搭配巨集函式實作 alpha blending 函式。

- 半透明演算法



A = 原底圖
B = 遮罩圖
C = 新成像圖
alpha = 透光率(0 ≦ alpha ≦ 1, 0為全遮住, 1為全透明)
rgb = red, green, blue
Cr = Br × (1 - alpha) + Ar × alpha
Cg = Bg × (1 - alpha) + Ag × alpha
Cb = Bb × (1 - alpha) + Ab × alpha

- ALPHA(alpha , i , j)巨集函式

```
(((unsigned long)(((color[j][i]>>16)&0xFF)*alpha)<<16) |
((unsigned long)(((color[j][i]>>8)&0xFF)*alpha)<<8) |
((unsigned long)(((color[j][i])&0xFF)*alpha)))
```

➢ 利用父類別的指標來操作子類別的指標，來達到操作多型函式。

四、結語

1.問題及解決方法

問題	解決辦法
Class 越來越龐大。	使用繼承來解決，把相同的概念抽出來，寫成 Class 並繼承他。
用 switch 實做多型，case 越來越多寫到有點煩。	用父類別指標操作子類別指標，並配合 virtual function 做出 OOP 的多型技巧。
在 Wire Class 中宣告 Election Class，且程式也有 delete Wire Class 指標，但在程式結束卻發生 memory leak。	有時多型使用 Virtual function，須要另外宣告此 class 的 virtual 解構元。
MapManage 在換關時，無法重新 Loading 新的背景圖片。	把 Map 改成指標，刪掉再重新動態配置就可以重新 Loading。
當背景音樂停止，播放跳躍音效時程式會有 Delay 現象。	老師把 CAudio 改成 thread 方式執行，減少程式等待時間。
MapManage 要建立物件表的值，放在.cpp 中會讓編譯速度變很慢。	程式開啟後另外從檔案 loading 進來即可。
cpp 大小越來越龐大	使用 cpp、h 分頁技巧。
人物的 FallngDown 運算看程式碼看了好久還是找不出問題在哪邊。	使用 Trace 技巧，很簡單的就可以把值找出來，並加以修正。
不知道該把 Basic 和 AI Instruction 分成兩個 Class 還是應該寫成同一個。	方向一直都是錯的，這兩個根本就不應該被繼承，應該寫成一個 instruction Class，並用 has a 的觀念讓人物、怪物、物件使用。雖然知道怎麼寫了，但是因為時間不夠，我們還沒來的及改正。

遊戲暫停後再開始，發現所有音效重播。	修改老師架構並且新增 CAudio Class function 以滿足需求。

2.時間表

每周課餘撰寫程式時間(不含每個禮拜三小時的上課時間)

周次	陳科銘	謝宗廷	小組合計
1	-	-	-
2	8：45	11：30	20：15
3	11：40	13：00	24：40
4	15：30	16：00	31：30
5	12：30	10：10	22：40
6	04：30	04：00	08：30
7	07：15	07：00	14：15
8	09：55	10：30	20：25
9	05：00	6：30	11：30
10	20：45	12：40	33：25
11	13：40	14：20	28：00
12	00：15	09：30	09：45
13	-	-	-
14	03：40	-	03：40
15	20：50	22：45	43：35
16	13：00	17：00	30：00
總計	147：15	155：25	302：40
平均	9：12	9：42	18：54

3.貢獻比例

陳科銘：謝宗廷 => 50%：50%

4.檢核表

	項目	完成否	未完成原因
1	自定遊戲 Icon	□已完成 □未完成	
2	全螢幕啟動	□已完成 □未完成	
3	修改 Help->About	□已完成 □未完成	
4	初始畫面說明按鍵及滑鼠之用法與密技	□已完成 □未完成	
5	上傳 setup 檔	□已完成 □未完成	
6	報告封面、側邊格式正確	□已完成 □未完成	

5.收穫

謝宗廷

- OOP 的精神-繼承、多型、封裝
- TRACE 及中斷點搭配逐步執行與不進入函式等偵錯技巧
- Friend Class 使用時機
- 繼承的使用時機(需要操作多型，父類別與子類別是 is-a 的關係)
- reuse 程式碼的方式：has-a 水平呼叫、is-a 垂直繼承
- .h .cpp 分檔技巧

  .cpp 檔注意 include 標頭檔的先後順序
- 以父類別指標操作多型

  以父類別指標刪除子類別的物件，並不會呼叫到子類別的解構元。程式會執行父類別的解構元來 delete。因此留下的是沒有父類別成員的子類別。不過在程式結束之後，主程式會回收這些殘缺不全的類別所使用的記憶體空間。如果子類別有另外使用動態配置則會出

現 memory leak。此時要父類別要提供一個 virtual 的解構元來呼叫子類別的解構元。但並不是表示 virtual 解構元可以濫用，程式運行這些 virtual 函式需要把指標存入 stack，不必要的濫用會導致成本過高。

- virtual 函式意義及使用方式

  事實上 virtual 主要的使用時機是操作多型。但因為我們繼承架構的設計錯誤，我們需要讓父類別存取子類別的成員。我們錯誤的使用 virtual 函式傳子類別變數及指標給父類別使用。這點是需要避免的。

- delete 效率不佳避免濫用

  原本的想法是以 delete 再重新動態配置跑建構元的方式來初始化只有一個 instance 的類別。我們認為這樣意義上較為直覺以及方便乾淨。但我們並沒有考慮到程式在執行 delete 所處理的程序是很複雜的。由於遊戲是在 PC 上執行，記憶體成本相對較小。所以我們決定以記憶體換取效率

- 巨集函數優缺點

  巨集函式能夠避免撰寫重複的 CODE 以節省開發成本，但過度使用巨集反而容易忽略 OOP 的精神。

- const int 與 define 差異

  均不占記憶體，前者是有資料形態的(區域)常數，後者為全域常數

- static 修飾子使用及避免濫用

  static 使用在函式可以把變數隸屬於函式裡，編寫密技以及宣告一些 counter 很好用。Static 使用在宣告 class 的 member 時，可以把變數隸屬於類別。對於把圖檔宣告成 static 可以避免 instance 過多而重複 load 圖。一些變數也可以宣告成 static 而賦予其他新的

意義。Static 與 private constructor 搭配組合是為 singleton 的基礎。即使 static 實用性很高，還是不可以濫用 static。程式部分已有濫用 Public static 的現象。Public static 等效全域變數並不符封裝特性，要盡量避免。

- singleton design pattern 使用及了解優缺點

  優：保證唯一的 instance　缺：彈性小，回復 singleton 程序複雜

- 訓練出研究 API 的能力(mciSendcommandString, alphablending)

  研究 API 讓我對 STL 容器有更深一層的認識，如 list、iterator、map 等。最後自己也有利用 map

- 團隊溝通技巧

陳科銘

- 學習物件導向繼承觀念和 public、 protected、 private 的區別，也同時瞭解 Has a 跟 Is a 應該怎麼分配與設計。
- Debug 的技巧，從 用眼睛慢慢 -> trace -> 下中斷點逐步執行，還學到 this 在 debug 中能看到許許多多的資訊。
- 物件導向與 C 語言的不同點在於用父類別儲存子類別指標，搭配 virtual 可以很簡單的實現在 C 語言中要寫一堆 switch(){case：}的繁雜程式碼。
- #define 和 const 的區別，兩者都是取代，只是第一種是沒有型別的，而第二種確有，除非逼不得已，才會使用#define，而 const 還可以分辨是這整個 class 要用，還是只有在這函式中要用，彈性比較夠。
- virtual 的解構式的使用時機，並不是每個 virtual fn 都需要，因為創造這種解構式會多花上一倍記憶體，所以真的有 memory leak 時再用即可。
- CDC 的各點存取與運算操作，與 CDC 效能差時，可以用將解析度的方式來增加效率，此舉動對視覺的影響並不大的觀念。
- static 函式的使用。用在 loading 圖片檔可以減少 loading 時間，與對記憶體不必要的浪費，一個 class 大家用的圖片都一樣，就沒必要一人一份。還有 singleton 的設計，讓建構與解構都放在 private 只讓自己使用，並在 class 宣告時並自己，能確保在這程式中是唯一且不滅。但這技術也不能濫用，須全面考慮清楚再使用，以免造

成災難。

- 寫程式時遇到一個小問題但並不影響程式的功能,不要急著去把這問題解決,要先考慮成本與是否真的必要,還是學個經驗下次不要再犯即可。
- STL 容器的使用,使程式創作更簡單方便,裡面有各式各樣的實用的函式等著我們去利用它,不用在自己寫。
- 記錄檔的用 binary 來做,這樣可以防止其他人輕易看出裡面的內容與修改其值。然而因 Win7 資料夾權限問題,使得自己寫的程式如果要修改 program file 裡面的檔案會出現 error。
- 團隊溝通上也有很大的進步,自己的想表達想法夥伴不一定一聽就懂,而這時的溝通,就需要用引導式的對話,帶著他慢慢往你的想法邁進,會比較有效率的完成兩個人的共識。

6.心得、感想

陳科銘：

一下時我對物件導向程式設計真的一點都不了解,老師在台上講的跟 C 語言沒差多少,就把 scanf 和 printf 改成 cin 和 cout,而物件導向只有稍微提到一些基本概念,沒有很多實際的操作與練習,大部分的練習跟 C 語言差不多。

這次的 OOP 實習,大概算是我第一次接觸真正的 C++吧!靠著參考老師的範例,用破到不能再破的設計觀念,慢慢得寫出這次的作業,途中歷經了許多的困難與問題,漸漸的瞭解許多以前不會的語法與觀念,果然親自去體會從錯誤中學習,會是進步最快的方法。

在遊戲設計中,我們重新寫了好幾遍,總是覺得設計得不夠好、不夠周詳,而且許多觀念也都還停留在 C 語言,居然還想要用 switch 跟 struct union 實做出 C++最好用的東西,用父類別指標來存取子類別指標的多型操作,還好寫沒幾個就請老師幫我們看看,不然這樣繼續做下去,很難想像我們還能加多少物件跟怪物進去,這個架構就爆炸了。

而我也會謹記著老師講過的觀念,有時路上或路旁有顆小石頭,不需去把它搬離,當真的石頭大到擋住所有去路,非不得已再把它移開,

寫程式要考慮成本，該得過且過，下次注意不要再犯即可。但這次也許是練習吧，是還可以追求完美時期，我們花了許多時間與精神去研究它們與清除它們，雖然看起來很魯莽，但是能學到東西並能馬上加以操作練習並增加印象，感覺真得很棒。

我也非常喜歡老師這種教學，不奮不啟，不悱不發，這才有讀大學的感覺，不然什麼事情都被安排得好好，考試、上課枯燥乏味的教學，跟高中沒什麼兩樣？感覺修這門課真的是選對了！

謝宗廷：

這門課是 OOP 實習，但老實說，在第一次上課以前我不敢說我了解 OOP。雖然一下已經先修了 C++課程，但其實前半學期也只是將一些 C 語言用的語法轉換成使用 C++函式庫。真正接觸物件導向的精隨是在後半學期，老師上課有講解封裝、多型、多載等物件導向原理，但在台下的我聽得很模糊。如老師在 FrameWork 的前言所說的：「寫再多的小程式，都很難讓學生深刻的體會到物件的用法與物件的互動，而且無法培養系統的觀念，更遑論開發軟體的能力。」

的確，修完 C++的我並無法了解物件與物件間的互動精隨。對於那些名詞也僅有非常淺的認識。因此，修習這們課之前我已經有相當的心理準備。我要藉由這次的機會深入了解物件導向。

相較於我的組員陳科銘，我的程式基礎並沒有很穩固。但令人驚奇的，我們遇到的問題大部分能自己找出方法解決。我不會的，陳科銘可以教我。陳科銘不會的，我也能大概說個思考方向以便網路查詢進而解決問題。一開始我們就設立了非常高的目標，我們殷切的希望我們能夠達成。而學期開始不久後我們也真的下了很大的功夫撰寫程式，花費時數幾乎都領著全班高標移動。

我們很有熱情，但是我們對於物件導向的基礎不好。起初沒有經驗，

架構除形還沒有完全考慮周全就開始動手 CODING。當發現架構有很大的問題的時候程式已經寫了幾百行。幸好我與組員有相同的默契：砍掉重練。我們幾乎是不考慮時間成本只為了追求程式品質。學期到了第三周時，我們遊戲架構做了大幅度的修正三次。直到這時候我們程式才有了繼承架構。

由於這個學期我與組員也修了 C 語言，導致我們過度依賴 C 的用法。像是 define 全域常數以及使用 switch 實作多型。而忘了 C++的 const int 與多型操作這麼重要的概念。

此時的我們，看似問題解決，實則危機四伏。包括不成熟的繼承架構，以及錯誤的 virtual 用法、還有程式中摻雜了許多 C 語言用法。但最危險的是─組員間的溝通開始產生了些問題。關於繼承架構，彼此的觀念差異開始浮現。彼此對於 Code 堅持的原則也不一。我對於程式的架構以及使用註解比較堅持。陳科銘則是著重於效率及演算法。還好我們克服了！我們是一個團隊，一個團隊就該是一個『整體』。所以我們要把彼此的想法完完全全讓對方理解。講出可能會產生不平衡的地方讓對方了解。溝通可以讓對方認同你的想法，或者找出自己的想法有哪些地方需要改進。於是，我們發明了「引導式溝通」。引導對方跟著你原先的思考步驟思考，我們發現這樣可以讓對方更快了解狀況，也能迅速產生共鳴。藉由這樣的溝通方式，我們克服了彼此觀念不同的問題。甚至在一次次的溝通中，我發現這個團隊由兩個人漸漸變成一個人了！

隨著深入研究遊戲架框，我們每次都會發現新的寫法新的驚奇。AlphaBlending、Virtual destructor 、mciCommandstring、多執行序、singleton design pattern 等。知道越多就越覺得當初的技術有多麼不成熟。當初千心萬苦修改三次的主架構，後來發現也是錯的繼承架構。感謝老師在旁指導重要觀念。讓我們知道需考量的不只是這麼單純。

在你往前的道路上有一個十分礙眼的石頭，如果她沒有大到能夠阻礙你往前，那就略過她吧！越接近學期尾聲越能體會這句話的意思。因為要做的事太多了，所以需要考量時間成本。

雖然最後只有做完一關，雖然程式碼很明顯能看出不同時期的拙劣技巧，我還是能夠大聲的說「我沒有遺憾」。也許是學期初的那份固執，也許是對於程式的熱情。總之，我收穫很多，真的！

7.對於本課程的建議

- 希望能增加 alpha Blending 介面，或者是支援 png 圖檔，讓我們有透明度可以選擇。

五、附錄

mygame.h

```
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 OnKeyDown(UINT, UINT, UINT);       // 處理鍵盤 Down 的動作
protected:
  void OnShow();                // 顯示這個狀態的遊戲畫面
private:
  int order;
  CMovingBitmap pic[4];
};
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);
  static void ToBonus(){TimeToBonus=PassMusicTime;}
  static int multiplayer,Chip_Dale,NowLevel;    // multiplay 1= 1P ,2= 2P nowplayer 0 =Chip, 1= Dale
  static ChipDale    *player[2];
  static bool TimeToGo;
  static bool IfViewer;
  static bool IsBoss;
protected:
  void OnMove();                // 移動遊戲元素
  void OnShow();                // 顯示這個狀態的遊戲畫面
private:
  CMovingBitmap saved,loading; // 背景圖
  CMovingBitmap     Health[3],ShowWho[3];
  CFrame      Frame;
  MapManage    *Maps;
  GameMapEdit    EditPointer; //編輯箭頭
  Monster      *AllMonster[ONE_LEVEL_MONSTER_NUM];   // 全部怪物
  Object      *AllThrow[CanTakeNum];
  int        EditMoveMode;
  bool      show_save,show_load;
  static int    TimeToBonus;
};
class CGameStateBonus : public CGameState {
public:
  CGameStateBonus(CGame *g);
  ~CGameStateBonus();
  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
};
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 CAudio {
public:
  //自定義函式
  void PauseById(int id);
```

```
  void SetSpeedByID(unsigned int id,int speed);
  void PlayOnSpe(unsigned,bool repeat=false,int time=0);
  void Resume_for_CGame();
  //Functions for Game_ChipDale
  void PlayLevelMusic(int level,bool stop_and_play=false); //限於 GameStateRun 使用，會自動偵測是否該播放 BOSS 音樂
  void PauseLevelMusic(int level);            //限於 GameStateRun 使用，會自動偵測是否該播放 BOSS 音樂
  void StopLevelMusic(int level);             //限於 GameStateRun 使用，背景音樂與 BOSS 音樂全部 stop
  void LevelMusicOnit();                 //LevelMusic 對照 Map 初始化(只能執行一次，有防呆)
private:
  static map<int,int> LevelMusic;
};
class ToolCDC{
public:
  ToolCDC();
  static void Loading();          //為 ShowProgressBar 的圖片
  static void Fadeout(){NowState=1;}      //setState =1
  static void Fadein(){NowState=4;}      //setState =1
  static void SaveCDC();             //記錄目前螢幕的 Colors
  static int    ReturnStage(){return NowState;}   //傳回目前該做甚麼事情
  static void ToNextState();          //移到下一個 state
  static void CDDraw();
  static void ShowProgressBar(int WhichLevel,int percent);
private:
  static COLORREF color[MHEIGHT][MWIDTH];
  static CAnimation MovePointer;
  static CMovingBitmap loading_BG,loading_Bar,loading_Mask,level,letter[LEVELNUM];
  static int NowState;
  //0 未設定 ,
  //1 下一次要 OnShow 要 save & 鎖人物移動恩螢幕顯示, (淡出)
  //2 saved 跟 onMove 說可以換人物位置 & 鎖人物移動恩螢幕顯示 ,
  //3 鎖人物移動恩螢幕顯示
  //4 下一次 OnShow 要 save & 鎖人物移動恩螢幕顯示, (淡入)
  //5 鎖人物移動恩螢幕顯示
  static double alpha;                //目前的 aplha 值
};
class GameMapEdit{
public:
  GameMapEdit();
  void Loading();
  void OnShow(MapManage *);
  void SetOrder(int);
  int    nowOrder(){return Order;};
  void OnMove(MapManage *map);
  void SetWxWy(int setWx,int setWy);
  void SetMove(bool,bool,bool,bool,bool,int mode=0);
  void SetObject(MapManage *map);     //去 wx wy 位置放置 obj
  int ReturnWX(){return wx;}
  int ReturnWY(){return wy;}
  void FixXY(MapManage *);       // 修正螢幕位置
private:
  int wx,wy;
  int Order;
  int ThisMoveTimesX,ThisMoveTimesY;   // X、Y 方向的移動次數
  int ContinueMode;          // TAB 切換微調模式 0 1 2
  bool move[4];
  CMovingBitmap frame_pic;
  CMovingBitmap frame_background[OrderSize+MonsterOrderSize];
};
class GameScore{
public:
  static GameScore* Instance();
  ~GameScore();
  void Loading();
  void ShowScroe();
  void onShow();
  bool Switch;
private:
  GameScore();
```

```
  static GameScore Game_Score;
  CMovingBitmap Head[2];
  CMovingBitmap F,S;
  CMovingBitmap L_C,L_D;
  CInteger* score_p;
};
class CFrame{
public:
  CFrame();
  void SetWxWy(int wx,int wy,bool shiftmode=false);
  virtual void FixXY(MapManage *);      // 修正螢幕位置
  virtual void ReFixXY(MapManage *);      // 反修正螢幕位置
  virtual void FixMapMove(int fixX,int fixY);
  void SetWidthHeight(int tempW,int tempH);
  virtual int IfCollision(int twx,int twy,int twidth,int theight);
  int IfCollision(int Direct,int passSpeed);   //與地圖做運算碰撞
  virtual void CollisionReact(int setDirect,CFrame *which){;}
  int ReturnWX(){return wx;}       // 回傳螢幕 x 座標
  int ReturnWY(){return wy;}       // 回傳螢幕 y 座標
  int ReturnWidth(){return width;}
  int ReturnHeight(){return height;}
  bool ReturnLR(){return LRflag;}
  static int Jump_Fix;
private:
protected:
  int wx,wy;            // 框框左上角的螢幕座標 window x,y
  int width,height;
  bool flag[6];          // 上下左右 AB   按鍵旗標
  bool LRflag;           // 0 左 1 右       標示方向
};
```

mapmanage.h

```
class MapManage{
public:
  MapManage(int WhichLevel);
  void OnShow();
  void OnShowObject();
  void LevelLoading(int WhichLevel,bool NotResetAll=false);   //設定關卡   NotResetAll 是否重設此關所有變數
  int MoveMap(int direct,int MoveOneX=SPEED,int MoveOneY=SPEED);//move 1,2,4,8 ...
  void SetMapXY(int,int);        //設定 map 顯示位置
  void SetObstacle();          //設定障礙物資料
  void SetMonster(Monster *monster[]); //設定怪物資料
  void SetObj(int value,int wx,int wy); //wx,wy     螢幕座標
  void SetRecord(){recordx=x;recordy=y;} //設定目前地圖左上角為紀錄點
  int ReturnNowX(){return x;}       //傳回螢幕左上角在地圖的 x 位置
  int ReturnNowY(){return y;}       //傳回螢幕左上角在地圖的 y 位置
  int ReturnOBJ(int ox,int oy){return MapObjXY[oy][ox];}   //回傳 Obj 的值
  void SaveObj(int WhichLevel);     //儲存 Obj 資訊
  void ShowObstacle(int i,int j);     //顯示指定的物件   ps: 給 edit 用的
  void ClearisMoveMap(bool flag);     //清除 isMoveMap 紀錄
  void Set_toRecord();
  int IfCollision(int wx,int wy,int PicWidth,int PicHeight,bool ignore_obj_2=false,bool ignore_eat=false,bool findNext=false,bool
Reverse=false); //計算是否碰撞
  int    GetRoute(){return Route[y/MHEIGHT][x/MWIDTH];}
  int    GetRoute(int rx,int ry){return Route[ry][rx];}
  void ClearObstacle(int Value);     //把目標物件值告訴它 讓他直接去刪除碰撞機制
  int FillObstacle(int Value,int setWx,int setWy,bool Visible=true); //把目標物件值告訴它 讓他直接去增加碰撞機制
  static int isMoveMap;         //地圖移動方向         1,2,4,8   上下左右
  static int Teleport;
  static int LRMargin;
  friend class ChipDale;
private:
  CMovingBitmap frame_obstacle[OrderSize+MonsterOrderSize+UnVisibleOrderSize];
protected:
  int Route[MAX_YN][MAX_XN];       //地圖路線移動方向 1,2,4,8 方向 16 出生點 32~  64 ~boss
  int MapObjXY[MAX_OY][MAX_OX];     //物件座標~顯示讀寫檔用
  int Obstacle[MAX_OY][MAX_OX];     //障礙物     判斷碰撞用   //第一部分：種類   第二：左上 Y 第三 左上 X
  CMovingBitmap MapSP[MAX_YN][MAX_XN];
  int x,y;              //目前螢幕左上角在地圖的座標
```

```
  int recordx,recordy;        //死亡起始位置
};
```
instruction.h
```
class AI_Instructions : public CFrame{
public:
  AI_Instructions();
  bool MoveUp(MapManage* map);
  bool MoveDown(MapManage* map);
  bool MoveRight(MapManage* map);
  bool MoveLeft(MapManage* map);
  void Jump();
  int FallingDown(MapManage* map);
protected:
  int UpSpeed,MoveSPEED,JumpSPEED;
  int LR_Space;
  bool IsJump;
  bool NoCollision;              // NoCollision = true  不要判斷碰撞
  bool NoIgnore_2,NoIgnore_eat;
};
class BasicInstructions : public CFrame{
public:
  BasicInstructions();
  bool MoveRight(MapManage* map);
  bool MoveLeft(MapManage* map);
  bool Jump();
  void Squat();
  int FallingDown(MapManage* map);
  virtual ChipDale* getPartner(){return NULL;}
  virtual int CollisionChipDale(int Direct,int passSpeed,int Squeezemode=1){return false;}
  virtual void TriggerObj(int Derict){TRACE("TriggerObj error\n");} // Derict 吃花的方向
  virtual int SetNowTaken(int Value){return -1;} //設定 NowTaken
  virtual ChipDale* Instance(){return NULL;}
protected:
  int UpSpeed,time_jump;         // time_jump 避免二段跳
  bool IsJump,IsRun,IsLessCollision;   // isLessCollison = true  不要判斷地板 2 的碰撞(下跳觸發)
  int ani_jump_count;            // animation  跳轉蹲的計數器
  int Reduce_UP_VELOCITY;
  static bool canMoveMapX,canMoveMapY;
};
```
ChipDale.h
```
class ChipDale : public BasicInstructions{
public:
  ChipDale(int isDale);
  static void Loading();
  void OnMove();
  void GodMove();
  void OnShow();
  ChipDale* Instance(){return this;}
  int ReturnHideComplete(){return (animation[IsDale][1][4][LRflag].GetCurrentBitmapNumber()>=4)&&NowAct==4;}
  int ReturnNowAct(){return NowAct;}
  bool ReturnIsHurting(){return Hurt;}
  int ReturnLastAct(){return LastAct;}
  int ReturnIsTaken(){if(NowTaken>0)return 1;else return 0;}
  int ReturnTakenByPartner(){if(Partner!=NULL&&Partner->NowTaken==ChipDale_taken)return 1 ;else return 0;}
  int ReturnHealth(){return Health;}
  int ReturnLife(){return Life;}
  int ReturnInvincible(){return Invincible;}
  int ReturnIsDale(){return IsDale;}
  int CollisionChipDale(int Direct,int passSpeed,int Squeezemode=1);
  Object* ReturnNowTakeObj(){return NowTakeObj;}
  ChipDale* getPartner(){return Partner;}
  void setFlag(bool value,bool,bool,bool,bool,bool,bool); //值  上下左右 AB
  void SetState();                //設定 Act LRdirect
  void SetPartner(ChipDale *setPlayer){Partner = setPlayer;}
  void SetInvincible(int value){Invincible=value;}   //設定 Invincible 1 無敵  0 正常
  void ReleaseNowTakeObj();
  void FixSelf_Onto_ObjectTop();
  void InitialWidthHeight();          //初始化高度
```

```
  void Reset(int Wx,int Wy,bool LR=1,bool FullHealth=1);
  void ResetScore(){Score_Flower=Score_Star=0;}
  void Dead();
  void Lock(bool value = true ){LOCK=value;}
  void GetHurt();
  void Faint();
  void GodMode();
  virtual int SetNowTaken(int Value);          //設定 NowTaken
  virtual void TriggerObj(int Derict);        //Derict 吃花的方向
  int Score_Flower;
  int Score_Star;
  static Object    **CanThrow;
  static MapManage *Maps;
  static Monster    **AllMonster;
  friend class BasicInstructions;
  friend class ChipDale_Dead;
  friend class ChipDale_Resurrect;
  friend class ChipDale_Taken;
private:
  static CAnimation animation[2][2][ACTION_NUM][2];   // 動作~方向
  static CAnimation ani_sweat[2],ani_dizzy,ani_god[2];
  int IsDale;
  int ani_sweat_x;
  int ani_sweat_wy;
  int ani_sweat_count;
  int Health;
  int Life;
  int NowAct,LastAct;                // Act 0 站 1 走 2 跳 3 丟 4 蹲 5 受傷 6 暈眩
  int NowTaken,LastTaken;             // 0 空手 1 拿普通東西  6 蘋果... (<0 作為再次拿取延遲器)
  int freeze;                    // 丟東西的冷卻時間
  bool Hurt;                     // 是否受傷
  int IsFaint;                   // 是否暈眩 ,counter 合一
  bool ani_Hide_freeze_jump;             // 控制 HIDE 動畫未完成不能下跳，設定在 CHIPDALE 的動畫切換
  int Last_flag[6];                // 上一次按鍵的旗標，搭配 flag 做出放開按鍵判斷
  int Invincible;                  // 1 無敵 0 正常 (>1 作為 ONSHOW 的 COUNTER)
  Object *NowTakeObj;
  ChipDale *Partner;
  bool IsGod;
  bool LOCK;                     // 鎖 setFlag
  bool Alive;                    // 鎖除了 setFlag 以外的函式
};
```

object.h

```
class Object : public AI_Instructions{
public:
  Object();
  virtual ~Object(){;}
  virtual void OnShow(MapManage* map){;}
  virtual void OnMove(MapManage* map){;}
  virtual void Throw(int setDirect){;}
  int ReturnObjValue(){return ThisObjValue;}
  int ReturnNowAct(){return NowAct;}
  void SetNowAct(int setNowAct) {NowAct = setNowAct;}
  void RecoverObj(ChipDale *player);       //重新拾獲時需呼叫
  void CollisionMonster(Monster **monster);
  void CollisionChipDale(ChipDale *player);
protected:
  int CanAttackMode;              // 攻擊對象 0 任何人 1 除了主人(預設值),2 None 3 只攻擊怪物
  int Direct,LRflag,ThisObjValue,NowAct;
  //ThisObjValue 用來記錄刪除 obstacle 的編號
  //NowAct =0 停屍間 1 拿在手上 2 運動狀態 3 放在地上 4 打完怪物
  ChipDale *Owener;
};
class ChipDale_Dead:public Object{
public:
  ChipDale_Dead(ChipDale* chip);
  ~ChipDale_Dead();
  static void Loading();
  void OnShow(MapManage* map);
```

```
  void OnMove(MapManage* map);
  friend class ChipDale_Resurrect;
private:
  int isDale;
  int Shine_Count;
  static CMovingBitmap frame_pic[2][2];
  int Wait_A_Minute;
};
class ChipDale_Resurrect:public Object{
public:
  ChipDale_Resurrect(ChipDale_Dead* chip);
  static void Loading();
  void OnShow(MapManage* map);
  void OnMove(MapManage* map);
private:
  int isDale;
  int timeCount;
  static CMovingBitmap frame_pic[2][2];
};
class ChipDale_Taken:public Object{
public:
  ChipDale_Taken(ChipDale* chip);
  static void Loading();
  void OnShow(MapManage* map);
  void OnMove(MapManage* map);
  void Throw(int setDirect);
private:
  int isDale;
  static CAnimation animation[2][2];
};
class Star : public Object{
public:
  Star(int setWx,int setWy);
  static void Loading();
  void OnShow(MapManage* map);
  void OnMove(MapManage* map);
private:
  int lastUpSpeed;
  static CMovingBitmap frame_pic;
};
class Cheese : public Object{
public:
  Cheese(int setWx,int setWy);
  static void Loading();
  void OnShow(MapManage* map);
  void OnMove(MapManage* map);
private:
  int lastUpSpeed;
  static CMovingBitmap frame_pic;
};
class Explosion : public Object{
public:
  Explosion(int setOx,int setOy,int setChangeWhat,ChipDale *player);     //ChangeWhat 填代碼 (跟顯示物件代碼一樣)
  static void Loading();
  void OnShow(MapManage* map);
  void OnMove(MapManage* map);
private:
  int ChangeWhat;
  bool IfNeedReFix;
  static CAnimation frame_pic;
};
class Angel : public Object{
public:
  Angel(int setWx,int setWy,ChipDale *player);
  static void Loading();
  void OnShow(MapManage* map);
  void OnMove(MapManage* map);
private:
```

```
  int NowAttack;
  bool OutLRflag;
  const int TheBeeMaxSpeed;
  static CAnimation frame_pic[2];
  static Monster **monster;
};
class Apple : public Object{
public:
  Apple(ChipDale *player);
  static void Loading();
  void OnShow(MapManage* map);
  void OnMove(MapManage* map);
  void Throw(int setDirect);
private:
  static CMovingBitmap frame_pic[2];
};
class Ball : public Object{
public:
  Ball(ChipDale *player);
  static void Loading();
  void OnShow(MapManage* map);
  void OnMove(MapManage* map);
  void Throw(int setDirect);
private:
  int Rebound_times;
  static CMovingBitmap frame_pic[2];
};
class Craft : public Object{
public:
  Craft(ChipDale *player);
  static void Loading();
  void OnShow(MapManage* map);
  void OnMove(MapManage* map);
  void Throw(int setDirect);
  void CollisionReact(int setDirect,CFrame *which);
  ~Craft(){TRACE("Craft destuctor run\n");}
private:
  static CMovingBitmap frame_pic[2];
};
class Stone : public Object{
public:
  Stone(ChipDale *player);
  static void Loading();
  void OnShow(MapManage* map);
  void OnMove(MapManage* map);
  void Throw(int setDirect);
  void CollisionReact(int setDirect,CFrame *which);
  bool MoveRight(MapManage* map);
  bool MoveLeft(MapManage* map);
  void ReBound(MapManage* map);
private:
  bool HideThrow;
  static CMovingBitmap frame_pic[2];
  int ReboundLR;              // 0 無反彈 1 反彈右邊 -1 反彈左邊
  int ReboundSpeed;
};
class Greedy : public Object{
public:
  Greedy(int setWx,int setWy,Object *setRemoveObj);
  static void Loading();
  void OnShow(MapManage* map);
  void OnMove(MapManage* map);
private:
  int PassWx;
  bool showMouse;
  static CAnimation frame_pic[2];
  static CMovingBitmap frame_hole;
  Object *CheeseObj;
```

```
};
```
monster.h
```
class Monster : public AI_Instructions{
public:
  Monster();
  virtual ~Monster(){;}
  void SetNowAct(int Value){NowAct = Value;}
  int ReturnNowAct(){return NowAct;}
  bool ReturnCanTrace(){return CanTrace;}
  virtual void CollisionChipDale(ChipDale *player);
  virtual void OnShow(MapManage *map){;}
  virtual bool OnMove(MapManage *map,ChipDale **player){return false;}
  virtual void SetMonster(MapManage *map,int SetOx,int SetOy){;}
  virtual bool KillMonster(int Direct){return false;}
  ChipDale* Detect(ChipDale **player,int *WLength,int *HLength,int WRange,int HRange,bool IfTraceInvincible=false);
  friend class ChipDale;
protected:
  int LR_flag,NowAct;         //NowAct 正常介於 1-100   100UP 作為彈飛動畫
  int lastWy,wait;
  int Health;
  bool CanTrace;       //是否可以被跟蹤 給其他 OBJ 用  (ex: Object::Angel)
};
class bullet : public Monster{
public:
  bullet();
  virtual void OnShow(MapManage *map){;}
  bool OnMove(MapManage *map);
  int Collision(ChipDale *player){return player->IfCollision(wx,wy,width,height);}
protected:
  int MoveLR,MoveUD;
};
class MachineDog : public Monster{
public:
  MachineDog(MapManage *map,int SetOx,int SetOy);
  static void Loading();
  void OnShow(MapManage *map);
  bool OnMove(MapManage *map,ChipDale **player);
  bool KillMonster(int Direct);
private:
  static CAnimation frame_monster[2][2]; //NowAct LRflag
};
class Cactus : public Monster{
public:
  Cactus(MapManage *map,int SetOx,int SetOy);
  static void Loading();
  bool OnMove(MapManage *map,ChipDale **player);
private:
  static CMovingBitmap frame_monster;
};
class Electric : public Monster{
public:
  Electric(MapManage *map,int SetWx,int SetWy,int SetWireOLength);
  static void Loading();
  void OnShow(MapManage *map);
  bool OnMove(MapManage *map,ChipDale **player);
  int    ElectricCollision(ChipDale *player){return player->IfCollision(wx,wy,width,height);}
private:
  int MoveLength;
  int WireLength;
  const int ChangeSpeed,MaxMoveSpeed;
  static CMovingBitmap frame_monster[2];
};
class Wire : public Monster{
public:
  Wire(MapManage *map,int SetOx,int SetOy,int SetWireLength);
  ~Wire(){delete(real_monster);}
  static void Loading();
  void OnShow(MapManage *map);
```

```
  bool OnMove(MapManage *map,ChipDale **player);
  void CollisionChipDale(ChipDale *player);
  void FixMapMove(int fixX,int fixY);
private:
  int WireLength;
  Electric *real_monster;
};
class Mouse : public Monster{
public:
  Mouse(MapManage *map,int SetOx,int SetOy);
  static void Loading();
  void OnShow(MapManage *map);
  bool OnMove(MapManage *map,ChipDale **player);
  bool KillMonster(int Direct);
private:
  ChipDale *tracePlayer;
  static CAnimation frame_monster[3][2]; //NowAct LRflag
};
class Wasp : public Monster{
public:
  Wasp(MapManage *map,int SetOx,int SetOy);
  static void Loading();
  void OnShow(MapManage *map);
  bool OnMove(MapManage *map,ChipDale **player);
  bool KillMonster(int Direct);
private:
  int tLRMoveSPEED,tDownMoveSPEED;
  static CAnimation frame_monster[2];
};
class Lighting : public bullet{
public:
  Lighting(MapManage *map,int SetWx,int SetWy,int LR,int UD);
  static void Loading();
  void OnShow(MapManage *map);
private:
  static CMovingBitmap frame_monster;
};
class Centipedelimbs : public Monster{
public:
  Centipedelimbs(MapManage *map,int SetWx,int SetWy,int SetSelect);
  ~Centipedelimbs();
  static void Loading();
  void OnShow(MapManage *map,int countFlicker);
  bool OnMove(MapManage *map,ChipDale **player);
  int CentipedelimbsCollision(ChipDale *player);
private:
  static CAnimation frame_monster[3];
  bullet *bullets[CentipedeLightingNum];
  int Select;
  const int TotalBullTime,ReleaseBullTime,BulletMaxSpeed,WRandBullet;
};
class Centipede : public Monster{
public:
  Centipede(MapManage *map,int SetOx,int SetOy);
  ~Centipede();
  static void Loading();
  void OnShow(MapManage *map);
  bool OnMove(MapManage *map,ChipDale **player);
  void CollisionChipDale(ChipDale *player);
  void FixMapMove(int fixX,int fixY);
  int IfCollision(int twx,int twy,int twidth,int theight){return real_monster[0]->IfCollision(twx,twy,twidth,theight);}
  bool KillMonster(int Direct);
private:
  Centipedelimbs *real_monster[3];
  int countFlicker;
  static CAnimation frame_monster;
};
```

mygame.cpp

```
CGameStateInit::CGameStateInit(CGame *g): CGameState(g){}
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
 GameScore::Instance()->Loading();
 //logo.LoadBitmap(IDB_BACKGROUND);
 Sleep(300);      // 放慢，以便看清楚進度，實際遊戲請刪除此 Sleep
 // 此 OnInit 動作會接到 CGameStaterRun::OnInit()，所以進度還沒到 100%
 CAudio::Instance()->Load(AUDIO_BEGIN,   "sounds\\begin.mp3");
 CAudio::Instance()->Load(AUDIO_BUTTON,   "sounds\\button.mp3");
 pic[0].LoadBitmapA("Bitmaps\\BeginState\\1.bmp");
 pic[1].LoadBitmapA("Bitmaps\\BeginState\\2.bmp");
 pic[2].LoadBitmapA("Bitmaps\\BeginState\\3.bmp");
 pic[3].LoadBitmapA("Bitmaps\\BeginState\\4.bmp");
}
void CGameStateInit::OnBeginState()
{
 order=0;
}
void CGameStateInit::OnKeyDown(UINT nChar, UINT nRepCnt, UINT nFlags)
{
 const char KEY_ESC = 27;
 const char KEY_ENTER = 13;
 const char KEY_LEFT   = 0x25; // keyboard 左箭頭
 const char KEY_RIGHT = 0x27; // keyboard 右箭頭
 if(nChar == KEY_RIGHT){
  if(order==0){
   CAudio::Instance()->Play(AUDIO_BUTTON);
   order=1;
  }
  if(order==2){
   CAudio::Instance()->Play(AUDIO_BUTTON);
   order=3;
  }
 }
 if(nChar == KEY_LEFT){
  if(order==1){
   CAudio::Instance()->Play(AUDIO_BUTTON);
   order=0;
  }
  if(order==3){
   CAudio::Instance()->Play(AUDIO_BUTTON);
   order=2;
  }
 }
 if(nChar == KEY_ENTER){
  CAudio::Instance()->Play(AUDIO_BUTTON);
  if(order==0)order=2;
  else {
   CAudio::Instance()->Stop(AUDIO_BEGIN);
   if(order==1){
    CGameStateRun::multiplayer = 2;
    GotoGameState(GAME_STATE_RUN);
   }
   else{
    CGameStateRun::multiplayer = 1;
    if(order==2)CGameStateRun::Chip_Dale=0;
    else CGameStateRun::Chip_Dale=1;
    GotoGameState(GAME_STATE_RUN);
   }
  }
 }
}
void CGameStateInit::OnShow()
{
```

```
  pic[order].ShowBitmap();
}
/////////////////////////////////////////////////////////////////////////////
// 這個 class 為遊戲的遊戲執行物件，主要的遊戲程式都在這裡
/////////////////////////////////////////////////////////////////////////////
int CGameStateRun::multiplayer=1;
int CGameStateRun::NowLevel=1;
int CGameStateRun::Chip_Dale=0;
int CGameStateRun::TimeToBonus=0;
bool CGameStateRun::TimeToGo;
bool CGameStateRun::IfViewer=false;
bool CGameStateRun::IsBoss=false;
ChipDale* CGameStateRun::player[2];
CGameStateRun::CGameStateRun(CGame *g)
: CGameState(g)
{
  IfViewer = false;
  NowLevel=1;
  show_save = false;
  show_load = false;
  EditMoveMode = 0;
  Maps = NULL;
  player[0] = NULL;
  player[1] = NULL;
  for(int i=0;i<CanTakeNum;i++) //這只需寫一次 初始化陣列
    AllThrow[i]=NULL;
  for(int i=0;i<ONE_LEVEL_MONSTER_NUM;i++) //這只需寫一次 初始化陣列
    AllMonster[i]=NULL;
  ChipDale::CanThrow = AllThrow;
  ChipDale::AllMonster = AllMonster;
}
CGameStateRun::~CGameStateRun()
{
  if(Maps!=NULL) delete(Maps);
  for(int i=0;i<ONE_LEVEL_MONSTER_NUM && AllMonster[i]!=NULL;i++){
    delete(AllMonster[i]);
  }
  for(int i=0;i<CanTakeNum;i++){
    if(AllThrow[i]==NULL)continue;
    delete(AllThrow[i]);
  }
  for(int i=0;i<2 && player[i]!=NULL;i++)
    delete(player[i]);
}
void CGameStateRun::OnBeginState()
{
  int initial_Y;
  TimeToGo=false;
  EditPointer.SetWxWy(0,0);
  Maps = new MapManage(NowLevel);
  CAudio::Instance()->PlayLevelMusic(0,true);
  CAudio::Instance()->PauseLevelMusic(0);
  CAudio::Instance()->Play(AUDIO_1_1A);
  ChipDale::Maps = Maps;
  Maps->SetObstacle();
  Maps->SetMonster(AllMonster);
  for(int i=0;i<CanTakeNum;i++){
    if(AllThrow[i]!=NULL){
      delete AllThrow[i];
      AllThrow[i]=NULL;
    }
  }
  if(player[0]!=NULL)delete player[0];
  if(player[1]!=NULL)delete player[1];
  player[0] = new ChipDale(Chip_Dale);
  if(multiplayer==2){
    player[1] = new ChipDale(1);
  }
```

```
  else
    player[1]=NULL;
  player[0]->SetPartner(player[1]);
  if(multiplayer==2) player[1]->SetPartner(player[0]);
  initial_Y = (MapManage::Teleport>>7)/DesSize;//得到出生的高 , DesSize 表示 Des 最大的值(128)
  TRACE("initial_Y: %d\n",initial_Y);
  player[0]->InitialWidthHeight();
  player[0]->SetWxWy(80,initial_Y-player[0]->ReturnHeight());
  if(multiplayer==2){
    player[1]->InitialWidthHeight();
    player[1]->SetWxWy(80+player[1]->ReturnWidth(),initial_Y-player[1]->ReturnHeight());
  }
}
void CGameStateRun::OnMove()            // 移動遊戲元素
{
  // 如果希望修改 cursor 的樣式，則將下面程式的 commment 取消即可
  // SetCursor(AfxGetApp()->LoadCursor(IDC_GAMECURSOR));
  //TRACE("1\n");
  int des,initial_Y,fixX,fixY;
  int toolCDC_State = ToolCDC::ReturnStage();
  static int music_count=0;
  if(music_count<6*33-5)music_count++;
  if(music_count==6*33-5){
    CAudio::Instance()->PlayLevelMusic(NowLevel,true);
    music_count++;
  }
  if(GameScore::Instance()->Switch)return;
  if(TimeToGo||TimeToBonus==1){
    CAudio::Instance()->StopLevelMusic(NowLevel);
    CAudio::Instance()->Stop(AUDIO_EDIT);
    if(TimeToGo){
      player[0]->ResetScore();
      if(player[1]!=NULL)player[1]->ResetScore();
      TimeToGo=false;
      GotoGameState(GAME_STATE_OVER);
    }else{
      TimeToBonus=false;
      GotoGameState(GAME_STATE_BONUS);
    }
  }
  if(TimeToBonus>0){
    if(TimeToBonus==PassMusicTime)
    {
      CAudio::Instance()->StopLevelMusic(NowLevel);
      CAudio::Instance()->Play(AUDIO_1_PASS);
    }
    TimeToBonus--;
  }
  if(toolCDC_State==0){
    if(!IfViewer){
      //人物移動
      if(!TimeToBonus){
        player[0]->OnMove();
        if(multiplayer==2)
          player[1]->OnMove();
      }
      //取消注解此行可得人物 Y 軸
      //static int lastNowY = 0;int tempNowY =
//player[0]->ReturnWY()+player[0]->ReturnHeight();if(lastNowY!=tempNowY){TRACE("now_Y:
//%d\n",tempNowY);lastNowY=tempNowY;}
      //人物修正
      player[0]->FixXY(Maps);
      if(multiplayer==2)
        player[1]->FixXY(Maps);
      for(int i=0;i<CanTakeNum;i++){
        if(AllThrow[i]==NULL)continue;
        if(AllThrow[i]->ReturnNowAct()==0){
          delete(AllThrow[i]);
```

```
        AllThrow[i]=NULL;
        continue;
       }
       if(AllThrow[i]->ReturnNowAct()>=0)//有時候不想 FIX 修正位置 可以讓 NowAct 為負的!!!
        AllThrow[i]->FixXY(Maps);
       AllThrow[i]->OnMove(Maps);
     }
     //怪物移動+修正+碰撞測試
     for(int i=0;i<ONE_LEVEL_MONSTER_NUM && AllMonster[i]!=NULL;i++){
      if(AllMonster[i]->OnMove(Maps,player)){
       AllMonster[i]->CollisionChipDale(player[0]);
       if(multiplayer==2)
        AllMonster[i]->CollisionChipDale(player[1]);
      }
     }
     //碰撞 物件 怪物 人物 測試
     for(int i=0;i<CanTakeNum;i++){
      if(AllThrow[i]==NULL)continue;
      AllThrow[i]->CollisionMonster(AllMonster);
      AllThrow[i]->CollisionChipDale(player[0]);
      if(multiplayer==2)
       AllThrow[i]->CollisionChipDale(player[1]);
     }
    }
    else{
     EditPointer.OnMove(Maps);
     EditPointer.FixXY(Maps);
    }
   }
   else if(toolCDC_State==2){
    des = (Maps->Teleport)%DesSize;//得到出生的高 , DesSize 表示 Des 最大的值(128)
    initial_Y = (Maps->GetRoute((des-1)%10,(des-1)/10)>>7)/DesSize;
    TRACE("initial_Y: %d\n",initial_Y);
    fixX = -Maps->ReturnNowX()+(des-1)%MAX_XN*MWIDTH;
    fixY = -Maps->ReturnNowY()+(des-1)/MAX_YN*MHEIGHT;
    Maps->SetMapXY((des-1)%MAX_XN*MWIDTH ,(des-1)/MAX_YN*MHEIGHT);
    Maps->SetRecord();

    for(int i=0;i<ONE_LEVEL_MONSTER_NUM && AllMonster[i]!=NULL;i++){
     AllMonster[i]->FixMapMove(fixX,fixY);
    }
    for(int i=0;i<CanTakeNum;i++){
     if(AllThrow[i]==NULL)continue;
     if(AllThrow[i]->ReturnNowAct()!=1){
      delete(AllThrow[i]);
      AllThrow[i]=NULL;
     }
    }
    player[0]->Reset(80,initial_Y-player[0]->ReturnHeight(),true,false);
    if(multiplayer==2)
     player[1]->Reset(125,initial_Y-player[1]->ReturnHeight(),true,false);
    ToolCDC::ToNextState();
   }else if(toolCDC_State==4){
    if(Maps->GetRoute()&64){
     IsBoss=true;
     CAudio::Instance()->PlayLevelMusic(NowLevel,true);
    }else{
     IsBoss=false;
    }
   }
}
void CGameStateRun::OnInit()// 遊戲的初值及圖形設定
{
  // 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(33); // 接個前一個狀態的進度，此處進度視為 33%
  //
  // 開始載入資料
```

```
  //
  Health[0].LoadBitmapA("Bitmaps/StateRun/health_1.bmp",PURPLE);
  Health[1].LoadBitmapA("Bitmaps/StateRun/health_2.bmp",PURPLE);
  Health[2].LoadBitmapA("Bitmaps/StateRun/health_3.bmp",PURPLE);
  ShowWho[0].LoadBitmapA("Bitmaps/StateRun/chip_L.bmp",PURPLE);
  ShowWho[1].LoadBitmapA("Bitmaps/StateRun/dale_L.bmp",PURPLE);
  ShowWho[2].LoadBitmapA("Bitmaps/StateRun/dale_R.bmp",PURPLE);
  ShowInitProgress(40);
  ChipDale::Loading();
  EditPointer.Loading();
  ToolCDC::Loading();
  ShowInitProgress(45);
  //怪物圖片 loading
  MachineDog::Loading();
  Cactus::Loading();
  Wire::Loading();
  Mouse::Loading();
  Wasp::Loading();
  Centipede::Loading();
  //End Loading
  ShowInitProgress(50);
  //物件圖片 loading
  Apple::Loading();
  Stone::Loading();
  Craft::Loading();
  Star::Loading();
  Explosion::Loading();
  Angel::Loading();
  ChipDale_Dead::Loading();
  ChipDale_Resurrect::Loading();
  ChipDale_Taken::Loading();
  Greedy::Loading();
  Cheese::Loading();
  Ball::Loading();
  //End Loading
  ShowInitProgress(75);
  saved.LoadBitmapA("Bitmaps/object/save.bmp",0xffffff);
  loading.LoadBitmapA("Bitmaps/object/loading.bmp",0xffffff);
  // 完成部分 Loading 動作，提高進度
  ShowInitProgress(80);
  // 繼續載入其他資料
  CAudio::Instance()->LevelMusicOnit();
  CAudio::Instance()->Load(AUDIO_JUMP,    "sounds/jump.mp3");
  CAudio::Instance()->Load(AUDIO_EDIT,    "sounds/edit.mp3");
  CAudio::Instance()->Load(AUDIO_DEAD,    "sounds/dead.mp3");
  CAudio::Instance()->Load(AUDIO_1_1,     "sounds/state/1/level_1B.mp3");
  CAudio::Instance()->Load(AUDIO_1_BOSS,"sounds/state/1/boss_1B.mp3");
  CAudio::Instance()->Load(AUDIO_1_1A,    "sounds/state/1/level_1A.mp3");
  CAudio::Instance()->Load(AUDIO_1_PASS,"sounds/state/1/level_1pass.mp3");
  // 此 OnInit 動作會接到 CGameStaterOver::OnInit()，所以進度還沒到 100%
}
void CGameStateRun::OnKeyDown(UINT nChar, UINT nRepCnt, UINT nFlags)
{
  //密技區 宣告
  static char GodMode[]="GOD";static int    GodModeI = 0;
  static char EditMode[]="EDIT";static int EditModeI = 0;
  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
  //密技區 實做
  if(nChar==GodMode[GodModeI]){
    GodModeI++;
    if(GodMode[GodModeI]==0){
      player[0]->GodMode();
      GodModeI=0;
    }
  }
```

```
  else GodModeI=0;
  if(nChar==EditMode[EditModeI]){// CapsLock 切換人物與造物者模式
    EditModeI++;
    if(EditMode[EditModeI]==0){
      if(player[0]->ReturnHealth()<=0||multiplayer==2){EditModeI=0;return;}
      IfViewer = !IfViewer;
      if(IfViewer){
        CAudio::Instance()->PlayLevelMusic(0);
      }else{
        CAudio::Instance()->PlayLevelMusic(NowLevel);
      }
      player[0]->Reset(EditPointer.ReturnWX(),EditPointer.ReturnWY(),player[0]->ReturnLR(),false);
      if(multiplayer==2){

player[1]->Reset(EditPointer.ReturnWX()+player[1]->ReturnWidth(),EditPointer.ReturnWY(),player[1]->ReturnLR(),false);
      }
      EditPointer.SetMove(false,true,true,true,true,EditMoveMode);
      if(IfViewer){
        Maps->LevelLoading(NowLevel,true);
        Maps->SetMapXY(Maps->ReturnNowX()/ONEOBJX*ONEOBJX,Maps->ReturnNowY()/ONEOBJY*ONEOBJY);
      }
      else{
        Maps->SetMapXY(Maps->ReturnNowX()/SPEED*SPEED,Maps->ReturnNowY()/SPEED*SPEED);
        Maps->SetObstacle();
        Maps->SetMonster(AllMonster);
        player[0]->ReleaseNowTakeObj();
        if(multiplayer==2)
          player[1]->ReleaseNowTakeObj();
        for(int i=0;i<CanTakeNum;i++){
          if(AllThrow[i]==NULL)continue;
          if(AllThrow[i]->ReturnNowAct()>=0){
            delete(AllThrow[i]);
            AllThrow[i]=NULL;
          }
        }
      }
      EditModeI = 0;
    }
  }else EditModeI = 0;
  //一般按鍵觸發
  if(!IfViewer){
    if(multiplayer==1)
      player[0]->setFlag(true,(nChar==KEY_UP),(nChar == KEY_DOWN),(nChar == KEY_LEFT),(nChar ==
KEY_RIGHT),(nChar == 'Z'),(nChar == 'X'));
    if(multiplayer==2){
      player[0]->setFlag(true,(nChar==KEY_UP),(nChar == KEY_DOWN),(nChar == KEY_LEFT),(nChar ==
KEY_RIGHT),(nChar == 'N'),(nChar == 'M'));
      player[1]->setFlag(true,(nChar==87),(nChar == 83),(nChar == 65),(nChar == 68),(nChar == 90),(nChar == 88));
    }
    if(nChar==9)GameScore::Instance()->ShowScroe();
  }
  else{
    show_save = false;
    EditPointer.SetMove(true,(nChar == KEY_UP),(nChar == KEY_DOWN),(nChar == KEY_LEFT),(nChar ==
KEY_RIGHT),EditMoveMode);
    if(nChar=='Z') EditPointer.SetOrder(EditPointer.nowOrder()-1);
    if(nChar=='X') EditPointer.SetOrder(EditPointer.nowOrder()+1);
    if(nChar==13) EditPointer.SetObject(Maps);   // Enter 放置
    if(nChar==9) EditMoveMode = (EditMoveMode+1)%3; // TAB 切換模式
    if(nChar==27)   {// ESC 儲存
      Maps->SaveObj(NowLevel);
      show_save=true;
    }
  }

}
void CGameStateRun::OnKeyUp(UINT nChar, UINT nRepCnt, UINT nFlags)
{
```

```
 //TRACE("3\n");
 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(!IfViewer){
  if(multiplayer==1)
   player[0]->setFlag(false,(nChar==KEY_UP),(nChar == KEY_DOWN),(nChar == KEY_LEFT),(nChar ==
KEY_RIGHT),(nChar == 'Z'),(nChar == 'X'));
  if(multiplayer==2){
   player[0]->setFlag(false,(nChar==KEY_UP),(nChar == KEY_DOWN),(nChar == KEY_LEFT),(nChar ==
KEY_RIGHT),(nChar == 'N'),(nChar == 'M'));
   player[1]->setFlag(false,(nChar==87),(nChar == 83),(nChar == 65),(nChar == 68),(nChar == 90),(nChar == 88));
  }
  if(nChar==9)GameScore::Instance()->ShowScroe();
 }
 else{
  EditPointer.SetMove(false,(nChar == KEY_UP),(nChar == KEY_DOWN),(nChar == KEY_LEFT),(nChar ==
KEY_RIGHT));
 }
}
void CGameStateRun::OnShow()
{
 //  注意：Show 裡面千萬不要移動任何物件的座標，移動座標的工作應由 Move 做才對，
 //        否則當視窗重新繪圖時(OnDraw)，物件就會移動，看起來會很怪。換個術語
 //        說，Move 負責 MVC 中的 Model，Show 負責 View，而 View 不應更動 Model。
 //  貼上背景圖、撞擊數、球、擦子、彈跳的球
 int toolCDC_State = ToolCDC::ReturnStage();
 if(GameScore::Instance()->Switch){
  GameScore::Instance()->onShow();
  return;
 }
 if(toolCDC_State==0 || toolCDC_State==1 || toolCDC_State==4){
  Maps->OnShow();

  if(!IfViewer){
   for(int i=0;i<CanTakeNum;i++){//物件顯示靜止 NowAct=3 顯是在怪物之後
    if(AllThrow[i]==NULL)continue;
    if(AllThrow[i]->ReturnNowAct()!=3)continue;
    AllThrow[i]->OnShow(Maps);
   }

   for(int i=0;i<ONE_LEVEL_MONSTER_NUM && AllMonster[i]!=NULL;i++){//怪物顯示
    AllMonster[i]->OnShow(Maps);
   }

   for(int i=0;i<CanTakeNum;i++){//物件顯示靜止 NowAct=5 靜止在地上 顯是在怪物之前
    if(AllThrow[i]==NULL)continue;
    if(AllThrow[i]->ReturnNowAct()!=5)continue;
    AllThrow[i]->OnShow(Maps);
   }
   Maps->OnShowObject();
   //物件顯示在手中 NowAct=1
   if(player[0]->ReturnNowTakeObj()!=NULL)
    player[0]->ReturnNowTakeObj()->OnShow(Maps);
   if(multiplayer==2 && player[1]->ReturnNowTakeObj()!=NULL){
    player[1]->ReturnNowTakeObj()->OnShow(Maps);
   }
   player[0]->OnShow();//人物顯示
   if(multiplayer==2)
    player[1]->OnShow();
   for(int i=0;i<CanTakeNum;i++){//物件顯示運動中 NowAct = 2 4
    if(AllThrow[i]==NULL)continue;
    if(AllThrow[i]->ReturnNowAct()!=2 && AllThrow[i]->ReturnNowAct()!=4)continue;
    AllThrow[i]->OnShow(Maps);
   }
   ShowWho[Chip_Dale].SetTopLeft(0,0);
   ShowWho[Chip_Dale].ShowBitmap();
```

```
    switch(player[0]->ReturnHealth()){//血量顯示
      case 1 : Health[0].SetTopLeft(0,0);Health[0].ShowBitmap();break;
      case 2 : Health[1].SetTopLeft(0,0);Health[1].ShowBitmap();break;
      case 3 : Health[2].SetTopLeft(0,0);Health[2].ShowBitmap();break;
    }
    if(multiplayer==2){
      ShowWho[2].SetTopLeft(MWIDTH-ShowWho[2].Width(),0);
      ShowWho[2].ShowBitmap();
      switch(player[1]->ReturnHealth()){//血量顯示
        case 1 : Health[0].SetTopLeft(MWIDTH-ShowWho[2].Width(),0);Health[0].ShowBitmap();break;
        case 2 : Health[1].SetTopLeft(MWIDTH-ShowWho[2].Width(),0);Health[1].ShowBitmap();break;
        case 3 : Health[2].SetTopLeft(MWIDTH-ShowWho[2].Width(),0);Health[2].ShowBitmap();break;
      }
    }
   }
   else
    EditPointer.OnShow(Maps);
   //ClearisMoveMap 一定要放在所有要 show 物件的最後面
   Maps->ClearisMoveMap(IfViewer);

   if(show_save)
    saved.ShowBitmap();

   if(toolCDC_State==1||toolCDC_State==4){
    ToolCDC::SaveCDC();
    ToolCDC::ToNextState();
    if(toolCDC_State==4) ToolCDC::CDDraw();
   }
  }
  else{
   ToolCDC::CDDraw();
   ToolCDC::ToNextState();
  }
}
///////////////////////////////////////////////////////////////////////////
// 這個 class 為遊戲的結束狀態(Game Bonus)
///////////////////////////////////////////////////////////////////////////
CGameStateBonus::CGameStateBonus(CGame* g)
: CGameState(g)
{
  TRACE("BonusConstruct\n");
}
CGameStateBonus::~CGameStateBonus(){
  TRACE("~CGameStateBonus()\n");
}
void CGameStateBonus::OnInit(){
  TRACE("BonusInit\n");
}
void CGameStateBonus::OnBeginState(){
  TRACE("BonusOnBeginState\n");
}
void CGameStateBonus::OnMove(){}
void CGameStateBonus::OnShow(){}
///////////////////////////////////////////////////////////////////////////
// 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){
    CAudio::Instance()->Play(AUDIO_BEGIN,true);
    GotoGameState(GAME_STATE_INIT);
  }
}
void CGameStateOver::OnBeginState()
{
  counter = 30 * 5; // 5 seconds
```

```
  CAudio::Instance()->Play(AUDIO_GAMEOVER);
}
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(90); // 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);
  CAudio::Instance()->Load(AUDIO_GAMEOVER,"sounds\\gameover.mp3");
  CAudio::Instance()->Play(AUDIO_BEGIN,true);
}
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, "Game Over ! (%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
}
void CAudio::Resume_for_CGame()
{
  int state=CGame::Instance()->WhichState();
  if(state==GAME_STATE_RUN){
    if(CGameStateRun::IfViewer)
      PlayLevelMusic(0);
    else
    {
      PlayLevelMusic(CGameStateRun::NowLevel);
    }
  }else
    Resume();
}
void CAudio::PlayLevelMusic(int level,bool stop_and_play){
  if (!Instance()->isOpened)
    return;
  int Notboss;
  if(CGameStateRun::IsBoss)Notboss=0;
  else Notboss=1;
  if(level==0)Notboss=0;
  char command[MAX_MCI_COMMAND_SIZE];
  if(stop_and_play)
    sprintf(command, "play device%d from 0 repeat", LevelMusic.at(level*2-Notboss));
  else
    sprintf(command, "resume device%d", LevelMusic.at(level*2-Notboss));
  Instance()->SendMciCommand(command);
  if(level!=0){
    Instance()->PauseById(LevelMusic[0]);
    if(Notboss==0)Instance()->PauseById(LevelMusic[level*2-1]);
  }
  else{
    Instance()->PauseById(LevelMusic[CGameStateRun::NowLevel*2-1]);
    Instance()->PauseById(LevelMusic[CGameStateRun::NowLevel*2]);
  }
}
void CAudio::PauseLevelMusic(int level){
  if (!Instance()->isOpened)
    return;
  int Notboss;
  if(CGameStateRun::IsBoss)Notboss=0;
```

```
  else Notboss=1;
  if(level==0)Notboss=0;
  char command[MAX_MCI_COMMAND_SIZE];
  sprintf(command, "pause device%d wait", LevelMusic.at(level*2-Notboss));
  Instance()->SendMciCommand(command);
}
void CAudio::StopLevelMusic(int level){
  if (!Instance()->isOpened)
    return;
  char command[MAX_MCI_COMMAND_SIZE];
  sprintf(command, "stop device%d", LevelMusic.at(level*2-1));
  Instance()->SendMciCommand(command);
  sprintf(command, "stop device%d", LevelMusic.at(level*2));
  Instance()->SendMciCommand(command);
}
void CAudio::LevelMusicOnit(){
  static bool IsExecuted=false;
  if(IsExecuted)return;
  LevelMusic.insert(pair<int,int>(0,AUDIO_EDIT));
  LevelMusic.insert(pair<int,int>(1,AUDIO_1_1));
  LevelMusic.insert(pair<int,int>(2,AUDIO_1_BOSS));
  IsExecuted=true;
}
void CAudio::PauseById(int id)
{
  int j=0;
  if (!isOpened)
    return;
  map<int, Info>::iterator i;
  i=info.find(id);
  if (i->second.isGood) {
    char command[MAX_MCI_COMMAND_SIZE];
    sprintf(command, "pause device%d wait", i->first);
    SendMciCommand(command);
  }
}
void CAudio::SetSpeedByID(unsigned int id,int speed){
  if (!isOpened)
    return;
  GAME_ASSERT(info.find(id) != info.end(), "Can not play back audio: incorrect Audio ID!");
  if (!info[id].isGood)
    return;
  char command[400];
  sprintf(command, "set device%d speed %d", id,speed);
  SendMciCommand(command);
}
///////////////////////////////////////////////////////////////////////////
// ToolCDC
///////////////////////////////////////////////////////////////////////////
COLORREF ToolCDC::color[MHEIGHT][MWIDTH];
CAnimation ToolCDC::MovePointer;
CMovingBitmap ToolCDC::loading_BG,ToolCDC::loading_Bar,ToolCDC::loading_Mask;
CMovingBitmap ToolCDC::letter[LEVELNUM],ToolCDC::level;
int ToolCDC::NowState=0;
double ToolCDC::alpha=0.0;
ToolCDC::ToolCDC(){}
void ToolCDC::Loading(){
  char name[100];
  MovePointer.SetDelayCount(20);
  MovePointer.AddBitmap("Bitmaps/action/","Chip/","run_1R.bmp",PURPLE);
  MovePointer.AddBitmap("Bitmaps/action/","Chip/","run_2R.bmp",PURPLE);
  MovePointer.AddBitmap("Bitmaps/action/","Chip/","run_3R.bmp",PURPLE);
  MovePointer.AddBitmap("Bitmaps/action/","Chip/","run_4R.bmp",PURPLE);
  loading_BG.LoadBitmapA("Bitmaps/BeginState/loadingBG.bmp",PURPLE);
  loading_Bar.LoadBitmapA("Bitmaps/BeginState/loadingBar.bmp",PURPLE);
  loading_Mask.LoadBitmapA("Bitmaps/BeginState/loadingMask.bmp",PURPLE);
  level.LoadBitmapA("Bitmaps/BeginState/Level.bmp",PURPLE);
  for(int i=0;i<LEVELNUM;i++){
```

```
    sprintf(name,"Bitmaps/BeginState/Letter%d.bmp",i+1);
    letter[i].LoadBitmapA(name,PURPLE);
  }
}
void ToolCDC::CDDraw()
{
  CDC *pDC = CDDraw::GetBackCDC();     // 取得 Back Plain 的 CDC
  for(int i=0;i<MWIDTH;i+=1){
    for(int j=0;j<MHEIGHT;j+=1){
      pDC->SetPixel(i,j,ALPHA(alpha,i,j));
    }
  }
  CDDraw::ReleaseBackCDC();         // 放掉 Back Plain 的 CDC
}
void ToolCDC::SaveCDC()
{
  CDC *pDC = CDDraw::GetBackCDC();     // 取得 Back Plain 的 CDC
  for(int i=0;i<MWIDTH;i+=1){
    for(int j=0;j<MHEIGHT;j+=1){
      if(i%2==0&&j%2==0)
        color[j][i] =pDC->GetPixel(i,j);
      else
        color[j][i] = color[j/2*2][i/2*2];
    }
  }
  CDDraw::ReleaseBackCDC();         // 放掉 Back Plain 的 CDC
  if(NowState<=2) alpha = 0.75;
  if(NowState>=3) alpha = 0.25;
}
void ToolCDC::ToNextState()
{
  switch(NowState){
    case 1:case 2:case 4:
      NowState += 1;
      break;
    case 3:
      if(alpha!=0.0){
        alpha -= 0.25;
        if(alpha<0.0)alpha=0.0;
      }
      else{
        NowState += 1;
      }
      break;
    case 5:
      if(alpha!=1.0){
        alpha += 0.25;
        if(alpha>1.0)alpha=1.0;
      }
      else{
        NowState = 0;
      }
      break;
  }
}
void ToolCDC::ShowProgressBar(int WhichLevel,int percent){
  int width = MovePointer.Width(),height = MovePointer.Height();
  if(percent>100)percent = 100;
  CDDraw::BltBackColor(DEFAULT_BG_COLOR);   // 將 Back Plain 塗上預設的顏色
  loading_Mask.SetTopLeft(95,275);
  loading_Mask.ShowBitmap();
  loading_Bar.SetTopLeft(95-450*(100-percent)/100,275);
  loading_Bar.ShowBitmap();
  loading_BG.SetTopLeft(0,0);
  loading_BG.ShowBitmap();
  MovePointer.SetBottomLeft(95+450*percent/100-(width)/2,275-(height-30)/2,height);
  MovePointer.OnShow();
  MovePointer.OnMove();
```

```
  level.SetTopLeft(160,140);
  level.ShowBitmap();
  letter[WhichLevel-1].SetTopLeft(415,140);
  letter[WhichLevel-1].ShowBitmap();
  CDDraw::BltBackToPrimary();         // 將 Back Plain 貼到螢幕
}
/*************************************************************************/
//GameMapEdit 實作                    */
//                          */
/*************************************************************************/
GameMapEdit::GameMapEdit(){
  Order = 0;
  wx = wy = 0;
  for(int i=0;i<4;i++)
    move[i]=false;
  ContinueMode = 0;
}
void GameMapEdit::Loading(){
  char temp[100];
  frame_pic.LoadBitmapA("Bitmaps/object/Pointer.bmp");
  for(int i=0;i<OrderSize;i++){
    sprintf(temp,"Bitmaps/object/%d.bmp",i);
    frame_background[i].LoadBitmapA(temp,PURPLE);
  }
  for(int i=-1;i>=-MonsterOrderSize;i--){
    sprintf(temp,"Bitmaps/monster/%d.bmp",-i);
    frame_background[-i+OrderSize-1].LoadBitmapA(temp,PURPLE);
  }
}
void GameMapEdit::OnShow(MapManage *map){
  int temp;
  //顯示 目前螢幕上的 OBJ
  for(int i=0;i<=(MWIDTH+2*WinShowBuffer)/ONEOBJX;i++)
    for(int j=0;j<=(MHEIGHT+2*WinShowBuffer)/ONEOBJY;j++)
      map->ShowObstacle(i,j);
  //顯示 目前位置
  temp = (Order<0)*(-Order+OrderSize-1) + (Order>=0)*(Order);
  if(Order==0)
    frame_background[0].SetTopLeft(wx-16,wy-16);
  else
    frame_background[temp].SetTopLeft(wx,wy);
  frame_background[temp].ShowBitmap();
  frame_pic.SetTopLeft(wx,wy);
  frame_pic.ShowBitmap();
}
void GameMapEdit::SetOrder(int value){
  if (value < OrderSize && value >= -MonsterOrderSize)
    Order = value;
  if (value < -MonsterOrderSize)
    Order = OrderSize-1;
  if (value >=OrderSize)
    Order = -MonsterOrderSize;
}
void GameMapEdit::OnMove(MapManage *map)
{
  int width,height,temp;       //目前圖片高度和寬度
  int timesX,timesY;
  if(ContinueMode==0)    {timesX=1; timesY=3; }
  else if(ContinueMode==1){timesX=1; timesY=1; }
  else if(ContinueMode==2){timesX=-1;timesY=-1;}
  temp = (Order<0)*(-Order+OrderSize-1) + (Order>=0)*(Order);
  width = frame_background[temp].Width();
  height = frame_background[temp].Height();
  if(timesX==-1||timesY==-1){
    timesX = width/ONEOBJX;
    timesY = height/ONEOBJY;
  }
  static int limitX = (MWIDTH + width)/2;
```

```
  static int limitY = (MHEIGHT + height)/2;
  if(move[0]){
    wy -= ONEOBJY*timesY;
    if(wy < 0){
      wy += ONEOBJY*timesY;
    }
    if(wy < limitY){
      if((map->GetRoute()&14) && ((map->ReturnNowY())%MHEIGHT)<ONEOBJY*timesY &&
((map->ReturnNowY())%MHEIGHT)>0)
        timesY =((map->ReturnNowY())%MHEIGHT)/ONEOBJY;
      map->MoveMap(1,ONEOBJX*timesX,ONEOBJY*timesY);
    }
    ThisMoveTimesX=timesX;
    ThisMoveTimesY=timesY;
  }
  if(move[1]){
    wy += ONEOBJY*timesY;
    if(wy > MHEIGHT-height){
      wy -= ONEOBJY*timesY;
    }
    if(wy > limitY){
      if((map->GetRoute()&13) && MHEIGHT-((map->ReturnNowY())%MHEIGHT)<ONEOBJY*timesY &&
MHEIGHT-((map->ReturnNowY())%MHEIGHT)>0)
        timesY =(MHEIGHT-((map->ReturnNowY())%MHEIGHT))/ONEOBJY;
      map->MoveMap(2,ONEOBJX*timesX,ONEOBJY*timesY);
    }
    ThisMoveTimesX=timesX;
    ThisMoveTimesY=timesY;
  }
  if(move[2]){
    wx -= ONEOBJX*timesX;
    if(wx < 0){
      wx += ONEOBJX*timesX;
    }
    if(wx < limitX)
      map->MoveMap(4,ONEOBJX*timesX,ONEOBJY*timesY);

    ThisMoveTimesX=timesX;
    ThisMoveTimesY=timesY;
  }
  if(move[3]){
    wx += ONEOBJX*timesX;
    if(wx > MWIDTH-width){
      wx -= ONEOBJX*timesX;
    }
    if(wx > limitX)
      map->MoveMap(8,ONEOBJX*timesX,ONEOBJY*timesY);

    ThisMoveTimesX=timesX;
    ThisMoveTimesY=timesY;
  }
  if(ContinueMode>0){
    move[0] = move[1] = move[2] = move[3] = false;
    ContinueMode =0;
  }
}
void GameMapEdit::SetWxWy(int setWx,int setWy)
{
  wx = setWx;
  wy = setWy;
}
void GameMapEdit::SetMove(bool flag,bool IsUp,bool IsDown,bool IsLeft,bool IsRight,int mode)
{
  if(IsUp) move[0]=flag;
  if(IsDown) move[1]=flag;
  if(IsLeft) move[2]=flag;
  if(IsRight) move[3]=flag;
  if(mode) ContinueMode = mode;
```

```
}
void GameMapEdit::FixXY(MapManage *map)
{
  int temp = map->MoveMap(0);
  if(temp&1)
    wy += ONEOBJY*ThisMoveTimesY;
  if(temp&2)
    wy -= ONEOBJY*ThisMoveTimesY;
  if(temp&4)
    wx += ONEOBJX*ThisMoveTimesX;
  if(temp&8)
    wx -= ONEOBJX*ThisMoveTimesX;

  ThisMoveTimesX=0;
  ThisMoveTimesY=0;
}
void GameMapEdit::SetObject(MapManage *map)
{
  map->SetObj(Order,wx,wy);
}
/*****************************************************************/
//GameScore 實作                    */
//                        */
/*****************************************************************/
GameScore GameScore::Game_Score;
GameScore::GameScore(){
  Switch=false;
  score_p=new CInteger(2);
}
GameScore::~GameScore(){
  delete(score_p);
  TRACE("~GameScore()\n");
}
GameScore* GameScore::Instance()
{
  return &Game_Score;
}
void GameScore::Loading(){
  Head[0].LoadBitmapA("Bitmaps/score/chiphead.bmp");
  Head[1].LoadBitmapA("Bitmaps/score/dalehead.bmp");
  F.LoadBitmapA("Bitmaps/score/F.bmp",PURPLE);
  S.LoadBitmapA("Bitmaps/score/S.bmp",PURPLE);
  L_C.LoadBitmapA("Bitmaps/score/L_C.bmp",PURPLE);
  L_D.LoadBitmapA("Bitmaps/score/L_D.bmp",PURPLE);
  score_p->LoadBitmap();
}
void GameScore::ShowScroe(){
  if(Switch==true)Switch=false;
  else      Switch=true;
}
void GameScore::onShow(){
  if(Switch==false)return;
  if(CGameStateRun::player[0]->ReturnIsDale()==0)
  {
    Head[0].SetTopLeft(MWIDTH/2-100-Head[0].Width(),100);
    Head[0].ShowBitmap();
    F.SetTopLeft(MWIDTH/2-100-Head[0].Width(),240);
    S.SetTopLeft(MWIDTH/2-100-Head[0].Width(),300);
    L_C.SetTopLeft(MWIDTH/2-100-Head[0].Width(),360);
    F.ShowBitmap();
    S.ShowBitmap();
    L_C.ShowBitmap();
    score_p->SetInteger(CGameStateRun::player[0]->Score_Flower);
    score_p->SetTopLeft(MWIDTH/2-50-Head[0].Width(),250);
    score_p->ShowBitmap();
    score_p->SetInteger(CGameStateRun::player[0]->Score_Star);
    score_p->SetTopLeft(MWIDTH/2-50-Head[0].Width(),310);
    score_p->ShowBitmap();
```

```
  score_p->SetInteger(CGameStateRun::player[0]->ReturnLife());
  score_p->SetTopLeft(MWIDTH/2-50-Head[0].Width(),370);
  score_p->ShowBitmap();
 }
 if(CGameStateRun::multiplayer==2||CGameStateRun::player[0]->ReturnIsDale())
 {
  ChipDale* p=CGameStateRun::player[0];
  if(CGameStateRun::multiplayer==2)p=CGameStateRun::player[1];
  Head[1].SetTopLeft(MWIDTH/2+100,100);
  Head[1].ShowBitmap();
  F.SetTopLeft(MWIDTH/2+100,240);
  S.SetTopLeft(MWIDTH/2+100,300);
  L_D.SetTopLeft(MWIDTH/2+100,360);
  F.ShowBitmap();
  S.ShowBitmap();
  L_D.ShowBitmap();
  score_p->SetInteger(p->Score_Flower);
  score_p->SetTopLeft(MWIDTH/2+150,250);
  score_p->ShowBitmap();
  score_p->SetInteger(p->Score_Star);
  score_p->SetTopLeft(MWIDTH/2+150,310);
  score_p->ShowBitmap();
  score_p->SetInteger(p->ReturnLife());
  score_p->SetTopLeft(MWIDTH/2+150,370);
  score_p->ShowBitmap();
 }
}
/*************************************************************************/
//CFrame 實作                    */
//                    */
/*************************************************************************/
int CFrame::Jump_Fix = 0;
CFrame::CFrame()
{
 wx=wy=0;
 for(int i=0;i<6;i++)
  flag[i]=false;
 LRflag=1;
}
void CFrame::SetWxWy(int setX,int setY,bool shiftmode)
{
 if(shiftmode){
  if((wx+width+setX)<=MWIDTH&&(wx+setX)>=0) wx += setX;
  if((wy+setY)<MHEIGHT)      wy += setY;
 }
 else{
  if(setX>=0&&(width+setX)<MWIDTH)    wx = setX;
  if(setY<MHEIGHT)           wy = setY;
 }
}
void CFrame::SetWidthHeight(int tempW,int tempH)
{
 width = tempW;
 height = tempH;
}
void CFrame::FixXY(MapManage *map)
{
 int temp = map->MoveMap(0);
 if(temp&1)
  wy += Jump_Fix;
 if(temp&2)
  wy -= Jump_Fix;
 if(temp&4)
  wx += MapManage::LRMargin;
 if(temp&8)
  wx -= MapManage::LRMargin;
}
void CFrame::ReFixXY(MapManage *map)
```

```
{
  int temp = map->MoveMap(0);
  if(temp&1)
    wy -= Jump_Fix;
  if(temp&2)
    wy += SPEED;
  if(temp&4)
    wx -= MapManage::LRMargin;
  if(temp&8)
    wx += MapManage::LRMargin;
}
void CFrame::FixMapMove(int fixX,int fixY)
{
  wx -= fixX;
  wy -= fixY;
}
int CFrame::IfCollision(int twx,int twy,int twidth,int theight)
{
  //左上 1
  int cx,cy;
  for(int i=1;i<=4;i++){
    switch(i){
      case 1:
        cx = twx;
        cy = twy;
        break;
      case 2:
        cx = twx+twidth;
        cy = twy;
        break;
      case 3:
        cx = twx+twidth;
        cy = twy+theight;
        break;
      case 4:
        cx = twx;
        cy = twy+theight;
        break;
    }
    if(wx<=cx     && wx+width >= cx     && wy<=cy     && wy+height >= cy)    return i;
  }
  if(twx<=wx     && twx+twidth >= wx     && twy<=wy     && twy+theight >= wy)    return 5;
  return 0;
}
int CFrame::IfCollision(int Direct,int passSpeed){
  MapManage *map = ChipDale::Maps;
  passSpeed = abs(passSpeed);
  switch(Direct){
    case 1: return map->IfCollision(wx,wy-passSpeed,width,passSpeed,true);
    case 4:
      if(wx-passSpeed < 0) return 1;
      return map->IfCollision(wx-passSpeed,wy,passSpeed,height,true);
    case 8:
      if(wx+width+passSpeed > MWIDTH) return 1;
      return map->IfCollision(wx+width,wy,passSpeed,height,true);
  }
  return 0;
}
```

mapmanage.cpp

```
/*****************************************************************/
//MapManage 實作                                                 */
/*****************************************************************/
#define SET_INITIAL(Level,LOCATE,INITIAL_Y)
limit[(Level-1)*MAX_YN+LOCATE/10][(Level-1)*MAX_YN+LOCATE%MAX_XN-1] += ((INITIAL_Y*DesSize)<<7);
#define DELIVER(Level,LOCATE,DES)
limit[(Level-1)*MAX_YN+LOCATE/10][(Level-1)*MAX_YN+LOCATE%MAX_XN-1] += (DES<<7);
int MapManage::isMoveMap = 0;
int MapManage::Teleport = 0;
```

```
int MapManage::LRMargin = 0;
MapManage::MapManage(int WhichLevel)
{
  LevelLoading(WhichLevel);
}
void MapManage::LevelLoading(int WhichLevel,bool NotResetAll){
  char temp[100];
  int count=0,OnePercent = (MAX_YN*MAX_XN*2 + OrderSize + MonsterOrderSize + 1)/100;
  FILE *file;
  static int limit[MAX_YN*2][MAX_XN] =       {//第一關
            {15, 0,15+64, 0, 0, 0, 0, 0, 0, 0},
            { 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
            { 8, 8, 8, 8, 8, 8, 0, 0, 0, 0},
            { 0, 0, 0, 0, 0, 0, 0, 0, 0, 0},
            { 9, 8, 8, 8, 8, 8, 8+16, 0, 0, 0},
            { 1, 0, 0, 0, 0, 0 ,0 ,0, 0, 0},
            { 5, 4, 4, 4, 4, 5, 0, 0, 0, 0},
            { 0, 0, 0, 0, 0, 1, 0, 0, 0, 0},
            { 0, 0, 0, 0, 0, 1, 0, 0, 0, 0},
            { 8, 8, 8, 8, 8, 9, 0, 0, 0, 0},
            //第二關...(待開發)
            },IfSetLimit=0;
  //initial_Y 是要輸入 地板的左上角 y 位置 不是人物的左上角 y 位置
  if(!IfSetLimit){//防止跑兩次以上 因為 limit 是 static!!!! (有修正過)
    //第一關
    SET_INITIAL(1,91,135);
    SET_INITIAL(1,21,326);
    SET_INITIAL(1,1,395);
    SET_INITIAL(1,3,395);
    DELIVER(1,47,21);
    DELIVER(1,26,1);
    DELIVER(1,1,3);
    //第二關...(待開發)
    //關卡設定結束
    IfSetLimit=1;
  }
  if(!NotResetAll){
    x=0;y=0;
    ToolCDC::ShowProgressBar(WhichLevel,count/OnePercent);
    for(int i=0;i<MAX_XN;i++){
      for(int j=0;j<MAX_YN;j++){
        Route[j][i] = limit[(WhichLevel-1)*MAX_YN+j][i];
        if(Route[j][i]>0){
          sprintf(temp,"Bitmaps/0x%d/%d.bmp",WhichLevel,j*10+i+1);
          MapSP[j][i].LoadBitmap(temp);
          if(Route[j][i]&16){
            x = i*MWIDTH;
            y = j*MHEIGHT;
            recordx=x;
            recordy=y;
            Teleport = Route[j][i];
          }
        }
        count++;
        ToolCDC::ShowProgressBar(WhichLevel,count/OnePercent);
      }
    }
  }
  /* NotResetAll 有跟無差在底下 SET */
  sprintf(temp,"ObjInfo/0x%d.ChipDale",WhichLevel);
  file    = fopen(temp,"rb");
  for(int j=0;j<MAX_OY;j++)for(int i=0;i<MAX_OX;i++)MapObjXY[j][i]=0;
  if(file){
    for(int j=0;j<MAX_YN;j++){
      for(int i=0;i<MAX_XN;i++){
        if(Route[j][i]){
          for(int k=0;k<MAX_OY/MAX_YN;k++){
            fread(&MapObjXY[j*MAX_OY/MAX_YN+k][i*MAX_OX/MAX_XN],MAX_OX/MAX_XN,sizeof(int),file);
```

```
        }
       }
       if(!NotResetAll){
        count++;
        ToolCDC::ShowProgressBar(WhichLevel,count/OnePercent);
       }
      }
     }
     fclose(file);
    }
    else{
     SaveObj(WhichLevel);
     if(!NotResetAll){
      count += MAX_YN*MAX_XN;
      ToolCDC::ShowProgressBar(WhichLevel,count/OnePercent);
     }
    }
    if(!NotResetAll){
     for(int i=0;i<OrderSize;i++){
      sprintf(temp,"Bitmaps/object/%d.bmp",i);
      frame_obstacle[i].LoadBitmapA(temp,PURPLE);
      count++;
      ToolCDC::ShowProgressBar(WhichLevel,count/OnePercent);
     }
     for(int i=-1;i>=-MonsterOrderSize;i--){
      sprintf(temp,"Bitmaps/monster/%d.bmp",-i);
      frame_obstacle[-i+OrderSize-1].LoadBitmapA(temp,PURPLE);
      count++;
      ToolCDC::ShowProgressBar(WhichLevel,count/OnePercent);
     }
     frame_obstacle[OrderSize+MonsterOrderSize + 0].LoadBitmapA("Bitmaps/object/StoneUnVisible.bmp",PURPLE);
     count++;
     ToolCDC::ShowProgressBar(WhichLevel,100);
    }
   }
   void MapManage::OnShow(){
    int gx = x/MWIDTH,gy = y/MHEIGHT;     //地圖左上角轉換成螢幕格座標
    int ox = x/ONEOBJX,oy = y/ONEOBJY;
    for(int i=0;i<2;i++){
     for(int j=0;j<2;j++){
      if(gx+i>=0 && gx+i<MAX_XN && gy+j>=0 && gy+j<MAX_YN && Route[gy+j][gx+i]>0){
       MapSP[gy+j][gx+i].SetTopLeft((gx+i)*MWIDTH-x,(gy+j)*MHEIGHT-y);
       MapSP[gy+j][gx+i].ShowBitmap();
      }
     }
    }
   }
   void MapManage::OnShowObject(){
    int gx = x/MWIDTH,gy = y/MHEIGHT;     //地圖左上角轉換成螢幕格座標
    int ox = x/ONEOBJX,oy = y/ONEOBJY;
    for(int j=-(WinShowBuffer/ONEOBJY);j<MHEIGHT/ONEOBJY;j++){
     if(oy+j<0)j=-oy;
     for(int i=-(WinShowBuffer/ONEOBJX);i<MWIDTH/ONEOBJX;i++){
      if(ox+i<0)i=-ox;
      if(MapObjXY[oy+j][ox+i]>=OrderSize||MapObjXY[oy+j][ox+i]<=2)
       continue;
      frame_obstacle[MapObjXY[oy+j][ox+i]].SetTopLeft( (ox+i)*ONEOBJX-x , (oy+j)*ONEOBJY-y );
      frame_obstacle[MapObjXY[oy+j][ox+i]].ShowBitmap();
     }
    }
   }
   void MapManage::ShowObstacle(int i,int j){
    int ox = (x-WinShowBuffer)/ONEOBJX,oy = (y-WinShowBuffer)/ONEOBJY,temp=0;
    if(ox+i>=0 && ox+i<MAX_OX && oy+j>=0 && oy+j<MAX_OY && MapObjXY[oy+j][ox+i]!=0){
     if(MapObjXY[oy+j][ox+i]>=OrderSize || MapObjXY[oy+j][ox+i] < -MonsterOrderSize)
      return;
     temp = (MapObjXY[oy+j][ox+i]<0)*(-MapObjXY[oy+j][ox+i]+OrderSize-1) +
   (MapObjXY[oy+j][ox+i]>=0)*(MapObjXY[oy+j][ox+i]);
```

```
    frame_obstacle[ temp ].SetTopLeft((ox+i)*ONEOBJX-x,(oy+j)*ONEOBJY-y);
    frame_obstacle[ temp ].ShowBitmap();
   }
  }
 int MapManage::MoveMap(int move,int MoveOneX,int MoveOneY){
   if((move&4) || (move&8)){
    LRMargin = MoveOneX;
   }
   if((move&1) || (move&2)){
    CFrame::Jump_Fix = MoveOneY;
   }
   if( (move&1) && !(isMoveMap&1)){
    if(x%MWIDTH == 0 && ( (Route[y/MHEIGHT][x/MWIDTH]&1) ||
 ((Route[y/MHEIGHT][x/MWIDTH]&2)&&(isMoveMap&16)))){
      y -=MoveOneY;
      isMoveMap |= 1;
      if(y<0 || Route[y/MHEIGHT][x/MWIDTH]==0){
       y +=MoveOneY;
       isMoveMap &= 30;
      }
    }
    else if(x%MWIDTH <= SPEED && (Route[y/MHEIGHT][x/MWIDTH]&1)){
      y -=MoveOneY;
      x -= x%MWIDTH;
      isMoveMap |= (1+4);
      LRMargin = x%MWIDTH;
      if(y<0 || Route[y/MHEIGHT][x/MWIDTH]==0){
       y +=MoveOneY;
       isMoveMap &= 30;
      }
    }
    else if((x+SPEED)%MWIDTH <= SPEED && (Route[y/MHEIGHT][(x+SPEED)/MWIDTH]&1)){
      y -=MoveOneY;
      x += (x+SPEED)/MWIDTH*MWIDTH - x;
      isMoveMap |= (1+8);
      LRMargin = (x+SPEED)/MWIDTH*MWIDTH - x;
      if(y<0 || Route[y/MHEIGHT][x/MWIDTH]==0){
       y +=MoveOneY;
       isMoveMap &= 30;
      }
    }
   }
   if( (move&2) && !(isMoveMap&2)){
    if(x%MWIDTH == 0 && ( (Route[y/MHEIGHT][x/MWIDTH]&2) ||
 ((Route[y/MHEIGHT][x/MWIDTH]&1)&&(isMoveMap&16)))){
      y +=MoveOneY;
      isMoveMap |= 2;
      if(y+MHEIGHT-1>MHEIGHT*MAX_YN || Route[(y+MHEIGHT-1)/MHEIGHT][x/MWIDTH]==0){
       y -=MoveOneY;
       isMoveMap &= 29;
      }
    }
   }
   if( (move&4) && !(isMoveMap&4)){
    if(y%MHEIGHT == 0 && ( (Route[y/MHEIGHT][x/MWIDTH]&4) ||
 ((Route[y/MHEIGHT][x/MWIDTH]&8)&&(isMoveMap&16)))){
      x -=MoveOneX;
      isMoveMap |= 4;
      if(x<0 || Route[y/MHEIGHT][x/MWIDTH]==0){
       x +=MoveOneX;
       isMoveMap &= 27;
      }
    }
   }
   if( (move&8) && !(isMoveMap&8)){
    if(y%MHEIGHT == 0 && ( (Route[y/MHEIGHT][x/MWIDTH]&8) ||
 ((Route[y/MHEIGHT][x/MWIDTH]&4)&&(isMoveMap&16)))){
      x +=MoveOneX;
```

```
      isMoveMap |= 8;
      if(x+MWIDTH-1>MWIDTH*MAX_XN || Route[y/MHEIGHT][(x+MWIDTH-1)/MWIDTH]==0){
        x -=MoveOneX;
        isMoveMap &= 23;
      }
    }
  }
  return isMoveMap;
}
void MapManage::SetMapXY(int setX,int setY){
  x = setX;
  y = setY;
}
void MapManage::Set_toRecord(){
  Object **AllThrow = ChipDale::CanThrow;
  LevelLoading(CGameStateRun::NowLevel,true);
  SetMapXY(recordx,recordy);
  SetObstacle();
  SetMonster(ChipDale::AllMonster);
  for(int i=0;i<CanTakeNum;i++){
    if(AllThrow[i]!=NULL)
      AllThrow[i]->SetNowAct(0);
  }
}
void MapManage::SetObj(int value,int wx,int wy){
  MapObjXY[(wy+y)/ONEOBJY][(wx+x)/ONEOBJX] = value;
}
void MapManage::SaveObj(int WhichLevel){
  char temp[100];
  FILE *file;
  sprintf(temp,"ObjInfo/0x%d.ChipDale",WhichLevel);
  file    = fopen(temp,"wb");
  for(int j=0;j<MAX_YN;j++){
    for(int i=0;i<MAX_XN;i++){
      if(Route[j][i]){
        for(int k=0;k<MAX_OY/MAX_YN;k++){
          fwrite(&MapObjXY[j*MAX_OY/MAX_YN+k][i*MAX_OX/MAX_XN],MAX_OX/MAX_XN,sizeof(int),file);
        }
      }
    }
  }
  fclose(file);
}
void MapManage::ClearisMoveMap(bool WatchMode)
{
  if(WatchMode)isMoveMap = 16;
  else isMoveMap=0;
}
int MapManage::IfCollision(int wx,int wy,int PicWidth,int PicHeight,bool ignore_obj_2,bool ignore_eat,bool findNext,bool
Reverse)
{
  int start_ox,start_oy,end_ox,end_oy,tj;
  if(wy<0){
    PicHeight += wy;
    wy=0;
  }
  start_ox = (x+wx)/ONEOBJX;
  start_oy = (y+wy)/ONEOBJY;
  if(start_ox<0)start_ox = 0;
  if(start_oy<0)start_oy = 0;
  end_ox = (x+wx+PicWidth)/ONEOBJX;
  end_oy = (y+wy+PicHeight)/ONEOBJY;
  if(end_ox>=MAX_OX)end_ox = MAX_OX-1;
  if(end_oy>=MAX_OY)end_oy = MAX_OY-1;

  for(int j=end_oy-1;j>=start_oy;j--){
    if(Reverse) tj = (start_oy+end_oy-1)-j;
    else    tj = j;
```

```
  for(int i=start_ox;i<end_ox;i++){
    if(!ignore_eat && ( Obstacle[tj][i]/E8==4 || Obstacle[tj][i]/E8>=7 && Obstacle[tj][i]/E8<=13 || Obstacle[tj][i]/E8==17) )//花
      continue;
    if(ignore_obj_2 && Obstacle[tj][i]==2)
      continue;
    if(Obstacle[tj][i]>0){
      if(Obstacle[tj][i]!=1&&Obstacle[tj][i]!=2)
      if(findNext==true){
        j=(Obstacle[tj][i]%E8)/E4-1;
        findNext=false;
        break;
      }
      return Obstacle[tj][i];
    }
  }
 }
 return 0;
}
void MapManage::SetObstacle()
{
 for(int i=0;i<MAX_OX;i++)
   for(int j=0;j<MAX_OY;j++)
     Obstacle[j][i]=0;
 int ox_end,oy_end,ox_start,oy_start;
 for(int i=0;i<MAX_OX;i++)
 {
   for(int j=0;j<MAX_OY;j++)
   {
    if(MapObjXY[j][i] < OrderSize && MapObjXY[j][i] > 0){
      ox_start=i;
      oy_start=j;
      switch(MapObjXY[j][i]){
        case 1:
        case 3:case 4:case 5:case 6:case 7:case 8:
        case 12:case 13:case 14:case 15:case 16:case 17:case 18:case BALL:
          ox_end = ox_start + frame_obstacle[MapObjXY[j][i]].Width()/ONEOBJX;
          oy_end = oy_start + frame_obstacle[MapObjXY[j][i]].Height()/ONEOBJY;
          break;
        case 9:case 10:case 11:
          ox_end = ox_start + frame_obstacle[MapObjXY[j][i]].Width()/ONEOBJX;
          oy_end = oy_start + frame_obstacle[MapObjXY[j][i]].Height()/ONEOBJY;
          oy_start += 5;
          ox_start += 2;
          ox_end -= 2;
          break;
        case 2:
          ox_end = ox_start + frame_obstacle[MapObjXY[j][i]].Width()/ONEOBJX;
          oy_end = oy_start + 1;
          break;
        default:
          ox_end = ox_start;oy_end = oy_start;
          break;
      }
      for(int l=oy_start;l<oy_end;l++){
        for(int k=ox_start;k<ox_end;k++){
          if(MapObjXY[j][i]==1||MapObjXY[j][i]==2)
            Obstacle[l][k] = MapObjXY[j][i];
          else
            Obstacle[l][k] = MapObjXY[j][i]*E8+(j+1)*E4+(i+1);
        }
      }
      switch(MapObjXY[j][i]){
        case 9:case 10:case 11:
          MapObjXY[j][i]=18;
          break;
        case 14:case 15:case 16:
          MapObjXY[j][i]=3;
          break;
```

```
        case 13:case 17:
          MapObjXY[j][i]=0;
          break;
       }
      }
    }
  }
}
void MapManage::SetMonster(Monster *monster[])
{
  int lengthO,k=0;
  for(int i=k;i<ONE_LEVEL_MONSTER_NUM;i++){
    if(monster[i]!=NULL){
      delete(monster[i]);
    }
  }
  for(int j=0;j<MAX_OY;j++){
    for(int i=0;i<MAX_OX;i++){
      switch(MapObjXY[j][i]){
        case -1:
          monster[k] = new MachineDog(this,i,j);
          k++;break;
        case -2:
          monster[k] = new Cactus(this,i,j);
          k++;break;
        case -3:
          for(lengthO=i+1;lengthO<i+50;lengthO++){
            if(MapObjXY[j][lengthO] == -3){
              MapObjXY[j][lengthO] = 0;
              break;
            }
          }
          monster[k] = new Wire(this,i,j,lengthO-i);
          k++;break;
        case -4:
          monster[k] = new Mouse(this,i,j);
          k++;break;
        case -5:
          monster[k] = new Wasp(this,i,j);
          k++;break;
        case -6:
          monster[k] = new Centipede(this,i,j);
          k++;break;
      }
    }
  }
  if(k>=ONE_LEVEL_MONSTER_NUM){
    TRACE("SetMonster Overflow ( %d )!!!\n",k);
    Sleep(10000);
  }
  else{
    for(int i=k;i<ONE_LEVEL_MONSTER_NUM;i++)
      monster[i] = NULL;
  }
}
void MapManage::ClearObstacle(int Value)
{
  int ox_start,oy_start;
  int ox_end,oy_end;
  int ObjetID;
  ox_start = Value%E4-1; Value /= E4;
  oy_start = Value%E4-1; Value /= E4;
  ObjetID = Value;
  if(Value!=0){
    ox_end = ox_start + frame_obstacle[ObjetID].Width()/ONEOBJX;
    oy_end = oy_start + frame_obstacle[ObjetID].Height()/ONEOBJY;
    for(int k=ox_start;k<ox_end;k++)
      for(int l=oy_start;l<oy_end;l++)
```

```
        Obstacle[l][k] = 0;
    MapObjXY[oy_start][ox_start]=0;
    if(Value==5)
      MapObjXY[oy_start+1][ox_start]=0;
  }
}
int MapManage::FillObstacle(int Value,int setWx,int setWy,bool Visible)
{
  int minusX=0,minusY=0;
  int ox_start,oy_start;
  int ox_end,oy_end;
  int ObjetID;
  ox_start = (setWx + x)/ONEOBJX;
  oy_start = (setWy + y)/ONEOBJY;
  ObjetID = Value;
  if(Value!=0){
    ox_end = ox_start + frame_obstacle[ObjetID].Width()/ONEOBJX;
    oy_end = oy_start + frame_obstacle[ObjetID].Height()/ONEOBJY;
    switch(ObjetID){
      case 4:case 7:case 8:
        minusX = 1;
        minusY = 1;
        break;
    }
    for(int l=oy_start+minusY;l<oy_end-minusY;l++)
      for(int k=ox_start+minusX;k<ox_end-minusX;k++)
        Obstacle[l][k] = Value*E8+(oy_start+1)*E4+(ox_start+1);
    if(Visible)
      MapObjXY[oy_start][ox_start] = Value;
  }
  return Value*E8+(oy_start+1)*E4+(ox_start+1);
}
```

instruction.cpp

```
/*********************************************************************/
//AI_Instructions 實作                                                */
/*********************************************************************/
AI_Instructions::AI_Instructions()
{
  UpSpeed=0;
  IsJump = false;
  LR_Space = 0;
  NoIgnore_2 = true;
  NoIgnore_eat = false;
}
bool AI_Instructions::MoveUp(MapManage* map){
  if(NoCollision || !map->IfCollision(wx,wy-MoveSPEED,width,height,true)){
    wy -= MoveSPEED;
    return true;
  }
  return false;
}
bool AI_Instructions::MoveDown(MapManage* map){
  if(NoCollision || !map->IfCollision(wx,wy+MoveSPEED,width,height,true)){
    wy += MoveSPEED;
    return true;
  }
  return false;
}
bool AI_Instructions::MoveLeft(MapManage* map){
  if(NoCollision || !map->IfCollision(wx-MoveSPEED,wy,MoveSPEED,height,true)){
    wx -= MoveSPEED;
    return true;
  }
  return false;
}
bool AI_Instructions::MoveRight(MapManage* map){
  if(NoCollision || !map->IfCollision(wx+width,wy,MoveSPEED,height,true)){
    wx += MoveSPEED;
```

```
    return true;
  }
  return false;
}
void AI_Instructions::Jump()
{
  UpSpeed = JumpSPEED;
}
int AI_Instructions::FallingDown(MapManage* map)
{
  int i=0;
  int fixY=0,fixX=0;
  int IsLand=false;
  //修正落下時左右兩邊應該空多少不判斷
  wx += LR_Space;
  width -= 2*LR_Space;
  //最後面記得要回復原本設定
  //落下過程的 FLAG 初始化
  if(IsJump || !map->IfCollision(wx+fixX,wy+height+fixY,width,1,false,NoIgnore_eat/*ONEOBJY*/)){
    UpSpeed -= GRAVITY;
    IsJump = true;
  }
  ////////////////////////////////
  //以下部分為操作速度的實作過程
  ////////////////////////////////
  if(UpSpeed<0 && map->IfCollision(wx+fixX,wy+height+fixY,width,abs(UpSpeed),false,NoIgnore_eat)){
    //落地動作
    while(!map->IfCollision(wx+fixX,wy+height+i+fixY,width,1,false,NoIgnore_eat))i++;/* 碰撞的修正 */
    wy += i;
    UpSpeed = 0;
    IsJump = false;
    IsLand=true;
  }
  else if(UpSpeed>0 && map->IfCollision(wx+fixX,wy+fixY-abs(UpSpeed),width,abs(UpSpeed),NoIgnore_2)){
    /*向上跳過程遇到障礙物*/
    i=0;while(!map->IfCollision(wx+fixX,wy-i+fixY-1,width,1,NoIgnore_2))i++;// 碰撞的修正
    wy -= i;
    UpSpeed = 0;
  }
  else{
    //跳躍過程
    wy -= UpSpeed;
  }
  if(map->IfCollision(wx+fixX,wy+height+fixY,width,1,false,NoIgnore_eat/*ONEOBJY*/)){
    IsLand=true;
    IsJump = false;
  }
  //修正落下時左右兩邊應該空多少不判斷 回復原本設定
  wx -= LR_Space;
  width += 2*LR_Space;
  return IsLand;
}
/*****************************************************************/
//BasicInstructions 實作                                          */
/*****************************************************************/
bool BasicInstructions::canMoveMapX = true;
bool BasicInstructions::canMoveMapY = true;
BasicInstructions::BasicInstructions()
{
  UpSpeed=0;
  time_jump=0;
  IsJump = false;
  IsRun    = false;
  IsLessCollision = false;
  ani_jump_count=TIMEFOR_ANI_JUMP+1;
  Reduce_UP_VELOCITY = 0;
}
bool BasicInstructions::MoveLeft(MapManage* map){
```

```
 int i,limitX = (MWIDTH + width)/2,temp,testTemp;
 int UnVisibleStone = OrderSize+MonsterOrderSize +0;
 TriggerObj(3);
 if(ToolCDC::ReturnStage()!=0)return false; //防止已經存圖又移動
 //抓人
 if(Instance()->Partner!=NULL&&CollisionChipDale(4,2,0)&&!Instance()->ReturnIsTaken()&&Instance()->A_FLAG
  &&!Instance()->Partner->ReturnIsTaken()&&!Instance()->Partner->ReturnInvincible()){
  Object** CanThrow=ChipDale::CanThrow;
  for(int i=0;i<CanTakeNum;i++){
   if(CanThrow[i]==NULL){
    //if(Partner->Alive)break; //註解掉此行會有殘影效果
    CanThrow[i]=new ChipDale_Taken(Instance());
    Instance()->NowTakeObj=CanThrow[i];
    Instance()->NowTaken=ChipDale_taken;
    Instance()->A_FLAG = false;
    break;
   }
  }
 }
 //拿東西
 if(A_FLAG && !SetNowTaken(-1)){
  temp = map->IfCollision(wx-SPEED-ONEOBJX,wy,ONEOBJX,height,true,false);
  testTemp = map->IfCollision(wx-SPEED-ONEOBJX,wy,ONEOBJX,height,true,false,true);
  if(testTemp/E8==5 || temp/E8==5 && testTemp/E8!=5 && testTemp/E8!=0) temp = testTemp;
  if(testTemp/E8==UnVisibleStone || temp/E8==UnVisibleStone && testTemp/E8!=UnVisibleStone && testTemp/E8!=0) temp
= testTemp;
  if(temp!=1&&temp!=2&&temp!=0&&temp/E8!=4){
   map->ClearObstacle(temp);
   SetNowTaken(temp);
   A_FLAG = false;
  }
 }
 temp = CollisionChipDale(4,SPEED,0);
 //移動
 if(!map->IfCollision(wx-SPEED,wy,SPEED,height,true) && !temp){

  SetWxWy(-SPEED,0,true);
  if(canMoveMapX && wx < limitX)
   map->MoveMap(4);
  return true;
 }
 else if(temp) {
  //FIRST 腳色完全貼近
  i=SPEED-1;while(i>=0 && CollisionChipDale(4,i,0))i--;
  SetWxWy(-i,0,true);
  //移動剩餘額度 SPEED-i

  //貼近之後推擠對方
  if(!getPartner()->ReturnHideComplete()&&!IfCollision(4,1))
  CollisionChipDale(4,1);
  //帶動螢幕
  if(canMoveMapX && wx < limitX)
   map->MoveMap(4,1);
  return true;
 }
 else {
  //撞到地圖障礙物修正
  i=0;while(!map->IfCollision(wx-i,wy,width,height,true))i++;
  wx -=(i!=0)*(i-1)+(i==0)*(-SPEED);
 }
 return false;
}
bool BasicInstructions::MoveRight(MapManage* map){
 int i,limitX = (MWIDTH + width)/2,temp,testTemp;
 int UnVisibleStone = OrderSize+MonsterOrderSize +0;
 TriggerObj(4);
 if(ToolCDC::ReturnStage()!=0)return false; //防止已經存圖又移動
 //抓人
```

```
 if(Instance()->Partner!=NULL&&CollisionChipDale(8,2,0)&&!Instance()->ReturnIsTaken()&&Instance()->A_FLAG
  &&!Instance()->Partner->ReturnIsTaken()&&!Instance()->Partner->ReturnInvincible()){
  Object** CanThrow=ChipDale::CanThrow;

  for(int i=0;i<CanTakeNum;i++){
   if(CanThrow[i]==NULL){
    CanThrow[i]=new ChipDale_Taken(Instance());
    Instance()->NowTakeObj=CanThrow[i];
    Instance()->NowTaken=ChipDale_taken;
    Instance()->A_FLAG = false;
    break;
   }
  }
 }
 //拿東西
 if(A_FLAG && !SetNowTaken(-1)){
  temp = map->IfCollision(wx+width+SPEED,wy,ONEOBJX,height,true,false);
  testTemp = map->IfCollision(wx+width+SPEED,wy,ONEOBJX,height,true,false,true);
  if(testTemp/E8==5 || temp/E8==5 && testTemp/E8!=5 && testTemp/E8!=0) temp = testTemp;
  if(testTemp/E8== UnVisibleStone|| temp/E8==UnVisibleStone && testTemp/E8!=UnVisibleStone && testTemp/E8!=0) temp
= testTemp;
  if(temp!=1&&temp!=2&&temp!=0&&temp/E8!=4){//箱子...
   map->ClearObstacle(temp);
   SetNowTaken(temp);
   A_FLAG = false;
  }
 }
 //移動
 temp = CollisionChipDale(8,SPEED,0);
 if(!map->IfCollision(wx+width,wy,SPEED,height,true) && !temp){
  SetWxWy(SPEED,0,true);
  if(canMoveMapX && wx > limitX)
   map->MoveMap(8);
  return true;
 }
 else if(temp){
  //FIRST 腳色完全貼近
  i=SPEED-1;while(i>=0 && CollisionChipDale(8,i,0))i--;
  SetWxWy(i,0,true);
  //移動剩餘額度 SPEED-i
  //貼近之後推擠對方
  if(!getPartner()->ReturnHideComplete()&&!IfCollision(8,1))
  CollisionChipDale(8,1);
  //帶動螢幕
  if(canMoveMapX && wx > limitX)
   map->MoveMap(8,1);
  return true;
 }
 else{
  i=0;while(!map->IfCollision(wx+i,wy,width,height,true))i++;
  wx +=(i!=0)*(i-1)+(i==0)*(-SPEED);
 }
 return false;
}
bool BasicInstructions::Jump()
{
 if(ToolCDC::ReturnStage()!=0)return false; //防止已經存圖又移動
 if(time_jump < TIMEFORJUMP && !IsLessCollision){
  if(B_FLAG){
   UpSpeed = UP_VELOCITY - (time_jump-1)*GRAVITY -Reduce_UP_VELOCITY;
   time_jump++;
  }
  else{
   time_jump = TIMEFORJUMP;
   UpSpeed = UP_VELOCITY - (TIMEFORJUMP-1)*GRAVITY -Reduce_UP_VELOCITY;
  }
  return true;
 }
```

```
 return false;
}
int BasicInstructions::FallingDown(MapManage* map)
{
 int i=0,limitY = (MHEIGHT )/2- height;
 int If_Reset_State=false,tempFixY=0,tempFixX=0;
 if(ToolCDC::ReturnStage()!=0)return If_Reset_State; //防止已經存圖又移動
 //暫時性修正  讓遊戲在未修正前也能判斷正常
 if(map->MoveMap(0)&1)tempFixY = Jump_Fix;
 if(map->MoveMap(0)&4)tempFixX = SPEED;
 if(map->MoveMap(0)&8)tempFixX = -SPEED;
 //落下過程的 FLAG 初始化 // 預設是不進行跳躍
 if(!IsLessCollision && !map->IfCollision(wx+tempFixX,wy+height+tempFixY,width,1/*ONEOBJY*/)
  &&!CollisionChipDale(2,1,0)){
  UpSpeed -= GRAVITY;
  IsJump = true;
  If_Reset_State = true;
 }
 //如果下方為藍色地板以外的物件則不能下跳
 if(IsLessCollision && map->IfCollision(wx+tempFixX,wy+height+tempFixY,width,1/*ONEOBJY*/,true )){
  IsLessCollision= false;
  IsJump=false;
  B_FLAG = false;
  UpSpeed=0;
 }
 //等到 MoveRL 修好了再啟用
 if(CollisionChipDale(2,0,0)){
  i=0;
  while(CollisionChipDale(2,1,0)){
   wy--;
   i++;/* 碰撞的修正 */
  }
 }
 ////////////////////////////////
 //以下部分為操作速度的實作過程
 ////////////////////////////////
 //吃花
 if(UpSpeed<=0)
  TriggerObj(1);
 else
  TriggerObj(2);
 if(IsLessCollision){
  //下跳穿越地板
  UpSpeed -= GRAVITY;
  wy -= UpSpeed;
  if(!map->IfCollision(wx+tempFixX,wy+height+tempFixY,width,1))
   IsLessCollision= false;
  IsJump = true;
  If_Reset_State = true;
 }
 else if(UpSpeed<0 && map->IfCollision(wx+tempFixX,wy+height+tempFixY,width,abs(UpSpeed))){
  //落地動作
  while(!map->IfCollision(wx+tempFixX,wy+height+i+tempFixY,width,1))i++;/* 碰撞的修正 */
  wy += i;
  UpSpeed = 0;
  time_jump = 0;
  If_Reset_State = true;
  IsJump = false;
  B_FLAG = false;
  ani_jump_count=0;
 }
 else if(UpSpeed<0 && CollisionChipDale(2,UpSpeed,0)){
  i=0;
  while(CollisionChipDale(2,i,0)!=1){
   i++;/* 碰撞的修正 */
  }
  wy += i-1;
  UpSpeed = 0;
```

```
  time_jump = 0;
  If_Reset_State = true;
  IsJump = false;
  B_FLAG = false;

  ani_jump_count=0;
 }
 else if(UpSpeed>0 && map->IfCollision(wx+tempFixX,wy+tempFixY-abs(UpSpeed),width,abs(UpSpeed),true)){
  /*向上跳過程遇到障礙物*/
  i=0;while(!map->IfCollision(wx+tempFixX,wy-i+tempFixY-1,width,1,true))i++;// 碰撞的修正
  wy -= i;
  UpSpeed = 0;
  time_jump = TIMEFORJUMP;
 }
 else{//跳躍過程,持續呼叫
  //2P 碰撞
  if(UpSpeed>0)CollisionChipDale(1,UpSpeed,1);
  wy -= UpSpeed;
 }
 /*跳躍帶動螢幕*/
 if(canMoveMapY && wy < limitY && UpSpeed>0 && !(map->MoveMap(0)&1)){
  map->MoveMap(1,SPEED,UpSpeed/SPEED*SPEED);
  Jump_Fix =UpSpeed/SPEED*SPEED;
 }
 return If_Reset_State;
}
```

ChipDale.cpp

```
/*********************************************************************/
//ChipDale 實作                                                      */
/*********************************************************************/
Object     **ChipDale::CanThrow;
MapManage *ChipDale::Maps;
Monster     **ChipDale::AllMonster;
CAnimation ChipDale::animation[2][2][ACTION_NUM][2];        // 動作~方向
CAnimation ChipDale::ani_sweat[2];
CAnimation ChipDale::ani_dizzy;
CAnimation ChipDale::ani_god[2];
ChipDale::ChipDale(int isDale){
 IsDale = isDale;
 Life=3;
 Reset(10,10);//必須先有 Life 才能 reset
 IsGod=false;
 ResetScore();
}
void ChipDale::Reset(int Wx,int Wy,bool LR,bool FullHealth){
 if(Life<=0)return;
 wx=Wx;
 wy=Wy;
 LRflag=LR;
 if(FullHealth)Health=3;
 LOCK=false;
 time_jump = 0;
 NowAct=LastAct=0;
 NowTaken=0;
 freeze=0;
 Reduce_UP_VELOCITY = 0;
 Invincible = IsFaint=0;
 Hurt=false;
 NowTakeObj=NULL;
 ani_sweat_count=0;
 ani_Hide_freeze_jump=false;
 setFlag(false,true,true,true,true,true,true);
 Alive=true;
 UpSpeed=0;
 time_jump=0;
 IsJump = false;
 IsRun    = false;
 IsLessCollision = false;
```

```
 ani_jump_count=TIMEFOR_ANI_JUMP+1;
 Reduce_UP_VELOCITY = 0;
};
void ChipDale::Loading(){
 char name[6]="chip/";
 for(int i=0;i<2;i++){
  animation[i][0][0][0].AddBitmap("Bitmaps/action/",name,"stand_L.bmp",PURPLE);
  animation[i][0][0][1].AddBitmap("Bitmaps/action/",name,"stand_R.bmp",PURPLE);
  animation[i][0][1][0].AddBitmap("Bitmaps/action/",name,"run_1L.bmp",PURPLE);
  animation[i][0][1][0].AddBitmap("Bitmaps/action/",name,"run_2L.bmp",PURPLE);
  animation[i][0][1][0].AddBitmap("Bitmaps/action/",name,"run_3L.bmp",PURPLE);
  animation[i][0][1][0].AddBitmap("Bitmaps/action/",name,"run_4L.bmp",PURPLE);
  animation[i][0][1][1].AddBitmap("Bitmaps/action/",name,"run_1R.bmp",PURPLE);
  animation[i][0][1][1].AddBitmap("Bitmaps/action/",name,"run_2R.bmp",PURPLE);
  animation[i][0][1][1].AddBitmap("Bitmaps/action/",name,"run_3R.bmp",PURPLE);
  animation[i][0][1][1].AddBitmap("Bitmaps/action/",name,"run_4R.bmp",PURPLE);
  animation[i][0][2][0].AddBitmap("Bitmaps/action/",name,"jump_1L.bmp",PURPLE);
  animation[i][0][2][1].AddBitmap("Bitmaps/action/",name,"jump_1R.bmp",PURPLE);
  animation[i][0][3][0].AddBitmap("Bitmaps/action/",name,"throw_L.bmp",PURPLE);
  animation[i][0][3][1].AddBitmap("Bitmaps/action/",name,"throw_R.bmp",PURPLE);
  animation[i][0][4][0].AddBitmap("Bitmaps/action/",name,"Squat_1L.bmp",PURPLE);
  animation[i][0][4][1].AddBitmap("Bitmaps/action/",name,"Squat_1R.bmp",PURPLE);
  animation[i][0][5][0].AddBitmap("Bitmaps/action/",name,"Hurt_L.bmp",PURPLE);
  animation[i][0][5][1].AddBitmap("Bitmaps/action/",name,"Hurt_R.bmp",PURPLE);
  animation[i][0][6][0].AddBitmap("Bitmaps/action/",name,"Faint_1L.bmp",PURPLE);
  animation[i][0][6][0].AddBitmap("Bitmaps/action/",name,"Faint_2L.bmp",PURPLE);
  animation[i][0][6][0].AddBitmap("Bitmaps/action/",name,"Faint_3L.bmp",PURPLE);
  animation[i][0][6][0].AddBitmap("Bitmaps/action/",name,"Faint_4L.bmp",PURPLE);
  animation[i][0][6][1].AddBitmap("Bitmaps/action/",name,"Faint_1R.bmp",PURPLE);
  animation[i][0][6][1].AddBitmap("Bitmaps/action/",name,"Faint_2R.bmp",PURPLE);
  animation[i][0][6][1].AddBitmap("Bitmaps/action/",name,"Faint_3R.bmp",PURPLE);
  animation[i][0][6][1].AddBitmap("Bitmaps/action/",name,"Faint_4R.bmp",PURPLE);
  animation[i][1][0][0].AddBitmap("Bitmaps/action/",name,"Take_L.bmp",PURPLE);
  animation[i][1][0][1].AddBitmap("Bitmaps/action/",name,"Take_R.bmp",PURPLE);
  animation[i][1][1][0].AddBitmap("Bitmaps/action/",name,"Take_Run_1L.bmp",PURPLE);
  animation[i][1][1][0].AddBitmap("Bitmaps/action/",name,"Take_Run_2L.bmp",PURPLE);
  animation[i][1][1][1].AddBitmap("Bitmaps/action/",name,"Take_Run_1R.bmp",PURPLE);
  animation[i][1][1][1].AddBitmap("Bitmaps/action/",name,"Take_Run_2R.bmp",PURPLE);
  animation[i][1][2][0].AddBitmap("Bitmaps/action/",name,"Take_Jump_L.bmp",PURPLE);
  animation[i][1][2][1].AddBitmap("Bitmaps/action/",name,"Take_Jump_R.bmp",PURPLE);
  animation[i][1][3][0].AddBitmap("Bitmaps/action/",name,"throw_L.bmp",PURPLE);
  animation[i][1][3][1].AddBitmap("Bitmaps/action/",name,"throw_R.bmp",PURPLE);
  animation[i][1][4][0].SetDelayCount(2);
  animation[i][1][4][0].AddBitmap("Bitmaps/action/",name,"Hide_crate_1L.bmp",PURPLE);
  animation[i][1][4][0].AddBitmap("Bitmaps/action/",name,"Hide_crate_2L.bmp",PURPLE);
  animation[i][1][4][0].AddBitmap("Bitmaps/action/",name,"Hide_crate_3L.bmp",PURPLE);
  animation[i][1][4][0].AddBitmap("Bitmaps/action/",name,"Hide_crate_4L.bmp",PURPLE);
  animation[i][1][4][0].AddBitmap("Bitmaps/action/",name,"Hide_crate_5L.bmp",PURPLE);
  animation[i][1][4][0].AddBitmap("Bitmaps/action/",name,"Hide_crate_6L.bmp",PURPLE);
  animation[i][1][4][1].SetDelayCount(2);
  animation[i][1][4][1].AddBitmap("Bitmaps/action/",name,"Hide_crate_1R.bmp",PURPLE);
  animation[i][1][4][1].AddBitmap("Bitmaps/action/",name,"Hide_crate_2R.bmp",PURPLE);
  animation[i][1][4][1].AddBitmap("Bitmaps/action/",name,"Hide_crate_3R.bmp",PURPLE);
  animation[i][1][4][1].AddBitmap("Bitmaps/action/",name,"Hide_crate_4R.bmp",PURPLE);
  animation[i][1][4][1].AddBitmap("Bitmaps/action/",name,"Hide_crate_5R.bmp",PURPLE);
  animation[i][1][4][1].AddBitmap("Bitmaps/action/",name,"Hide_crate_6R.bmp",PURPLE);
  animation[i][1][5][0].AddBitmap("Bitmaps/action/",name,"Hurt_L.bmp",PURPLE);
  animation[i][1][5][1].AddBitmap("Bitmaps/action/",name,"Hurt_R.bmp",PURPLE);
  animation[i][1][6][0].AddBitmap("Bitmaps/action/",name,"Faint_1L.bmp",PURPLE);
  animation[i][1][6][0].AddBitmap("Bitmaps/action/",name,"Faint_2L.bmp",PURPLE);
  animation[i][1][6][0].AddBitmap("Bitmaps/action/",name,"Faint_3L.bmp",PURPLE);
  animation[i][1][6][0].AddBitmap("Bitmaps/action/",name,"Faint_4L.bmp",PURPLE);
  animation[i][1][6][1].AddBitmap("Bitmaps/action/",name,"Faint_1R.bmp",PURPLE);
  animation[i][1][6][1].AddBitmap("Bitmaps/action/",name,"Faint_2R.bmp",PURPLE);
  animation[i][1][6][1].AddBitmap("Bitmaps/action/",name,"Faint_3R.bmp",PURPLE);
  animation[i][1][6][1].AddBitmap("Bitmaps/action/",name,"Faint_4R.bmp",PURPLE);
  sprintf(name,"%s","dale/");
 }
```

```
 ani_sweat[0].AddBitmap("Bitmaps/action/ANI_ChipDale/sweat_L.bmp",PURPLE);
 ani_sweat[1].AddBitmap("Bitmaps/action/ANI_ChipDale/sweat_R.bmp",PURPLE);
 ani_dizzy.SetDelayCount(7);
 ani_dizzy.AddBitmap("Bitmaps/action/ANI_ChipDale/Dizzy1.bmp",PURPLE);
 ani_dizzy.AddBitmap("Bitmaps/action/ANI_ChipDale/Dizzy2.bmp",PURPLE);
 ani_dizzy.AddBitmap("Bitmaps/action/ANI_ChipDale/Dizzy3.bmp",PURPLE);
 ani_dizzy.AddBitmap("Bitmaps/action/ANI_ChipDale/Dizzy4.bmp",PURPLE);
 ani_god[0].AddBitmap("Bitmaps/action/ANI_ChipDale/god_L.bmp",PURPLE);
 ani_god[1].AddBitmap("Bitmaps/action/ANI_ChipDale/god_R.bmp",PURPLE);
}
void ChipDale::OnShow()
{
 int Last_ani_height,fix_hieght;
 if(!Alive&&!IsGod)return;
 //特定動畫重設循環
 if(NowAct!=4){
  if(animation[IsDale][1][4][0].GetCurrentBitmapNumber()>=4){
   animation[IsDale][1][4][0].SetDelayCount(2);/*SET 完記得 RESET，不然第一張圖會用到舊的 DELAY_COUNTER*/
   animation[IsDale][1][4][0].Reset();

  }
  if(animation[IsDale][1][4][1].GetCurrentBitmapNumber()>=4){
   animation[IsDale][1][4][1].SetDelayCount(2);
   animation[IsDale][1][4][1].Reset();
  }
 }
 if(LastAct==2){
  animation[IsDale][0][2][0].Reset();
  animation[IsDale][0][2][1].Reset();
 }
 if(ani_Hide_freeze_jump==0)ani_Hide_freeze_jump=1;
 //動畫切 9=換 及 重設 height wxwy
 if(!ReturnHideComplete()
  Last_ani_height=height;
  if(NowAct!=2)
  animation[IsDale][TAKEN_FLAG][NowAct][LRflag].OnMove();
  if(Last_ani_height!=animation[IsDale][TAKEN_FLAG][NowAct][LRflag].Height()){
   height=animation[IsDale][TAKEN_FLAG][NowAct][LRflag].Height();
   fix_hieght=Last_ani_height-height;
   SetWxWy(wx,wy+fix_hieght);
  }
 }else {
  ani_Hide_freeze_jump=0;
  if(TAKEN_FLAG&&NowAct==4){
   if(!animation[IsDale][1][4][LRflag].IsFinalBitmap()){
    animation[IsDale][1][4][LRflag].SetDelayCount(5);
    animation[IsDale][1][4][LRflag].OnMove();
   }else{
    animation[IsDale][1][4][LRflag].SetDelayCount(100);
    animation[IsDale][1][4][LRflag].OnMoveToNum(4);
   }
  }
 }
 //顯示人物
 //人物無敵效果
 if((Invincible && (Invincible %5==2||Invincible %5==3)) || !Invincible || (NowAct==4&&TAKEN_FLAG) ){
  if(IsGod){
   IsJump=false;
   if(LRflag)
    ani_god[LRflag].SetBottomLeft(wx+(-ani_god[LRflag].Width()+15),wy,ani_god[LRflag].Height());
   else
    ani_god[LRflag].SetBottomLeft(wx+width-20,wy,ani_god[LRflag].Height());
   ani_god[LRflag].OnShow();
  }
  if(ani_jump_count<TIMEFOR_ANI_JUMP){
   //跳轉蹲動畫
   Last_ani_height=height;
   height=animation[IsDale][0][4][LRflag].Height();
```

```
      fix_hieght=Last_ani_height-height;
      SetWxWy(wx,wy+fix_hieght);
      animation[IsDale][0][4][LRflag].SetBottomLeft(wx,wy,height);
      animation[IsDale][0][4][LRflag].OnShow();
     }else{
      //一般狀態動畫顯示
      animation[IsDale][TAKEN_FLAG][NowAct][LRflag].SetBottomLeft(wx,wy,height);
      animation[IsDale][TAKEN_FLAG][NowAct][LRflag].OnShow();
     }
     //流汗動畫顯示
     if(ani_sweat_count>0){
      int tempx=ani_sweat_x+10-Maps->ReturnNowX();/*-((Maps->MoveMap(0)&8)>0)*SPEED*ani_sweat_count*/;

if(!LRflag)tempx=ani_sweat_x+width-20-Maps->ReturnNowX();/*+((Maps->MoveMap(0)&4)>0)*SPEED*ani_sweat_count*/;
      ani_sweat[LRflag].SetBottomLeft(tempx,ani_sweat_wy+ani_sweat_count*7/*汗的位移*/,ani_sweat[LRflag].Height());
      ani_sweat[LRflag].OnShow();
     }
    }
    //暈眩顯示
    if(NowAct==6){
     ani_dizzy.SetBottomLeft(wx,wy-ani_dizzy.Height(),ani_dizzy.Height());
     ani_dizzy.OnShow();
     ani_dizzy.OnMove();
    }
}
void ChipDale::Dead(){
    Object **CanThrow = ChipDale::CanThrow;
    Life--;
    for(int i=0;i<CanTakeNum;i++){
     if(CanThrow[i]!=NULL)continue;
     CanThrow[i] = new ChipDale_Dead(this);
     break;
    }
    ReleaseNowTakeObj();
    Alive=false;
    Health=0;
}
void ChipDale::GetHurt(){
    if(!Alive||IsGod)return;
        Hurt=true;
    if(UpSpeed>=0)UpSpeed = 40;
    else UpSpeed+=40;
    SetState();
    Health--;
    if(Health<=0){
     Dead();
    }
}
void ChipDale::Faint(){
    if(!Alive)return;
    IsFaint=1;
    SetState();
}
int ChipDale::SetNowTaken(int Value){
    if(!Alive)return 0;
    if(Value==-1)
     return NowTaken!=0;
    else{
     NowTaken = Value/E8;
     if(NowTaken == OrderSize + MonsterOrderSize + 0){
      for(int i=0;i<CanTakeNum;i++){
       if(CanThrow[i]==NULL)continue;
       if(CanThrow[i]->ReturnObjValue() == Value){
        NowTakeObj = CanThrow[i];
        NowTakeObj->RecoverObj(this);
        break;
       }
       if(i+1==CanTakeNum){TRACE("SetNowTaken: No Find In CanThrow\n");Sleep(100000);}
```

```
    }
   }
   else{
    switch(NowTaken){
     case 14:
      NowTaken = 3;

Maps->FillObstacle(7,(Value%E4-1)*ONEOBJX-Maps->ReturnNowX(),(Value%E8/E4-1)*ONEOBJY-Maps->ReturnNowY());
      break;
     case 15:
      NowTaken = 3;

Maps->FillObstacle(8,(Value%E4-1)*ONEOBJX-Maps->ReturnNowX(),(Value%E8/E4-1)*ONEOBJY-Maps->ReturnNowY());
      break;
     case 16:
      NowTaken = 3;

Maps->FillObstacle(4,(Value%E4-1)*ONEOBJX-Maps->ReturnNowX(),(Value%E8/E4-1)*ONEOBJY-Maps->ReturnNowY());
      break;
    }
    for(int i=0;i<CanTakeNum;i++){
     if(CanThrow[i]==NULL){
      switch(NowTaken){
       case 3:
        CanThrow[i] = new Craft(this);
        break;
       case 5:
        CanThrow[i] = new Stone(this);
        break;
       case 6:
        CanThrow[i] = new Apple(this);
        break;
       case BALL:
        CanThrow[i] = new Ball(this);
        break;
      }
      NowTakeObj = CanThrow[i];
      break;
     }
     if(i+1==CanTakeNum){TRACE("SetNowTaken: No Find In CanThrow\n");Sleep(100000);}
    }
   }
   return Value;
  }
}
void ChipDale::FixSelf_Onto_ObjectTop(){
  int i=0;
  if(!Alive)return;
  while(Maps->IfCollision(wx,wy+i,width,height,true))i--;
  wy+=i;
  if(i<0)TRACE("fix\n");
}
void ChipDale::SetState(){
  int LastHeight=height;
  LastAct = NowAct;
  //設定 LRflag
  if(!(LastAct==4)||(Last_flag[1]&&!DOWN_FLAG)){
   //蹲下不可以變換方向
   if(LEFT_FLAG&&!RIGHT_FLAG) LRflag=0;
   if(!LEFT_FLAG&&RIGHT_FLAG) LRflag=1;
  }
  //state 切換
  if(LEFT_FLAG==RIGHT_FLAG){ NowAct=0;IsRun=false;}      //左右同時按 或都不按 Act=站
  else{NowAct=1;if(!DOWN_FLAG||(NowTaken==6))IsRun=true;}
  if(IsJump) NowAct=2;
  if(DOWN_FLAG&&NowAct!=2){
   if(NowTaken!=APPLE&&NowTaken!=ChipDale_taken){
    NowAct=4;
```

```
    IsRun=0;
   }
  }
  if(A_FLAG && (TAKEN_FLAG)) NowAct=3;
  if(Hurt)NowAct=5;
  if(IsFaint)NowAct=6;
  //重設 wx wy
  if((NowAct==4/*||LastAct==4*/)&&TAKEN_FLAG){
   SetWxWy(wx,wy-34+height);
  }
  else
   SetWxWy(wx,wy-animation[IsDale][TAKEN_FLAG][NowAct][LRflag].Height()+height);
  //重設 height
  if(NowAct==4&&TAKEN_FLAG&&animation[IsDale][0][4][LRflag].GetCurrentBitmapNumber()==0)height=34;
  else SetWidthHeight(45,animation[IsDale][TAKEN_FLAG][NowAct][LRflag].Height());
  //蹲下放開需要調整 2P 位置
  if(LastAct==4&&Partner!=NULL){
   if(CollisionChipDale(0,0,0))
   Partner->SetWxWy(0,LastHeight-height,true);
  }
 }
 void ChipDale::setFlag(bool value,bool up,bool down,bool left,bool right,bool A,bool B){
  if(LOCK)     return; //!Alive 必須能控制 ChipDale_
  if(IsFaint&&value) return;
  if(up)       UP_FLAG = value;
  if(down)     DOWN_FLAG = value;
  if(left)     LEFT_FLAG = value;
  if(right)    RIGHT_FLAG = value;
  if(A)       A_FLAG = value;
  if(B){
   if(!B_FLAG && time_jump==0 && value && !DOWN_FLAG){
    B_FLAG = true;
    IsJump = true;
   }
   if(!value)
    B_FLAG = false;
   if(DOWN_FLAG && value
 && !IsJump ){ if((TAKEN_FLAG&&(!ani_Hide_freeze_jump||NowTaken==APPLE||NowTaken==ChipDale_taken))||!TAKEN
 _FLAG)//HIDE 動畫冷卻時間
    IsLessCollision = true;
   }
  }
  SetState();
  //設定 LAST_FLAG
  for(int i=0;i<6;i++){
   Last_flag[i]=flag[i];
  }
 };
 void ChipDale::GodMode(){
  //GodMode 不支援 2P
  if(CGameStateRun::multiplayer!=2)
   IsGod=!IsGod;
 }
 void ChipDale::GodMove(){
  int limitX = (MWIDTH + width)/2;
  int limitY = (MHEIGHT + height)/2;
  if(LEFT_FLAG&&wx-SPEED*2>=0){
   SetWxWy(-SPEED*2,0,true);
   if(wx < limitX)Maps->MoveMap(4,20);
  }else if(RIGHT_FLAG&&wx+width+SPEED*2<=MWIDTH){
   SetWxWy(SPEED*2,0,true);
   if(wx > limitX)Maps->MoveMap(8,20);
  }
  if(UP_FLAG&&wy-SPEED*2>=0){
   SetWxWy(0,-SPEED*2,true);
   if(wy < limitY){
    Maps->MoveMap(1,10,20);
   }
```

```
  }else if(DOWN_FLAG&&wy+height+SPEED*2<=MHEIGHT){
    SetWxWy(0,SPEED*2,true);
    if(wy > limitY){
      Maps->MoveMap(2,10,20);
    }
  }
}
void ChipDale::OnMove(){
  int temp,tDerict,LRMargin=MapManage::LRMargin;
  if(!Alive)return;
  if(wy>MHEIGHT+50){Dead();return;}
  if(freeze){
    HOLD(3,freeze){freeze=0;};    //HOLD 值    2~3 為佳    (1 為沒效果)
  }
  TriggerObj(0);
  //運動
  if(!IsGod){
    if((!freeze&&IsRun&&!LRflag&&!Hurt||Hurt&&LRflag))MoveLeft(Maps);
    if(!freeze&&IsRun&& LRflag&&!Hurt||Hurt&&!LRflag)MoveRight(Maps);
    if(IsJump)Jump();

    if(FallingDown(Maps)){SetState();}
  }else{
    GodMove();
  }
  if(NowTaken==6) Reduce_UP_VELOCITY=10;//增加重力加速度
  //丟的冷卻時間
  if(NowTaken < 0)NowTaken++;
  //丟實作
  if(NowAct==3 && NowTakeObj!=NULL){
    tDerict = 1*(UP_FLAG)+4*(!LRflag)+8*(LRflag);
    if(UP_FLAG && !IsJump) UpSpeed += 20;//上丟會稍微往上跳
    NowTakeObj->Throw(tDerict);
    NowTakeObj=NULL;
    if(NowTaken==6)Reduce_UP_VELOCITY=0;//改成正常重力加速度
    NowTaken = -6;
  }
  //丟得僵直時間
  if(NowTaken==-3){setFlag(0,0,0,0,0,1,0);freeze=1;} //決定丟動畫的延遲時間 NowTaken 判斷可為-1 ~-5
  //跳轉蹲動畫切換變數設定
  if(ani_jump_count<TIMEFOR_ANI_JUMP){
    if(ani_jump_count < 1){
      //clock_t t=clock();
      CAudio::Instance()->Play(AUDIO_JUMP);
      //TRACE("CAudio %d\n",clock()-t);
    }
    if(ani_jump_count==2)SetState();
    //TRACE("%d wy=%d height=%d \n",ani_jump_count,wy,height);
    ani_jump_count++;
  }
  //受傷及無敵的變數設定
  const int Hurt_time=10;
  const int Hurt_Shine_time=50;
  const int invincibility_time=240;
  const int Hurt_start=invincibility_time-Hurt_Shine_time;
  const int Hurt_end=Hurt_start+Hurt_time;
  if(Invincible)Invincible++;
  if(Hurt&&Invincible<Hurt_start)Invincible=Hurt_start;
  if(Invincible>invincibility_time){
    SetInvincible(0);
    if(Partner==NULL||!Partner->ReturnInvincible())
      CAudio::Instance()->SetSpeedByID(AUDIO_1_1,1000);
  }
  //受傷回復設定
  if(Invincible==Hurt_end){Hurt=0;SetState();};
  //暈眩變數設定
  if(IsFaint){
    if(NowTakeObj!=NULL)ReleaseNowTakeObj();
```

```
  //石頭暈眩修正
  if(IsFaint<7){//暈眩圖片寬度不一，此條件防止連續修正
    int i=0,j=0;
    while(Maps->IfCollision(wx,wy+i,width,height,true))i--;//先修正 WY   如修正超過一個物件高則修正 WX
    if(-i>34){
      i=0;
      while(Maps->IfCollision(wx-LRflag*j+!LRflag*j,wy,width,height,true))j++;
        //根據人物面對方向往反方向修正
      if(j>45){
        j=0;
        //反方向修正超過一個物件寬則朝相同方向修正
        while(Maps->IfCollision(wx-LRflag*j+!LRflag*j,wy,width,height,true))j--;
        if(-j>45)j=0;//三種方向修正都超過一個物件長寬則不修正(卡在石頭裡)
      }
      wx-=(LRflag*j-!LRflag*j);
    }
    wy+=i;
  }
  IsFaint++;
  if(IsFaint>50){IsFaint=0;SetState();}
  setFlag(0,1,1,1,1,1,1);
 }
 //流汗動畫顯示變數設定
 if(NowTaken==APPLE)ani_sweat_count++;
 else ani_sweat_count=0;
 if(ani_sweat_count>5/*週期*/)ani_sweat_count=1;     //更改週期亦需改變每顆汗流下的位移(onshow)
 if(ani_sweat_count==1){
  ani_sweat_x=wx+Maps->ReturnNowX();
  ani_sweat_wy=wy;
 }
 //2P 移動鎮螢幕
 canMoveMapX=true;
 canMoveMapY=true;
 temp = Maps->GetRoute();
 if((temp&8) && wx<=LRMargin || (temp&4) && (wx>=MWIDTH-width-LRMargin))
 canMoveMapX = false;
 if((temp&2) && wy<=Jump_Fix || (temp&1) && wy>=(MHEIGHT-2*height-Jump_Fix))
 canMoveMapY = false;
}
void ChipDale::InitialWidthHeight(){
 width = animation[IsDale][0][0][0].Width();
 height = animation[IsDale][0][0][0].Height();
}
int ChipDale::CollisionChipDale(int Direct,int passSpeed,int mode){
 int temp=0,ObjFix=0;
 const int LRspace=5;
 if(Partner == NULL||!Partner->Alive)return 0;
 passSpeed = abs(passSpeed);
 if(Partner->ReturnNowTakeObj()!=NULL && !Partner->ReturnHideComplete()){
  ObjFix = Partner->ReturnNowTakeObj()->ReturnHeight();
  wy += ObjFix;
 }
 if(Direct==0)    temp = Partner->IfCollision(wx+LRspace,wy,width-2*LRspace,height);
 else if(Direct==1) temp = Partner->IfCollision(wx+LRspace,wy-passSpeed,width-2*LRspace,passSpeed);
 else if(Direct==2) temp = Partner->IfCollision(wx+LRspace,wy+height,width-2*LRspace,passSpeed);
 else if(Direct==4) temp = Partner->IfCollision(wx+LRspace-passSpeed,wy,passSpeed,height);
 else if(Direct==8) temp = Partner->IfCollision(wx-LRspace+width,wy,passSpeed,height);
 if(ObjFix!=0)
  wy -= ObjFix;
 if(temp>0){
  if(!Partner->IfCollision(Direct,passSpeed)){
    if(mode){
        if(Direct==1) Partner->SetWxWy(0,-passSpeed,true);
     else if(Direct==4) Partner->SetWxWy(-passSpeed,0,true);
     else if(Direct==8) Partner->SetWxWy(passSpeed,0,true);
    }
    return 1;//發生碰撞，推擠 2P
  }
```

```
    return 2;//發生碰撞，不能推擠 2P
   }
   return 0;//無發生碰撞
}
void ChipDale::TriggerObj(int Derict){
  int temp=0,fixX=0,fixY=0,ox,oy;
  if(!Alive)return;
  if(Maps->MoveMap(0)&1)fixY = Jump_Fix;
  if(Maps->MoveMap(0)&4)fixX = SPEED;
  if(Maps->MoveMap(0)&8)fixX = -SPEED;
  while(true){
      if(Derict==0) temp = Maps->IfCollision(wx+fixX,wy+fixY,width,height,true,true);
    else if(Derict==1) temp = Maps->IfCollision(wx+fixX,wy+fixY+height,width,abs(UpSpeed),false,true,true);
    else if(Derict==2) temp = Maps->IfCollision(wx+fixX,wy+fixY-UpSpeed,width,abs(UpSpeed),true,true);
    else if(Derict==4) temp = Maps->IfCollision(wx+width+fixX,wy+fixY,ONEOBJX,height,true,true);
    else if(Derict==3) temp = Maps->IfCollision(wx-ONEOBJX+fixX,wy+fixY,ONEOBJX,height,true,true);
    switch(temp/E8){
      case FLOWER:
        Score_Flower++;
        Maps->ClearObstacle(temp);
        break;
      case STAR:
        Score_Star++;
        Maps->ClearObstacle(temp);
        break;
      case 8:
        Health=3;
        Maps->ClearObstacle(temp);
        break;
      case 9:
        CAudio::Instance()->SetSpeedByID(AUDIO_1_1,1500);
        Maps->ClearObstacle(temp);
        for(int i=0;i<CanTakeNum;i++){
          if(CanThrow[i]==NULL){
            CanThrow[i] = new Explosion(temp%E4-1,temp%E8/E4-1,9,this);
            break;
          }
          if(i+1==CanTakeNum){TRACE("SetNowTaken: No Find In CanThrow\n");Sleep(100000);}
        }
        break;
      case 10://Cheese Box
        Maps->ClearObstacle(temp);
        for(int i=0;i<CanTakeNum;i++){
          if(CanThrow[i]==NULL){
            CanThrow[i] = new Explosion(temp%E4-1,temp%E8/E4-1,CHEESE,this);
            break;
          }
          if(i+1==CanTakeNum){TRACE("SetNowTaken: No Find In CanThrow\n");Sleep(100000);}
        }
        break;
      case 11:
        Maps->ClearObstacle(temp);
        break;
      case 12:
        Maps->ClearObstacle(temp);
        break;
      case DOOR:
        Lock();
        if(Partner!=NULL)Partner->Lock();
        ToolCDC::Fadeout();
        ox = temp%E4-1;
        oy = temp%E8/E4-1;
        Maps->Teleport = Maps->GetRoute(ox*ONEOBJX/MWIDTH,oy*ONEOBJY/MHEIGHT)>>7;
        Lock(0);
        if(Partner!=NULL)Partner->Lock(0);
        return;
      case 17:
        Maps->ClearObstacle(temp);
```

```
      for(int i=0;i<CanTakeNum;i++){
       if(CanThrow[i]==NULL){
        CanThrow[i] = new Explosion(temp%E4-1,temp%E8/E4-1,7,this);
        CanThrow[i]->ReFixXY(Maps);
        break;
       }
       if(i+1==CanTakeNum){TRACE("SetNowTaken: No Find In CanThrow\n");Sleep(100000);}
      }
      return;
     default:
      return ;
   }
  }
}
void ChipDale::ReleaseNowTakeObj(){
  if(NowTakeObj==NULL||!Alive) return;
  if(NowTaken==STONE || NowTaken==MonsterOrderSize+OrderSize+0)
    NowTakeObj->Throw(0);
  else
    NowTakeObj->Throw(1);
  NowTakeObj=NULL;
  NowTaken=-6;
}
```

object.cpp

```
/*****************************************************************/
//Object 實作                                                    */
/*****************************************************************/
Object::Object()
{
  NowAct = 1;     //石頭拿起
  ThisObjValue = 0;
  wx = wy = 0;
  CanAttackMode = 1;
  Owener = NULL;
  Direct = 0;
}
void Object::RecoverObj(ChipDale *player){
  Owener = player;//記住自己的主人
  NowAct = 1;
  ThisObjValue = 0;
}
void Object::CollisionMonster(Monster **monster)
{
  int temp;
  if(NowAct==0 || Owener==NULL || CanAttackMode==2) return; //NowAct==0 準備投胎 , 沒有主人不行 ,
CanAttackMode==2 不攻擊任何人
  if(NowAct==1 && Owener->ReturnHideComplete()){//NowAct==1 且主人蹲著 須要先修正 wx wy (目前與主人關西)
    wx = Owener->ReturnWX();
    wy = Owener->ReturnWY()+Owener->ReturnHeight()-height;
  }
  else if(NowAct!=2)return; //NowAct==2 為運動狀態才能攻擊人 , 但如果 NowAct==1 有例外 主人蹲著 要判斷碰撞
  for(int i=0;i<ONE_LEVEL_MONSTER_NUM && monster[i]!=NULL;i++){
    if(monster[i]->ReturnNowAct()<=0) continue; //怪物運動狀態為 0 表示尚未遇到 , -1 已死亡
    temp = monster[i]->IfCollision(wx,wy,width,height);//測試碰撞
    switch(temp){
      case 1:case 4://箱子的左上左下碰到怪物
        if(monster[i]->KillMonster(4)){
          CollisionReact(temp,monster[i]);
          if(NowAct==1 && Owener->ReturnHideComplete()) Owener->ReleaseNowTakeObj();//打完怪物丟出此物品
          NowAct=4;//表示已經丟出去打到怪物
          i=ONE_LEVEL_MONSTER_NUM;//跳出此迴圈 以防 double kill
        }
        break;
      case 2:case 3://箱子的右上右下碰到怪物
        if(monster[i]->KillMonster(8)){
          CollisionReact(temp,monster[i]);
          if(NowAct==1 && Owener->ReturnHideComplete())Owener->ReleaseNowTakeObj();//打完怪物丟出此物品
          NowAct=4;//表示已經丟出去打到怪物
```

```
        i=ONE_LEVEL_MONSTER_NUM;//跳出此迴圈 以防 double kill
       }
       break;
     case 5://箱子整個在怪物裡面 幾乎不可能發生
       if(monster[i]->KillMonster(1)){
        CollisionReact(temp,monster[i]);
        if(NowAct==1 && Owener->ReturnHideComplete())Owener->ReleaseNowTakeObj();//打完怪物丟出此物品
        NowAct=4;//表示已經丟出去打到怪物
        i=ONE_LEVEL_MONSTER_NUM;//跳出此迴圈 以防 double kill
       }
       break;
    }
   }
}
void Object::CollisionChipDale(ChipDale *player){
  if(Owener==NULL)return;//沒有主人的物件不攻擊人
  if(CanAttackMode==2 || CanAttackMode==3)return;//CanAttackMode = 2 表示此物件不具攻擊性) , 3 表示此物件只攻
擊怪物
  if(player->ReturnInvincible())return;//此玩家為無敵 不攻擊
  if(NowAct==2||NowAct==4){//NowAct==2 表示此物件在運動的過程 且只有運動過程才會打傷人
    if(Owener==player){
      //TRACE("Self\n");
      if(CanAttackMode==1)return;//CanAttackMode == 1 表示此物件不會攻擊自己的主人
      if(CanAttackMode==0 && Owener->ReturnNowAct()>3 && Owener->ReturnNowAct()!=4
        && !Owener->ReturnHideComplete()&&!(Direct&1))return;
      if((Direct&32)&&Owener->ReturnNowAct()==4)return;
        //當 CanAttackMode==0 時 且箱子自己的主人的 NowAct>=3 則不打它主人
    }
    int ThrowFix=(Owener==player)*(4*(LRflag)-4*(!LRflag));
    if(player->IfCollision(wx+ThrowFix,wy,width,height)){
      player->Faint();
    }
  }
}
/*****************************************************************/
//ChipDale_Dead 實作                                              */
//                                                                */
/*****************************************************************/
CMovingBitmap ChipDale_Dead::frame_pic[2][2];
ChipDale_Dead::ChipDale_Dead(ChipDale* chip){
  isDale =chip->IsDale;
  LRflag =chip->LRflag;
  wx    =chip->wx;
  wy    =chip->wy;
  Owener    =chip;
  CanAttackMode=2;
  height=frame_pic[0][0].Height();
  NowAct=2;         //運動
  NoCollision = true;
  UpSpeed = 0;
  JumpSPEED = 30;
  MoveSPEED = SPEED/2;
  Wait_A_Minute=-1;
  CAudio::Instance()->PauseLevelMusic(CGameStateRun::NowLevel);
  CAudio::Instance()->Play(AUDIO_DEAD);
}
ChipDale_Dead::~ChipDale_Dead(){
  CAudio::Instance()->PlayLevelMusic(CGameStateRun::NowLevel);
}
void ChipDale_Dead::Loading(){
  frame_pic[0][0].LoadBitmapA("Bitmaps/action/chip/Hurt_L.bmp",PURPLE);
  frame_pic[0][1].LoadBitmapA("Bitmaps/action/chip/Hurt_R.bmp",PURPLE);
  frame_pic[1][0].LoadBitmapA("Bitmaps/action/dale/Hurt_L.bmp",PURPLE);
  frame_pic[1][1].LoadBitmapA("Bitmaps/action/dale/Hurt_R.bmp",PURPLE);
}
void ChipDale_Dead::OnMove(MapManage* map){
  if(NowAct==0) return;//死亡準備投胎
  //死亡之等待時間
```

```
  if(Wait_A_Minute>=0){
    if(Wait_A_Minute>0)Wait_A_Minute--;
    else {
      NowAct=0;
      CAudio::Instance()->PlayLevelMusic(CGameStateRun::NowLevel);
      if((Owener->Partner==NULL||Owener->Partner->Life<=0)&&Owener->Life>0){
        //回紀錄點
        map->Set_toRecord();
        Owener->Reset(10,10);
      }else if(Owener->Life<=0&&(Owener->Partner==NULL||Owener->Partner->Life<=0)){
        //GameOver
        CGameStateRun::TimeToGo=true;
      }
    }
    return;
  }
  //Dead 物件生命週期結束設定
  if(wy+frame_pic[isDale][LRflag].Height()>MHEIGHT+100 ){
    Wait_A_Minute=33;
    if(Owener->Life>0&&Owener->Partner!=NULL&&Owener->Partner->Life>0){
      //復活
      for(int i=0;i<CanTakeNum;i++){
        if(ChipDale::CanThrow[i]!=NULL)continue;
        ChipDale::CanThrow[i] = new ChipDale_Resurrect(this);
        break;
      }
    }else if((Owener->Partner==NULL||Owener->Partner->Life<=0)&&Owener->Life>0){
      //回紀錄點
    }else if(Owener->Life<=0&&(Owener->Partner==NULL||Owener->Partner->Life<=0))
    {
      //GameOver
    }
  }
  if(!IsJump && wy+height<MHEIGHT){
    IsJump = true;
    Jump();
  }
  if(!LRflag&&wx+width+MoveSPEED<MWIDTH) MoveRight(map);
  else if(LRflag&&wx-MoveSPEED>0)    MoveLeft(map);
  FallingDown(map);
}
void ChipDale_Dead::OnShow(MapManage* map){

  frame_pic[isDale][LRflag].SetTopLeft(wx,wy);
  frame_pic[isDale][LRflag].ShowBitmap();
}
/*************************************************************************/
//ChipDale_Resurrect 實作                  */
//                          */
/*************************************************************************/
CMovingBitmap ChipDale_Resurrect::frame_pic[2][2];
ChipDale_Resurrect::ChipDale_Resurrect(ChipDale_Dead* chip){
  isDale =chip->isDale;
  LRflag =chip->LRflag;
  wx    =chip->wx;
  wy    =chip->wy;
  Owener =chip->Owener;
  timeCount=0;
  CanAttackMode=2;
  height=frame_pic[isDale][LRflag].Height();
  width=frame_pic[isDale][LRflag].Width();
  Direct    =1;//上升
  NowAct=2;         //運動
  NoCollision = true;
  MoveSPEED = SPEED;
  if(wx<0)wx=0;
  if(wx+width>MWIDTH)wx=MWIDTH-width;
}
```

```
void ChipDale_Resurrect::Loading(){
  frame_pic[0][0].LoadBitmapA("Bitmaps/action/chip/Resurrect_L.bmp",PURPLE);
  frame_pic[0][1].LoadBitmapA("Bitmaps/action/chip/Resurrect_R.bmp",PURPLE);
  frame_pic[1][0].LoadBitmapA("Bitmaps/action/dale/Resurrect_L.bmp",PURPLE);
  frame_pic[1][1].LoadBitmapA("Bitmaps/action/dale/Resurrect_R.bmp",PURPLE);
}
void ChipDale_Resurrect::OnMove(MapManage* map){
  if(NowAct==0) return;//死亡準備投胎
  if(Owener->RIGHT_FLAG){
    LRflag=1;
    if(wx+width+MoveSPEED<MWIDTH)MoveRight(map);
  }
  else if(Owener->LEFT_FLAG){
    LRflag=0;
    if(wx-MoveSPEED>0 )MoveLeft(map);
  }
  //自動上下
  if(Direct==1)MoveUp(map);
  else if(Direct==2)MoveDown(map);
  if(wy<=0)Direct=2;
  else if(wy+height>MHEIGHT) Direct=1;
  //召喚(1 秒後按 A 手動召喚 or10 秒過後自動召喚)
  if(((Owener->A_FLAG&&timeCount>33*1)||timeCount>33*10)&&(wy+height<MHEIGHT)){
    Owener->Reset(wx,wy,LRflag==1);
    //Owener->SetWxWy(wx,wy);
    NowAct=0;
  }else timeCount++;
  //防止被推出場
  if(wx<0)wx=0;
  if(wx+width>MWIDTH)wx=MWIDTH-width;
}
void ChipDale_Resurrect::OnShow(MapManage* map){
  frame_pic[isDale][LRflag].SetTopLeft(wx,wy);
  //1 秒前有閃爍效果
  if(timeCount>33||(timeCount%5==2||timeCount%5==3))
    frame_pic[isDale][LRflag].ShowBitmap();
}
/*********************************************************************/
//ChipDale_Taken 實作                                                */
//Note::此物件是以 chip 的 NowTakeObj 創造                           */
/*********************************************************************/
CAnimation ChipDale_Taken::animation[2][2];
ChipDale_Taken::ChipDale_Taken(ChipDale* chip){
  isDale =chip->Partner->IsDale;
  LRflag =chip->LRflag;
  height=animation[0][0].Height();
  width=animation[0][0].Width();
  wx    =chip->wx;
  wy    =chip->wy-height;
  Owener    =chip;
  Owener->Partner->Alive=false;
  CanAttackMode=2;
  NowAct=1;         //拿在手上
  NoCollision = true;
  UpSpeed = 0;
  JumpSPEED = 30;
  MoveSPEED = SPEED;
}
void ChipDale_Taken::Loading(){
  animation[0][0].SetDelayCount(5);
  animation[0][1].SetDelayCount(5);
  animation[1][0].SetDelayCount(5);
  animation[1][1].SetDelayCount(5);
  animation[0][0].AddBitmap("Bitmaps/action/chip/taken_1L.bmp",PURPLE);
  animation[0][0].AddBitmap("Bitmaps/action/chip/taken_2L.bmp",PURPLE);
  animation[0][0].AddBitmap("Bitmaps/action/chip/taken_3L.bmp",PURPLE);
  animation[0][1].AddBitmap("Bitmaps/action/chip/taken_1R.bmp",PURPLE);
  animation[0][1].AddBitmap("Bitmaps/action/chip/taken_2R.bmp",PURPLE);
```

```
  animation[0][1].AddBitmap("Bitmaps/action/chip/taken_3R.bmp",PURPLE);
  animation[1][0].AddBitmap("Bitmaps/action/dale/taken_1L.bmp",PURPLE);
  animation[1][0].AddBitmap("Bitmaps/action/dale/taken_2L.bmp",PURPLE);
  animation[1][0].AddBitmap("Bitmaps/action/dale/taken_3L.bmp",PURPLE);
  animation[1][1].AddBitmap("Bitmaps/action/dale/taken_1R.bmp",PURPLE);
  animation[1][1].AddBitmap("Bitmaps/action/dale/taken_2R.bmp",PURPLE);
  animation[1][1].AddBitmap("Bitmaps/action/dale/taken_3R.bmp",PURPLE);
}
void ChipDale_Taken::Throw(int setDirect){
  LRflag=Owener->LRflag;
  NowAct=2;
  Jump();
}
void ChipDale_Taken::OnMove(MapManage* map){
  if(NowAct==1){
    wx=Owener->wx;
    wy=Owener->wy-height;
    LRflag=Owener->LRflag;
  }
  else if(NowAct==2){
    if(LRflag&&wx+width<MWIDTH)
      MoveRight(map);
    else if(!LRflag&&wx>0)
      MoveLeft(map);
    IsJump = true;
    FallingDown(map);
    if(UpSpeed<=0){
      NowAct=0;
      Owener->Partner->Reset(wx,wy,LRflag==1,false);
    }
  }
}
void ChipDale_Taken::OnShow(MapManage* map){
  animation[isDale][LRflag].SetBottomLeft(wx,wy,height);
  animation[isDale][LRflag].OnMove();
  animation[isDale][LRflag].OnShow();
}
/*************************************************************************/
//Apple 實作                                                             */
/*************************************************************************/
CMovingBitmap Apple::frame_pic[2];
Apple::Apple(ChipDale *player){
  width = frame_pic[0].Width();
  height = frame_pic[0].Height();
  Owener = player;//記住自己的主人
}
void Apple::Loading(){
  frame_pic[0].LoadBitmapA("Bitmaps/object/Apple_L.bmp",PURPLE);
  frame_pic[1].LoadBitmapA("Bitmaps/object/Apple_R.bmp",PURPLE);
}
void Apple::OnShow(MapManage* map){
  if(NowAct==0) return;//死亡準備投胎
  else if(NowAct==1){//拿在手上
frame_pic[Owener->ReturnLR()].SetTopLeft(Owener->ReturnWX()-(width-Owener->ReturnWidth())/2,Owener->ReturnWY()-
height*(!Owener->ReturnHideComplete()));
    frame_pic[Owener->ReturnLR()].ShowBitmap();
  }
  else{//丟出與落地
    frame_pic[LRflag].SetTopLeft(wx,wy);
    frame_pic[LRflag].ShowBitmap();
  }
}
void Apple::OnMove(MapManage* map){
  if(NowAct==0) return;//死亡準備投胎
  if(NowAct==1) return;//還在人物手上
  if(wx < -WinShowBuffer || wx > MWIDTH || wy < -WinShowBuffer){
    NowAct = 0;
    return;
```

```
  }
  if(Direct&1) MoveUp(map);
  if(Direct&4) MoveLeft(map);
  if(Direct&8) MoveRight(map);
}
void Apple::Throw(int setDirect){
  NowAct=2;
  LRflag = Owener->ReturnLR();
  Direct = setDirect;
  JumpSPEED = 0;
  MoveSPEED = SPEED *2;
  NoCollision = true;
  IsJump = false;
  if(Direct&1)Direct=1;
  else    Direct = Direct&12;
  wx = Owener->ReturnWX()-(width-Owener->ReturnWidth())/2;
  wy = Owener->ReturnWY()+Owener->ReturnHeight()-height*(!Owener->ReturnHideComplete())-40;//離地面 40 公分
}

/*********************************************************************/
//Angel 實作                                                          */
/*********************************************************************/
CAnimation Angel::frame_pic[2];
Monster       **Angel::monster;
Angel::Angel(int setWx,int setWy,ChipDale *player):TheBeeMaxSpeed(SPEED*2){//Angel X Y 方向的移動速度最高為
SPEED*2
  width = frame_pic[0].Width();
  height = frame_pic[0].Height();
  Owener = player;//記住自己的主人
  wx = setWx;
  wy = setWy;
  NowAttack=-1;
  CanAttackMode = 3;
  LRflag=0;
  NoCollision = true;
}
void Angel::Loading(){
  frame_pic[0].AddBitmap("Bitmaps/action/Angel/bee_1R.bmp",PURPLE);
  frame_pic[1].AddBitmap("Bitmaps/action/Angel/bee_1L.bmp",PURPLE);
  monster = ChipDale::AllMonster;
}
void Angel::OnShow(MapManage* map){
  if(NowAct==0) return;//死亡準備投胎
  frame_pic[LRflag].SetBottomLeft(wx,wy,height);
  frame_pic[LRflag].OnShow();
}
void Angel::OnMove(MapManage* map){
  int tempX,tempY,tempT;
  if(NowAct==0){
    return;//死亡準備投胎
  }
  NowAct=2;
  if(!Owener->ReturnInvincible()){
    if(wx < -WinShowBuffer || wx > MWIDTH || wy < -WinShowBuffer){
      NowAct = 0;
      return;
    }
    MoveSPEED = TheBeeMaxSpeed;
    if(((ChipDale::Maps->GetRoute())&8)==8) MoveLeft(map);
    else                MoveRight(map);
    MoveUp(map);
    NowAct=4;
    return;
  }
  if(NowAttack!=-1 && (monster[NowAttack]->ReturnNowAct()<=0 || monster[NowAttack]->ReturnNowAct()>=100))
NowAttack=-1;//Look if Monster is Alive?
  if(NowAttack==-1){//不知道要去攻擊哪一個怪物 搜尋目標
    for(int i=0;i<ONE_LEVEL_MONSTER_NUM && monster[i]!=NULL;i++){
```

```
    if(monster[i]->ReturnNowAct()>=1 && monster[i]->ReturnNowAct()<100 && monster[i]->ReturnCanTrace()){
      NowAttack = i;
      break;
    }
   }
  }
  if(NowAttack==-1){
   LRflag = !LRflag;
   if(LRflag) tempX = (Owener->ReturnWX()+(Owener->ReturnWidth()-width)/2-5)-wx;//離人物中心偏左 5px
   else    tempX = (Owener->ReturnWX()+(Owener->ReturnWidth()-width)/2+5)-wx;//離人物中心偏左 5px
   tempY = (Owener->ReturnWY()-height)-wy;
  }
  else{
   tempX = monster[NowAttack]->ReturnWX()-wx;
   tempY = monster[NowAttack]->ReturnWY()-wy;
   if(tempX<0) LRflag = 1;
   else    LRflag = 0;
  }
  //華麗移動(新版)
  if(tempX>tempY){
   tempT = tempX/TheBeeMaxSpeed;
   if(abs(tempX)>=TheBeeMaxSpeed) MoveSPEED=TheBeeMaxSpeed;
   else              MoveSPEED=abs(tempX);
   if(tempX<0)             MoveLeft(map);
   else if(tempX>0)          MoveRight(map);

   if(abs(tempT)==0)tempT=1;
   if(abs(tempY)>=TheBeeMaxSpeed) MoveSPEED=TheBeeMaxSpeed;
   else              MoveSPEED=abs(tempY/tempT);
   if(tempY<0)             MoveUp(map);
   else if(tempY>0)          MoveDown(map);
  }
  else{
   tempT = tempY/TheBeeMaxSpeed;
   if(abs(tempY)>=TheBeeMaxSpeed) MoveSPEED=TheBeeMaxSpeed;
   else              MoveSPEED=abs(tempY);
   if(tempY<0)             MoveUp(map);
   else if(tempY>0)          MoveDown(map);

   if(abs(tempT)==0)tempT=1;
   if(abs(tempX)>=TheBeeMaxSpeed) MoveSPEED=TheBeeMaxSpeed;
   else              MoveSPEED=abs(tempX/tempT);
   if(tempX<0)             MoveLeft(map);
   else if(tempX>0)          MoveRight(map);
  }
}
/*********************************************************************/
//Ball 實作                                                          */
/*********************************************************************/
CMovingBitmap Ball::frame_pic[2];
Ball::Ball(ChipDale *player){
  width = frame_pic[0].Width();
  height = frame_pic[0].Height();
  Owener = player;//記住自己的主人
  CanAttackMode = 1;
  LRflag=0;
  NowAct=1;
  Rebound_times=0;
  IsJump=false;
  NoCollision=false;
  MoveSPEED=SPEED*2;
  UpSpeed=0;
  JumpSPEED=40;
}
void Ball::Loading()
{
  frame_pic[0].LoadBitmapA("Bitmaps/object/Ball_L.bmp",PURPLE);
  frame_pic[1].LoadBitmapA("Bitmaps/object/Ball_R.bmp",PURPLE);
```

```
}
void Ball::OnMove(MapManage* map)
{
 if(NowAct==0) return;//死亡準備投胎
 if(NowAct==1) return;//還在人物手上
 if(NowAct==3) {
  CanAttackMode=1;
  return; //在地上
 }
 if(wx < -WinShowBuffer || wx > MWIDTH || wy < -WinShowBuffer){
  NowAct = 0;
  return;
 }
 if(NowAct==2||NowAct==4)        //運動狀態
 {

  if(Direct&4){
   MoveLeft(map);
   LRflag=0;
   if(wx<=0){
    wx=0;
    Direct=8;
    Rebound_times--;
   }
  }
  else if(Direct&8){
   MoveRight(map);
   LRflag=1;
   if(wx+width>=MWIDTH){
    wx=MWIDTH-width;
    Direct=4;
    Rebound_times--;
   }
  }else if(Direct&1){
   MoveUp(map);
   if(wy<0){
    Direct=2;
    Rebound_times--;
   }
  }else if(!MoveDown(map)){
   Rebound_times--;
  }
  if(Rebound_times<=0){
   //Direct=0;
   IsJump=true;
   FallingDown(map);

   CanAttackMode=0;
   if(IsJump==false)
   {
    ThisObjValue = map->FillObstacle(OrderSize+MonsterOrderSize + 0,wx,wy);
    wx = (ThisObjValue%E4-1)*ONEOBJX-map->ReturnNowX();
    wy = (ThisObjValue%E8/E4-1)*ONEOBJY-map->ReturnNowY();
    NowAct=5;
   }
  }
  else if(Rebound_times==1)CanAttackMode=0;
 }
}
void Ball::OnShow(MapManage* map)
{
 if(NowAct==0) return;//死亡準備投胎
 else if(NowAct==1){//拿在手上
frame_pic[Owener->ReturnLR()].SetTopLeft(Owener->ReturnWX()-(width-Owener->ReturnWidth())/2,Owener->ReturnWY()-
height*(!Owener->ReturnHideComplete()));
  frame_pic[Owener->ReturnLR()].ShowBitmap();
 }
 else{//丟出與落地
```

```
    frame_pic[LRflag].SetTopLeft(wx,wy);
    frame_pic[LRflag].ShowBitmap();
  }
}
void Ball::Throw(int setdirect)
{
  NowAct=2;
  CanAttackMode=1;
  Rebound_times=2;
  wx = Owener->ReturnWX()+(Owener->ReturnWidth()-width)/2;
  if(Owener->ReturnLastAct()==4)
    wy = Owener->ReturnWY()+Owener->ReturnHeight()-height;
  else
    wy = Owener->ReturnWY();
  if(setdirect&1)
    Direct=1;
  else if(setdirect&4)
    Direct=4;
  else if(setdirect&8)
    Direct=8;
}
/*********************************************************************/
//Craft 實作                                                          */
/*********************************************************************/
CMovingBitmap Craft::frame_pic[2];
Craft::Craft(ChipDale *player){
  width = frame_pic[0].Width();
  height = frame_pic[0].Height();
  Owener = player;//記住自己的主人
}
void Craft::Loading(){
  frame_pic[0].LoadBitmapA("Bitmaps/object/Craft_L.bmp",PURPLE);
  frame_pic[1].LoadBitmapA("Bitmaps/object/Craft_R.bmp",PURPLE);
}
void Craft::OnShow(MapManage* map){
  if(NowAct==0) return;//死亡準備投胎
  else if(NowAct==1){//拿在手上

frame_pic[Owener->ReturnLR()].SetTopLeft(Owener->ReturnWX()-(width-Owener->ReturnWidth())/2,Owener->ReturnWY()-
height*(!Owener->ReturnHideComplete()));
    frame_pic[Owener->ReturnLR()].ShowBitmap();
  }
  else{//丟出與落地
    frame_pic[LRflag].SetTopLeft(wx,wy);
    frame_pic[LRflag].ShowBitmap();
  }
}
void Craft::OnMove(MapManage* map){
  if(NowAct==0) return;//死亡準備投胎
  if(NowAct==1) return;//還在人物手上
  if(wx < -WinShowBuffer || wx > MWIDTH || wy < -WinShowBuffer){
    NowAct = 0;
    return;
  }
  if(Direct&1) MoveUp(map);
  if(Direct&4) MoveLeft(map);
  if(Direct&8) MoveRight(map);
}
void Craft::Throw(int setDirect){
  NowAct=2;
  LRflag = Owener->ReturnLR();
  Direct = setDirect;
  JumpSPEED = 0;
  MoveSPEED = SPEED *2;
  NoCollision = true;
  IsJump = false;
  if(Direct&1)Direct=1;
  else    Direct = Direct&12;
```

```
  wx = Owener->ReturnWX()-(width-Owener->ReturnWidth())/2;
  if(Owener->ReturnLastAct()==4)
    wy = Owener->ReturnWY()+Owener->ReturnHeight()-height;
  else
    wy = Owener->ReturnWY()+Owener->ReturnHeight()-height*(!Owener->ReturnHideComplete())-40;//離地面 40 公分
}
void Craft::CollisionReact(int setDirect,CFrame *which){
  switch(setDirect){
  case 1:case 4:
    Direct = 9;
    break;
  case 2:case 3:
    Direct = 5;
    break;
  case 5:
    Direct = 1;
    break;
  }
}
/*********************************************************************/
//Explosion 實作                                                      */
/*********************************************************************/
CAnimation Explosion::frame_pic;
Explosion::Explosion(int setOx,int setOy,int setChangeWhat,ChipDale *player){
  MapManage *map = ChipDale::Maps;
  width = frame_pic.Width();
  height = frame_pic.Height();
  ChangeWhat = setChangeWhat;
  wx = setOx*ONEOBJX-map->ReturnNowX();
  wy = setOy*ONEOBJY-map->ReturnNowY();
  frame_pic.Reset();
  CanAttackMode = 2;
  NowAct=2;
  Owener = player;
  IfNeedReFix = false;
}
void Explosion::Loading(){
  frame_pic.SetDelayCount(2);
  frame_pic.AddBitmap("Bitmaps/action/Explosion/Explosion_1.bmp",PURPLE);
  frame_pic.AddBitmap("Bitmaps/action/Explosion/Explosion_2.bmp",PURPLE);
  frame_pic.AddBitmap("Bitmaps/action/Explosion/Explosion_3.bmp",PURPLE);
  frame_pic.AddBitmap("Bitmaps/action/Explosion/Explosion_4.bmp",PURPLE);
}
void Explosion::OnShow(MapManage* map){
  if(NowAct==0) return;//死亡準備投胎
  frame_pic.SetBottomLeft(wx,wy,height);
  frame_pic.OnShow();
}
void Explosion::OnMove(MapManage* map){
  if(NowAct==0) return;//死亡準備投胎
  Object **CanThrow = ChipDale::CanThrow;
  bool IfNeedReFix=false;
  if(frame_pic.IsFinalBitmap()){
    switch(ChangeWhat){ //改變成甚麼要寫在這邊
      case STAR:
        for(int i=0,IfNeedReFix=false;i<CanTakeNum;i++){
          if(CanThrow[i]==this) IfNeedReFix=true;
          if(CanThrow[i]==NULL){
            CanThrow[i] = new Star(wx,wy);
            if(IfNeedReFix) CanThrow[i]->ReFixXY(map);
            break;
          }
          if(i+1==CanTakeNum){
            TRACE("CanThrow OverFlow!!!\n");
            Sleep(10000);
          }
        }
        break;
```

```
    case BOX_ANGLE:
      for(int i=0,IfNeedReFix=false;i<CanTakeNum;i++){
        if(CanThrow[i]==this) IfNeedReFix=true;
        if(CanThrow[i]==NULL){
          CanThrow[i] = new Angel(wx,wy,Owener);
          break;
        }
        if(i+1==CanTakeNum){
          TRACE("CanThrow OverFlow!!!\n");
          Sleep(10000);
        }
      }
      Owener->SetInvincible(1);
      break;
    case CHEESE:
      for(int i=0,IfNeedReFix=false;i<CanTakeNum;i++){
        if(CanThrow[i]==this) IfNeedReFix=true;
        if(CanThrow[i]==NULL){
          CanThrow[i] = new Cheese(wx,wy);
          if(IfNeedReFix) CanThrow[i]->ReFixXY(map);
          break;
        }
        if(i+1==CanTakeNum){
          TRACE("CanThrow OverFlow!!!\n");
          Sleep(10000);
        }
      }
   }
   NowAct=0;
  }
  frame_pic.OnMove();
}
/*********************************************************************/
//Star 實作                                                          */
/*********************************************************************/
CMovingBitmap Star::frame_pic;
Star::Star(int setWx,int setWy){
  width = frame_pic.Width();
  height = frame_pic.Height();
  wx = setWx;
  wy = setWy;
  CanAttackMode = 2;
  NowAct=2;
  UpSpeed=30;
  IsJump = false;
}
void Star::Loading(){
  frame_pic.LoadBitmapA("Bitmaps/object/7.bmp",PURPLE);
}
void Star::OnShow(MapManage* map){
  if(NowAct==0) return;//死亡準備投胎
  frame_pic.SetTopLeft(wx,wy);
  frame_pic.ShowBitmap();
}
void Star::OnMove(MapManage* map){
  if(NowAct==-1){
    NowAct=2;
    return;
  }
  if(NowAct==0) return;//死亡準備投胎
  lastUpSpeed=UpSpeed;
  FallingDown(map);
  if(!IsJump && lastUpSpeed==0){
    map->FillObstacle(7,wx,wy);
    NowAct=0;
  }
  else if(!IsJump){
    UpSpeed = abs(lastUpSpeed)*2/3;//落地彈跳 2/3 為系數
```

```
    IsJump=true;
  }
}
/*********************************************************************/
//Cheese 實作                                                        */
/*********************************************************************/
CMovingBitmap Cheese::frame_pic;
Cheese::Cheese(int setWx,int setWy){
  width = frame_pic.Width();
  height = frame_pic.Height();
  wx = setWx;
  wy = setWy;
  CanAttackMode = 2;
  NowAct=2;
  UpSpeed=30;
  IsJump = false;
}
void Cheese::Loading(){
  frame_pic.LoadBitmapA("Bitmaps/object/Cheese.bmp",PURPLE);
}
void Cheese::OnShow(MapManage* map){
  if(NowAct==0) return;//死亡準備投胎
  frame_pic.SetTopLeft(wx,wy);
  frame_pic.ShowBitmap();
}
void Cheese::OnMove(MapManage* map){
  Object **CanThrow = ChipDale::CanThrow;
  if(NowAct==-1){
    NowAct=2;
    return;
  }
  if(NowAct==0) return;//死亡準備投胎
  lastUpSpeed=UpSpeed;
  FallingDown(map);
  if(!IsJump && lastUpSpeed==0&&NowAct!=3){
    //map->FillObstacle(7,wx,wy);
    //NowAct=0;
    for(int i=0;i<CanTakeNum;i++){
      if(CanThrow[i]==NULL){
        CanThrow[i] = new Greedy(0,wy+height,this);
        TRACE("Greedy: %d %d\n",wx,wy);
        break;
      }
      if(i+1==CanTakeNum){
        TRACE("CanThrow OverFlow!!!\n");
        Sleep(10000);
      }
    }
    NowAct=3;
  }
  else if(!IsJump){
    UpSpeed = abs(lastUpSpeed)*2/3;//落地彈跳 2/3 為系數
    IsJump=true;
  }
}
/*********************************************************************/
//Stone 實作                                                         */
//此 Class 中的 Direct 編碼 => 1 上 , 2 下 , 4 左 , 8 右 ,           */
//              16 跑一次 , 32ReFix                                  */
/*********************************************************************/
CMovingBitmap Stone::frame_pic[2];
Stone::Stone(ChipDale *player){
  width = frame_pic[0].Width();
  height = frame_pic[0].Height();
  Owener = player;//記住自己的主人
  CanAttackMode = 0;
  HideThrow=false;
  ReboundLR=0;
```

```
  ReboundSpeed=0;
  NoIgnore_eat = true;
}
void Stone::Loading(){
  frame_pic[0].LoadBitmapA("Bitmaps/object/Stone_L.bmp",PURPLE);
  frame_pic[1].LoadBitmapA("Bitmaps/object/Stone_R.bmp",PURPLE);
}
void Stone::OnShow(MapManage* map){
  if(NowAct==0) return;//死亡準備投胎
  else if(NowAct==1){//拿在手上
frame_pic[Owener->ReturnLR()].SetTopLeft(Owener->ReturnWX()-(width-Owener->ReturnWidth())/2,Owener->ReturnWY()-
height*(!Owener->ReturnHideComplete()));
    frame_pic[Owener->ReturnLR()].ShowBitmap();
  }
  else{//丟出與落地
    frame_pic[LRflag].SetTopLeft(wx,wy);
    frame_pic[LRflag].ShowBitmap();
    //TRACE("show!!\n");
  }
}
bool Stone::MoveLeft(MapManage* map){
  if(!map->IfCollision(wx-MoveSPEED,wy,MoveSPEED,height,true)){
    wx -= MoveSPEED;
    return true;
  }else{
    int i=0;
    while(!map->IfCollision(wx-i,wy,MoveSPEED,height,true))i++;
    wx-=i;
    Jump();
    ReboundLR=1;
    ReboundSpeed=(MoveSPEED-i)/4;
  }
  return false;
}
bool Stone::MoveRight(MapManage* map){
  if(!map->IfCollision(wx+width,wy,MoveSPEED,height,true)){
    wx += MoveSPEED;
    return true;
  }else{
    int i=0;
    while(!map->IfCollision(wx+width,wy,i,height,true))i++;
    wx+=i;
    Jump();
    ReboundLR=-1;
    ReboundSpeed=(MoveSPEED-i)/4;
  }
  return false;
}
void Stone::ReBound(MapManage* map){
  if(!IsJump){
    ReboundLR=0;
    ReboundSpeed=0;
  }
  if(ReboundLR==-1){
    if(!map->IfCollision(wx-MoveSPEED,wy,MoveSPEED,height,true))
      wx-=ReboundSpeed;
  }
  else if(ReboundLR==1){
    if(!map->IfCollision(wx+width,wy,MoveSPEED,height,true))
      wx+=ReboundSpeed;
  }
}
void Stone::OnMove(MapManage* map){
  if(NowAct==0) return;//死亡準備投胎
  if(NowAct==1) return;//還在人物手上
  if(wx < -WinShowBuffer || wx > MWIDTH || wy < -WinShowBuffer){
    if(NowAct==3){
      map->ClearObstacle(ThisObjValue);
```

```
    TRACE("clear!!!\n");
   }
   NowAct = 0;
   return;
  }
  if(NowAct==3) return;
  if(!IsJump){
   IsJump = false;
   ThisObjValue = map->FillObstacle(OrderSize+MonsterOrderSize + 0,
                                    wx/*+(Direct&4)/4*(5)*(!HideThrow)+(Direct&8)/8*(-5)*(!HideThrow)*/,wy);
//(Direct&4)/4*(5)+(Direct&8)/8*(-5) 丟出落地後往回拉 不然一開始不丟遠 會打到自己
   wx = (ThisObjValue%E4-1)*ONEOBJX-map->ReturnNowX();
   wy = (ThisObjValue%E8/E4-1)*ONEOBJY-map->ReturnNowY();
   if(Direct&32){//有蹲下砸到怪物 會修正人物位置 用 Direct 32 當編碼
    Owener->FixSelf_Onto_ObjectTop();
    Direct &= 31;
   }
   NowAct = 3;
   return;
  }
  if(Direct&4 && !(Direct&16)) {MoveLeft(map);Direct|=16;}
  if(Direct&8 && !(Direct&16)) {MoveRight(map);Direct|=16;}
  ReBound(map);

  if(FallingDown(map))ReboundLR=0;;
 }
 void Stone::Throw(int setDirect){
  NowAct=2;
  LRflag = Owener->ReturnLR();
  Direct = setDirect | (Direct&32);
  if(Direct&1)Direct=1;
  UpSpeed = 0;
  MoveSPEED = 45-5;
  JumpSPEED = 30;
  NoCollision = false;
  IsJump = true;
  if(Direct&1) Jump();
  //TRACE("Direct: %d\n",Direct);
  wx = Owener->ReturnWX()+(Owener->ReturnWidth()-width)/2;
  if(Owener->ReturnLastAct()==4)
   wy = Owener->ReturnWY()+Owener->ReturnHeight()-height;
  else
   wy = Owener->ReturnWY()-height*(!Owener->ReturnHideComplete());
 }
 void Stone::CollisionReact(int setDirect,CFrame *which){
  if(NowAct==1) Direct |= 32;//有蹲下砸到怪物 會修正人物位置 用 Direct 32 當編碼
 }
 /*****************************************************************/
 //Greedy 實作                                                    */
 /*****************************************************************/
 CAnimation Greedy::frame_pic[2];
 CMovingBitmap Greedy::frame_hole;
 Greedy::Greedy(int setWx,int setBottonWy,Object *setCheeseObj){
  width = frame_pic[1].Width();
  height = frame_pic[1].Height();
  wx = setWx;
  wy = setBottonWy-height;
  Owener = NULL;//記住自己的主人
  CanAttackMode = 2;
  if(setWx<=MWIDTH/2){
   LRflag=1;
   wx -= width;
  }
  else
   LRflag=0;
  NowAct = 2;
  MoveSPEED = SPEED*4/5;
  CheeseObj = setCheeseObj;
```

```
  NoCollision = false;
  showMouse=true;
}
void Greedy::Loading(){
  frame_pic[0].SetDelayCount(5);
  frame_pic[0].AddBitmap("Bitmaps/action/Greedy/Greedy_1L.bmp",PURPLE);
  frame_pic[0].AddBitmap("Bitmaps/action/Greedy/Greedy_2L.bmp",PURPLE);
  frame_pic[1].SetDelayCount(5);
  frame_pic[1].AddBitmap("Bitmaps/action/Greedy/Greedy_1R.bmp",PURPLE);
  frame_pic[1].AddBitmap("Bitmaps/action/Greedy/Greedy_2R.bmp",PURPLE);
  frame_hole.LoadBitmapA("Bitmaps/object/hole.bmp",PURPLE);
}
void Greedy::OnShow(MapManage* map){
  if(NowAct==0) return;//死亡準備投胎
  if(showMouse && NowAct>0){//拿在手上
    frame_pic[LRflag].SetBottomLeft(wx,wy,height);
    frame_pic[LRflag].OnShow();
    frame_pic[LRflag].OnMove();
  }
  else if(!showMouse){
    frame_hole.SetTopLeft(wx,wy);
    frame_hole.ShowBitmap();
  }
}
void Greedy::OnMove(MapManage* map){
  if(NowAct==0) return;//死亡準備投胎
  if(NowAct==1) return;//還在人物手上
  if(!showMouse) return;//變成洞了
  if(wx>=-width && wx<=width+MWIDTH){
    if(!(!LRflag&&MoveLeft(map)) && !(LRflag&&MoveRight(map))){
      if(!NoCollision){
        NoCollision = true;
        if(!LRflag){
          PassWx = wx;
          MoveLeft(map);
        }
        else{
          PassWx = wx+width;
          MoveRight(map);
        }
      }
    }
    else if(CheeseObj!=NULL && CheeseObj->IfCollision(wx+(width/2)*(!LRflag),wy,width/2,height)){//只運算老鼠的一半寬
度 這樣看起來比較像有吃到
      CheeseObj->SetNowAct(0);
      CheeseObj=NULL;
    }
    else if(NoCollision && (!LRflag&&wx<=PassWx || LRflag&&wx>=PassWx)){
      showMouse = false;
      map->FillObstacle(13,PassWx,wy-11,false);//11 為寫死的值 兩個圖片(Greedy & hole)高的差值
      map->FillObstacle(13,PassWx,wy+height-34,false);//34 為寫死的 過關門的高度
      wx = PassWx;
      wy -= 11;
    }
  }
  else //自動消失 (離開顯示螢幕)
    NowAct=0;
}
```

monster.cpp

```
/*********************************************************************/
//Monster 實作                                                       */
/*********************************************************************/
Monster::Monster(){
  CanTrace = true;
  wait=0;
  MoveSPEED = SPEED;
  JumpSPEED=0;
  NoCollision=false;
```

```
  LR_Space = 0;
  wait = 0;
  UpSpeed = 0;
  LR_flag = 0;
  NowAct = 0;
  IsJump = false;
  Health = 1;
}
void Monster::CollisionChipDale(ChipDale *player){
  if(NowAct>=1&&NowAct<100){
    if(player->ReturnInvincible())return;
    if(player->ReturnHideComplete())return;
    if(player->IfCollision(wx,wy,width,height)){
       player->GetHurt();
    }
  }
}
ChipDale* Monster::Detect(ChipDale **player,int *WLength,int *HLength,int WRange,int HRange,bool IfTraceInvincible){
  ChipDale *result = NULL;
  int twx,twy,twidth,theight,tWLength,tHLength;
  MapManage *Maps = ChipDale::Maps;
  for(int i=0;i<2;i++){
    if(player[i]==NULL || player[i]->ReturnTakenByPartner()) continue;
    if(player[i]->ReturnHealth()<=0)continue;
    if(!IfTraceInvincible && player[i]->ReturnInvincible())continue;
    twidth = 0;
    theight = 0;
    twx = wx + width/2;
    twy = wy;
    if(WRange<0){
      twx -= MWIDTH;
      twidth = 2*MWIDTH + width;
    }
    else{
      twidth = WRange;
      if(!LRflag)
        twx -= WRange;
    }
    if(HRange<0){
      twy = (Maps->ReturnNowY()+twy)/MHEIGHT*MHEIGHT-Maps->ReturnNowY()-WinShowBuffer;
      theight = MHEIGHT+WinShowBuffer;
    }
    else{
      twy -= HRange;
      theight = 2*HRange + height;
    }
    if(player[i]->IfCollision(twx,twy,twidth,theight)){
      if(result!=NULL){
        tWLength = player[i]->ReturnWX() - wx;
        tHLength = player[i]->ReturnWY() - wy;
        if(tWLength*tWLength+tHLength*tHLength < (*WLength)*(*WLength)+(*HLength)*(*HLength)){
          *WLength = tWLength;
          *HLength = tHLength;
          result = player[i];
        }
      }
      else{
        *WLength = player[i]->ReturnWX() - wx;
        *HLength = player[i]->ReturnWY() - wy;
        result = player[i];
      }
    }
  }
  return result;
}
/*****************************************************************/
//MachineDog 實作                                                */
/*****************************************************************/
```

```
CAnimation MachineDog::frame_monster[2][2];
MachineDog::MachineDog(MapManage *map,int SetOx,int SetOy){
  MoveSPEED = SPEED*3/5;
  JumpSPEED=30;
  NoCollision=false;
  LR_Space = 15;
  wait = 15;
  width = frame_monster[0][0].Width();
  height = frame_monster[0][0].Height();
  wx = SetOx*ONEOBJX - map->ReturnNowX();
  wy = SetOy*ONEOBJY - map->ReturnNowY();
  lastWy = wy;
  UpSpeed = 0;
  LR_flag = 0;
  NowAct = 0;
  IsJump = false;
  Health = 1;
}
void MachineDog::Loading(){
  frame_monster[0][0].SetDelayCount(5);
  frame_monster[0][0].AddBitmap("Bitmaps/action/","MachineDog/","mechine_dog_stand_1L.bmp",PURPLE);
  frame_monster[0][0].AddBitmap("Bitmaps/action/","MachineDog/","mechine_dog_stand_2L.bmp",PURPLE);
  frame_monster[0][1].SetDelayCount(5);
  frame_monster[0][1].AddBitmap("Bitmaps/action/","MachineDog/","mechine_dog_stand_1R.bmp",PURPLE);
  frame_monster[0][1].AddBitmap("Bitmaps/action/","MachineDog/","mechine_dog_stand_2R.bmp",PURPLE);
  frame_monster[1][0].SetDelayCount(5);
  frame_monster[1][0].AddBitmap("Bitmaps/action/","MachineDog/","mechine_dog_run_1L.bmp",PURPLE);
  frame_monster[1][0].AddBitmap("Bitmaps/action/","MachineDog/","mechine_dog_run_2L.bmp",PURPLE);
  frame_monster[1][1].SetDelayCount(5);
  frame_monster[1][1].AddBitmap("Bitmaps/action/","MachineDog/","mechine_dog_run_1R.bmp",PURPLE);
  frame_monster[1][1].AddBitmap("Bitmaps/action/","MachineDog/","mechine_dog_run_2R.bmp",PURPLE);
}
void MachineDog::OnShow(MapManage *map){
  if(NowAct>0){
    frame_monster[NowAct>wait][LR_flag].SetBottomLeft(wx,wy,height);
    frame_monster[NowAct>wait][LR_flag].OnShow();
    frame_monster[NowAct>wait][LR_flag].OnMove();
  }
}
bool MachineDog::OnMove(MapManage *map,ChipDale **player){
  int MLength,HLength;
  if(NowAct<0)return false;
  FixXY(map);
  if(wx > -WinShowBuffer && wx < MWIDTH && wy > -WinShowBuffer && wy < MHEIGHT){
    if(NowAct==0){
      if(Detect(player,&MLength,&HLength,-1,-1,true)!=NULL){
        LR_flag = MLength >= 0;
        NowAct=1;//啟動
      }
    }
    else if(NowAct==100){
      MoveLeft(map);
      MoveUp(map);
    }
    else if(NowAct==101){
      MoveRight(map);
      MoveUp(map);
    }
    else if(NowAct>=1){
      if(NowAct <= wait){
        NowAct++;
      }
      else if(NowAct >= wait+1){
        if(!IsJump && NowAct >= wait+4){
          LR_flag = !LR_flag;
          NowAct = wait+1;
        }
        if(!IsJump && wy!=lastWy){
```

```
        NowAct=wait+1;
        lastWy = wy;
        LR_Space = 15;
       }
       if((LR_flag==0&&!MoveLeft(map)||LR_flag==1&&!MoveRight(map))&&!IsJump){
        IsJump = true;
        LR_Space = 0;
        Jump();
        NowAct++;
       }
     }
     FallingDown(map);
   }
   return true;
  }
  else if(NowAct>0)
    NowAct=-1;//表示活起來後又離開螢幕死掉
  return true;
}
bool MachineDog::KillMonster(int Direct){
  if(Direct&4)
    NowAct=100;
  else
    NowAct=101;
  IsJump=false;
  MoveSPEED = SPEED*2;
  NoCollision=true;
  Health = 0;
  return true;
}
/*********************************************************************/
//Cactus 實作                                                        */
/*********************************************************************/
CMovingBitmap Cactus::frame_monster;
Cactus::Cactus(MapManage *map,int SetOx,int SetOy){
  wx = SetOx*ONEOBJX - map->ReturnNowX();
  wy = SetOy*ONEOBJY - map->ReturnNowY();
  width = frame_monster.Width();
  height = frame_monster.Height();
  NowAct = 0;
  CanTrace=false;
}
void Cactus::Loading(){
  frame_monster.LoadBitmapA("Bitmaps/action/Cactus/Cactus.bmp",PURPLE);
}
bool Cactus::OnMove(MapManage *map,ChipDale **player){
  if(NowAct<0)return false;
  FixXY(map);
  if(wx > -WinShowBuffer && wx < MWIDTH && wy > -WinShowBuffer && wy < MHEIGHT){
    if(NowAct==0){
      NowAct=1;//啟動
    }
  }
  else if(NowAct>0)
    NowAct=-1;//表示活起來後又離開螢幕死掉
  return true;
}
/*********************************************************************/
//Electric & Wire 實作                                               */
/*********************************************************************/
////////////////////////////////////////////////////////
//Electric 屬於 Wire 架框的實際怪物
CMovingBitmap Electric::frame_monster[2];
Electric::Electric(MapManage *map,int SetWx,int SetWy,int
SetWireLength):ChangeSpeed(4),MaxMoveSpeed((int)(SPEED*1.5)){
  MoveLength=0;//移動距離 和 顯示時使用
  NoCollision=true;
  width = frame_monster[0].Width();
```

```
  height = frame_monster[0].Height();
  wx = SetWx;
  wy = SetWy;
  NowAct = 1;
  WireLength = SetWireLength;
  Health = 1;
  LRflag = 1;//電流的流動方向
  CanTrace=false;
}
void Electric::Loading(){
  frame_monster[0].LoadBitmapA("Bitmaps/action/Electric/Electric1.bmp",PURPLE);
  frame_monster[1].LoadBitmapA("Bitmaps/action/Electric/Electric2.bmp",PURPLE);
}
void Electric::OnShow(MapManage *map){
  if(NowAct>0){
    frame_monster[(MoveLength%(ChangeSpeed*2))>=ChangeSpeed].SetTopLeft(wx,wy);
    frame_monster[(MoveLength%(ChangeSpeed*2))>=ChangeSpeed].ShowBitmap();
  }
}
bool Electric::OnMove(MapManage *map,ChipDale **player){
  if(NowAct<0)return false;
  if(WireLength == MoveLength){
    LRflag = !LRflag;
    MoveLength = 0;
  }
  if(WireLength-MoveLength >= MaxMoveSpeed) MoveSPEED = MaxMoveSpeed;
  else                  MoveSPEED = WireLength-MoveLength;
  MoveLength += MoveSPEED;
  if(!LRflag) MoveLeft(map);
  else    MoveRight(map);
  return true;
}
////////////////////////////////////////////////////////////
//Wire
Wire::Wire(MapManage *map,int SetOx,int SetOy,int SetWireOLength){
  NoCollision=true;
  WireLength = SetWireOLength*ONEOBJX;
  wx = SetOx*ONEOBJX - map->ReturnNowX();
  wy = SetOy*ONEOBJY - map->ReturnNowY();
  NowAct = 0;
  Health = 1;
  CanTrace=false;
  real_monster = new Electric(map,wx,wy,WireLength);
}
void Wire::Loading(){
  Electric::Loading();
}
void Wire::OnShow(MapManage *map){
  if(NowAct>0){
    real_monster->OnShow(map);
  }
}
bool Wire::OnMove(MapManage *map,ChipDale **player){
  if(NowAct<0)return false;
  FixXY(map);
  real_monster->FixXY(map);
  if(wx > -WinShowBuffer-WireLength && wx < MWIDTH+WireLength && wy > -WinShowBuffer && wy < MHEIGHT){
    if(NowAct==0){
      NowAct=1;//啟動
    }
    if(NowAct==1){
      real_monster->OnMove(map,player);
    }
    return true;
  }
  else if(NowAct>0){
    NowAct=-1;//表示活起來後又離開螢幕死掉
  }
```

```
  return true;
}
void Wire::CollisionChipDale(ChipDale *player){
  if(NowAct>=1&&NowAct<100){
    if(player->ReturnInvincible())return;
    if(real_monster->ElectricCollision(player)){
       player->GetHurt();
    }
  }
}
void Wire::FixMapMove(int fixX,int fixY)
{
  wx -= fixX;
  wy -= fixY;
  real_monster->FixMapMove(fixX,fixY);
}
/*****************************************************************/
//Mouse  實作                                                    */
/*****************************************************************/
CAnimation Mouse::frame_monster[3][2];
Mouse::Mouse(MapManage *map,int SetOx,int SetOy){
  MoveSPEED = SPEED*3/5;
  NoCollision=false;
  LR_Space = 0;
  width = frame_monster[0][0].Width();
  height = frame_monster[0][0].Height();
  wx = SetOx*ONEOBJX - map->ReturnNowX();
  wy = SetOy*ONEOBJY - map->ReturnNowY();
  UpSpeed = 0;
  LR_flag = 0;
  NowAct = 0;
  IsJump = false;
  Health = 1;
}
void Mouse::Loading(){
  frame_monster[0][0].SetDelayCount(5);
  frame_monster[0][0].AddBitmap("Bitmaps/action/","Mouse/","mouse_stand_L.bmp",PURPLE);
  frame_monster[0][1].SetDelayCount(5);
  frame_monster[0][1].AddBitmap("Bitmaps/action/","Mouse/","mouse_stand_R.bmp",PURPLE);
  frame_monster[1][0].SetDelayCount(5);
  frame_monster[1][0].AddBitmap("Bitmaps/action/","Mouse/","mouse_Run_1L.bmp",PURPLE);
  frame_monster[1][0].AddBitmap("Bitmaps/action/","Mouse/","mouse_Run_2L.bmp",PURPLE);
  frame_monster[1][0].AddBitmap("Bitmaps/action/","Mouse/","mouse_Run_3L.bmp",PURPLE);
  frame_monster[1][0].AddBitmap("Bitmaps/action/","Mouse/","mouse_Run_4L.bmp",PURPLE);
  frame_monster[1][1].SetDelayCount(5);
  frame_monster[1][1].AddBitmap("Bitmaps/action/","Mouse/","mouse_Run_1R.bmp",PURPLE);
  frame_monster[1][1].AddBitmap("Bitmaps/action/","Mouse/","mouse_Run_2R.bmp",PURPLE);
  frame_monster[1][1].AddBitmap("Bitmaps/action/","Mouse/","mouse_Run_3R.bmp",PURPLE);
  frame_monster[1][1].AddBitmap("Bitmaps/action/","Mouse/","mouse_Run_4R.bmp",PURPLE);
  frame_monster[2][0].SetDelayCount(5);
  frame_monster[2][0].AddBitmap("Bitmaps/action/","Mouse/","mouse_Jump_L.bmp",PURPLE);
  frame_monster[2][1].SetDelayCount(5);
  frame_monster[2][1].AddBitmap("Bitmaps/action/","Mouse/","mouse_Jump_R.bmp",PURPLE);
}
void Mouse::OnShow(MapManage *map){
  int showAct;
  if(NowAct>0){
    if(!IsJump)    showAct=0;
    else      showAct=2;
    if(NowAct>=50) showAct=1;
    frame_monster[showAct][LR_flag].SetBottomLeft(wx,wy,height);
    frame_monster[showAct][LR_flag].OnShow();
    frame_monster[showAct][LR_flag].OnMove();
  }
}
bool Mouse::OnMove(MapManage *map,ChipDale **player){
  int MLength,HLength;
  if(NowAct<0)return false;
```

```
FixXY(map);
if(wx > -WinShowBuffer && wx < MWIDTH+WinShowBuffer && wy > -WinShowBuffer && wy < MHEIGHT){
 if(NowAct==0 && wx > 0 && wx < MWIDTH && wy > 0 && wy < MHEIGHT){
  if(Detect(player,&MLength,&HLength,-1,-1,true)!=NULL){
   LR_flag = MLength >= 0;
   NowAct=1;//啟動
  }
  NowAct=1;//啟動
 }
 else if(NowAct==100){
  MoveLeft(map);
  MoveUp(map);
 }
 else if(NowAct==101){
  MoveRight(map);
  MoveUp(map);
 }
 else if(NowAct>=1){
  tracePlayer = Detect(player,&MLength,&HLength,-1,0);
  if(tracePlayer!=NULL){
   LR_flag = MLength >= 0;
   NowAct = 50;
  }
  if(NowAct <= wait){
   NowAct++;
  }
  else if(NowAct >= wait+1 && NowAct < 50){
   if(!IsJump){
    if(NowAct >= wait+5*4){
     LR_flag = !LR_flag;
     NowAct = wait+1;
    }
    if((NowAct-wait)%4==1){
     IsJump = true;
     JumpSPEED=30;
     Jump();
    }
    NowAct++;

   }
   else{
    if(LR_flag==0){
     if(!MoveLeft(map)){
      LR_flag = !LR_flag;
      NowAct = wait+2;
     }
    }
    else if(LR_flag==1){
     if(!MoveRight(map)){
      LR_flag = !LR_flag;
      NowAct = wait+2;
     }
    }
   }
  }
  else if(NowAct >= 50){
   if((LR_flag==0&&!MoveLeft(map)||LR_flag==1&&!MoveRight(map)) && !IsJump){
    IsJump = true;
    JumpSPEED=30;
    Jump();
    if(NowAct==52){
     LR_flag = !LR_flag;
     NowAct = 50;
    }
    NowAct++;
   }
   if(Detect(player,&MLength,&HLength,-1,height)==NULL){
    NowAct = wait+1;
```

```
        //LR_flag = !LR_flag;
       }
      }
      FallingDown(map);
    }
    return true;
  }
  else if(NowAct>0)
    NowAct=-1;//表示活起來後又離開螢幕死掉
  return true;
}
bool Mouse::KillMonster(int Direct){
  if(Direct&4)
    NowAct=100;
  else
    NowAct=101;
  IsJump=false;
  MoveSPEED = SPEED*2;
  NoCollision=true;
  Health = 0;
  return true;
}
/*********************************************************************/
//Wasp 實作                                                          */
/*********************************************************************/
CAnimation Wasp::frame_monster[2];
Wasp::Wasp(MapManage *map,int SetOx,int SetOy){
  NoCollision=true;
  width = frame_monster[0].Width();
  height = frame_monster[0].Height();
  wx = SetOx*ONEOBJX - map->ReturnNowX();
  wy = SetOy*ONEOBJY - map->ReturnNowY();
  NowAct = 0;
  Health = 1;
  MoveSPEED = 3;
}
void Wasp::Loading(){
  frame_monster[0].SetDelayCount(5);
  frame_monster[0].AddBitmap("Bitmaps/action/","Wasp/","Wasp_1L.bmp",PURPLE);
  frame_monster[0].AddBitmap("Bitmaps/action/","Wasp/","Wasp_2L.bmp",PURPLE);
  frame_monster[1].SetDelayCount(5);
  frame_monster[1].AddBitmap("Bitmaps/action/","Wasp/","Wasp_1R.bmp",PURPLE);
  frame_monster[1].AddBitmap("Bitmaps/action/","Wasp/","Wasp_2R.bmp",PURPLE);
}
void Wasp::OnShow(MapManage *map){
  if(NowAct>0){
    frame_monster[LR_flag].SetBottomLeft(wx,wy,height);
    frame_monster[LR_flag].OnShow();
    frame_monster[LR_flag].OnMove();
  }
}
bool Wasp::OnMove(MapManage *map,ChipDale **player){
  int MLength,HLength;
  if(NowAct<0)return false;
  FixXY(map);
  if(wx > -WinShowBuffer && wx < MWIDTH && wy > -WinShowBuffer && wy < MHEIGHT){
    if(NowAct==0){
      if(Detect(player,&MLength,&HLength,-1,-1,true)!=NULL){
        LR_flag = MLength >= 0;
        NowAct=1;//啟動
      }
    }
    else if(NowAct==100){
      MoveLeft(map);
      MoveUp(map);
    }
    else if(NowAct==101){
      MoveRight(map);
```

```
      MoveUp(map);
    }
    else if(NowAct>=1){
      if(NowAct <= wait){
        NowAct++;
      }
      else if(NowAct >= wait+1){
        if(NowAct == wait+1){
          MoveDown(map);
          if(Detect(player,&MLength,&HLength,-1,height/2)){
            NowAct++;
          }
        }
        else{
          MoveSPEED = 1;
          MoveDown(map);
          MoveSPEED = SPEED;
          if(LR_flag==0) MoveLeft(map);
          if(LR_flag==1) MoveRight(map);
        }
      }
    }
    return true;
  }
  else if(NowAct>0)
    NowAct=-1;//表示活起來後又離開螢幕死掉
  return true;
}
bool Wasp::KillMonster(int Direct){
  if(Direct&4)
    NowAct=100;
  else
    NowAct=101;
  IsJump=false;
  MoveSPEED = SPEED*2;
  NoCollision=true;
  Health = 0;
  return true;
}
/*********************************************************************/
//bullet 實作 怪物所有用的子彈                                        */
//       需要另外做 onshow                                           */
/*********************************************************************/
bullet::bullet(){
  NoCollision=true;
  NowAct = 1;
  Health = 1;
  LRflag = 1;
  CanTrace=false;
}
bool bullet::OnMove(MapManage *map){
  if(NowAct<0)return false;
  if(wx > -WinShowBuffer && wx < MWIDTH && wy > -WinShowBuffer && wy < MHEIGHT){
    if(NowAct==0){
      NowAct=1;//啟動
    }
    if(NowAct==1){
      MoveSPEED = abs(MoveLR);
      if(MoveLR<0) MoveLeft(map);
      if(MoveLR>0) MoveRight(map);
      MoveSPEED = abs(MoveUD);
      if(MoveUD<0) MoveUp(map);
      if(MoveUD>0) MoveDown(map);
    }
    return true;
  }
  else if(NowAct>0){
    NowAct=-1;//表示活起來後又離開螢幕死掉
```

```
  }
  return true;
}
/*************************************************************/
//Centipede &    Centipedelimbs  實作                                    */
/*************************************************************/
////////////////////////////////////////////////////////
//Lighting
CMovingBitmap Lighting::frame_monster;
Lighting::Lighting(MapManage *map,int SetWx,int SetWy,int LR,int UD){
  wx = SetWx;
  wy = SetWy;
  MoveLR=LR;
  MoveUD=UD;
}
void Lighting::Loading(){
  frame_monster.LoadBitmapA("Bitmaps/action/Centipede/Lightning.bmp",PURPLE);
}
void Lighting::OnShow(MapManage *map){
  if(NowAct>0){
    frame_monster.SetTopLeft(wx,wy);
    frame_monster.ShowBitmap();
  }
}
////////////////////////////////////////////////////////
//Centipedelimbs
CAnimation Centipedelimbs::frame_monster[3];
Centipedelimbs::Centipedelimbs(MapManage *map,int SetWx,int SetWy,int
SetSelect):ReleaseBullTime(15),TotalBullTime(50),BulletMaxSpeed(10),WRandBullet(100){
  NoCollision=true;
  wx = SetWx;
  wy = SetWy;
  NowAct = 0;
  Health = 1;
  CanTrace=false;
  Select = SetSelect;
  width = frame_monster[Select].Width();
  height = frame_monster[Select].Height();
  for(int i=0;i<CentipedeLightingNum;i++)
    bullets[i] = NULL;
}
Centipedelimbs::~Centipedelimbs(){
  for(int i=0;i<CentipedeLightingNum;i++)
    if(bullets[i]!=NULL)
      delete(bullets[i]);
}
void Centipedelimbs::Loading(){
  frame_monster[0].SetDelayCount(2);
  frame_monster[0].AddBitmap("Bitmaps/action/","Centipede/","head.bmp",PURPLE);
  frame_monster[0].AddBitmap("Bitmaps/action/","Centipede/","head_die.bmp",PURPLE);
  frame_monster[1].SetDelayCount(1);
  frame_monster[1].AddBitmap("Bitmaps/action/","Centipede/","L_Fist.bmp",PURPLE);
  frame_monster[1].AddBitmap("Bitmaps/action/","Centipede/","L_Cloth.bmp",PURPLE);
  frame_monster[2].SetDelayCount(1);
  frame_monster[2].AddBitmap("Bitmaps/action/","Centipede/","R_Fist.bmp",PURPLE);
  frame_monster[2].AddBitmap("Bitmaps/action/","Centipede/","R_Cloth.bmp",PURPLE);
}
void Centipedelimbs::OnShow(MapManage *map,int countFlicker){
  if(NowAct<0)return;
  if(wx > -WinShowBuffer && wx < MWIDTH && wy > -WinShowBuffer && wy < MHEIGHT){
    switch(Select){
    case 0:
      if(countFlicker==0)
        frame_monster[0].Reset();
      frame_monster[0].SetBottomLeft(wx,wy,height);
      frame_monster[0].OnShow();
      frame_monster[0].OnMove();
      break;
```

```
   case 1:case 2:
    if(TotalBullTime-NowAct<=ReleaseBullTime) frame_monster[Select].OnMoveToNum(1);
    else                frame_monster[Select].OnMoveToNum(0);
    frame_monster[Select].SetBottomLeft(wx,wy,height);
    frame_monster[Select].OnShow();
    for(int i=0;i<CentipedeLightingNum;i++){
     if(bullets[i]!=NULL)
      bullets[i]->OnShow(map);
    }
    break;
   }
  }
}
bool Centipedelimbs::OnMove(MapManage *map,ChipDale **player){
  int WLength,HLength,UD,LR;
  if(NowAct<0)return false;
  for(int i=0;i<CentipedeLightingNum;i++){
   if(bullets[i]!=NULL)
    bullets[i]->FixXY(map);
  }
  if(wx > -WinShowBuffer && wx < MWIDTH && wy > -WinShowBuffer && wy < MHEIGHT){
   if(NowAct==0){
    NowAct=1;//啟動
   }
   if(NowAct>=1){
    if(Select>=1){//Select 1 & 2 左手跟右手  ,  0 是頭
     if(TotalBullTime-NowAct==ReleaseBullTime){
      for(int i=0;i<CentipedeLightingNum;i++){
       if(bullets[i]!=NULL){
        if(bullets[i]->ReturnNowAct()<0){
         delete(bullets[i]);
         bullets[i]=NULL;
        }
        continue;
       }
       else{
        Detect(player,&WLength,&HLength,-1,-1,true);
        WLength += rand()%(WRandBullet*2)-WRandBullet;
        if(WLength==0&&HLength==0) continue;
        if(abs(WLength)>abs(HLength)){
         LR = WLength>0 ? BulletMaxSpeed:-BulletMaxSpeed;
         UD = HLength/(WLength/LR);
        }
        else{
         UD = HLength>0 ? BulletMaxSpeed:-BulletMaxSpeed;
         LR = WLength/(HLength/UD);
        }
       }
       if(Select==1){
        bullets[i] = new Lighting(map,wx+36,wy+32,LR,UD);
        break;
       }
       else if(Select==2){
        bullets[i] = new Lighting(map,wx+10,wy+23,LR,UD);
        break;
       }
      }
     }
     NowAct++;
     if(NowAct>50)NowAct=1;
    }
    for(int i=0;i<CentipedeLightingNum;i++){
     if(bullets[i]!=NULL)
      bullets[i]->OnMove(map);
    }
   }
   return true;
  }
```

```
  else if(NowAct>0){
    NowAct=-1;//表示活起來後又離開螢幕死掉
  }
  return true;
}
int Centipedelimbs::CentipedelimbsCollision(ChipDale *player){
  if(player->IfCollision(wx,wy,width,height))
    return true;
  for(int i=0;i<CentipedeLightingNum;i++){
    if(bullets[i]!=NULL && bullets[i]->Collision(player))
      return true;
  }
  return false;
}
//////////////////////////////////////////////////////////
//Centipede
CAnimation Centipede::frame_monster;
Centipede::Centipede(MapManage *map,int SetOx,int SetOy){
  NoCollision=true;
  wx = SetOx*ONEOBJX - map->ReturnNowX();
  wy = SetOy*ONEOBJY - map->ReturnNowY();
  width = frame_monster.Width();
  height = frame_monster.Height();
  TRACE("Centipede!!!    wx %d    , wy %d\n",wx,wy);
  NowAct = 0;
  Health = 5;
  CanTrace=false;
  real_monster[0] = new Centipedelimbs(map,wx+180,wy-32,0);
  real_monster[1] = new Centipedelimbs(map,wx-22,wy+52,1);
  real_monster[2] = new Centipedelimbs(map,wx+321,wy-24,2);
  countFlicker=0;
}
Centipede::~Centipede(){
  for(int i=0;i<3;i++)
    delete(real_monster[i]);
}
void Centipede::Loading(){
  frame_monster.SetDelayCount(2);
  frame_monster.AddBitmap("Bitmaps/action/","Centipede/","Centipede_body_normal.bmp",PURPLE);
  frame_monster.AddBitmap("Bitmaps/action/","Centipede/","Centipede_body_die.bmp",PURPLE);
  Lighting::Loading();
  Centipedelimbs::Loading();
}
void Centipede::OnShow(MapManage *map){
  if(NowAct<0)return;
  if(wx > -WinShowBuffer && wx < MWIDTH && wy > -WinShowBuffer && wy < MHEIGHT){
    if(countFlicker==0)
      frame_monster.Reset();
    else
      countFlicker--;
    frame_monster.SetBottomLeft(wx,wy,height);
    frame_monster.OnShow();
    frame_monster.OnMove();
    for(int i=0;i<3;i++)
      real_monster[i]->OnShow(map,countFlicker);
  }
}
bool Centipede::OnMove(MapManage *map,ChipDale **player){
  if(NowAct<0)return false;
  FixXY(map);
  real_monster[0]->FixXY(map);
  real_monster[1]->FixXY(map);
  real_monster[2]->FixXY(map);
  if(wx > -WinShowBuffer && wx < MWIDTH && wy > -WinShowBuffer && wy < MHEIGHT){
    if(NowAct==0){
      NowAct=1;//啟動
    }
    if(NowAct==1){
```

```
    for(int i=1;i<3;i++)//real_monster[0] 基本上不會有 OnMove
      real_monster[i]->OnMove(map,player);
   }
   return true;
  }
  else if(NowAct>0){
   NowAct=-1;//表示活起來後又離開螢幕死掉
  }
  return true;
}
void Centipede::CollisionChipDale(ChipDale *player){
  if(NowAct>=1&&NowAct<100){
   if(player->ReturnInvincible())return;
if(real_monster[1]->CentipedelimbsCollision(player)||real_monster[2]->CentipedelimbsCollision(player)){
     player->GetHurt();
   }
  }
}
void Centipede::FixMapMove(int fixX,int fixY)
{
  wx -= fixX;
  wy -= fixY;
  real_monster[0]->FixMapMove(fixX,fixY);
  real_monster[1]->FixMapMove(fixX,fixY);
  real_monster[2]->FixMapMove(fixX,fixY);
}
bool Centipede::KillMonster(int Direct){
  if(countFlicker!=0) return false;
  Health--;
  if(Health>0){
   countFlicker = 50;
   return false;
  }
  else{
   CGameStateRun::ToBonus();
   NowAct=-1;
   return true;
  }
}
```