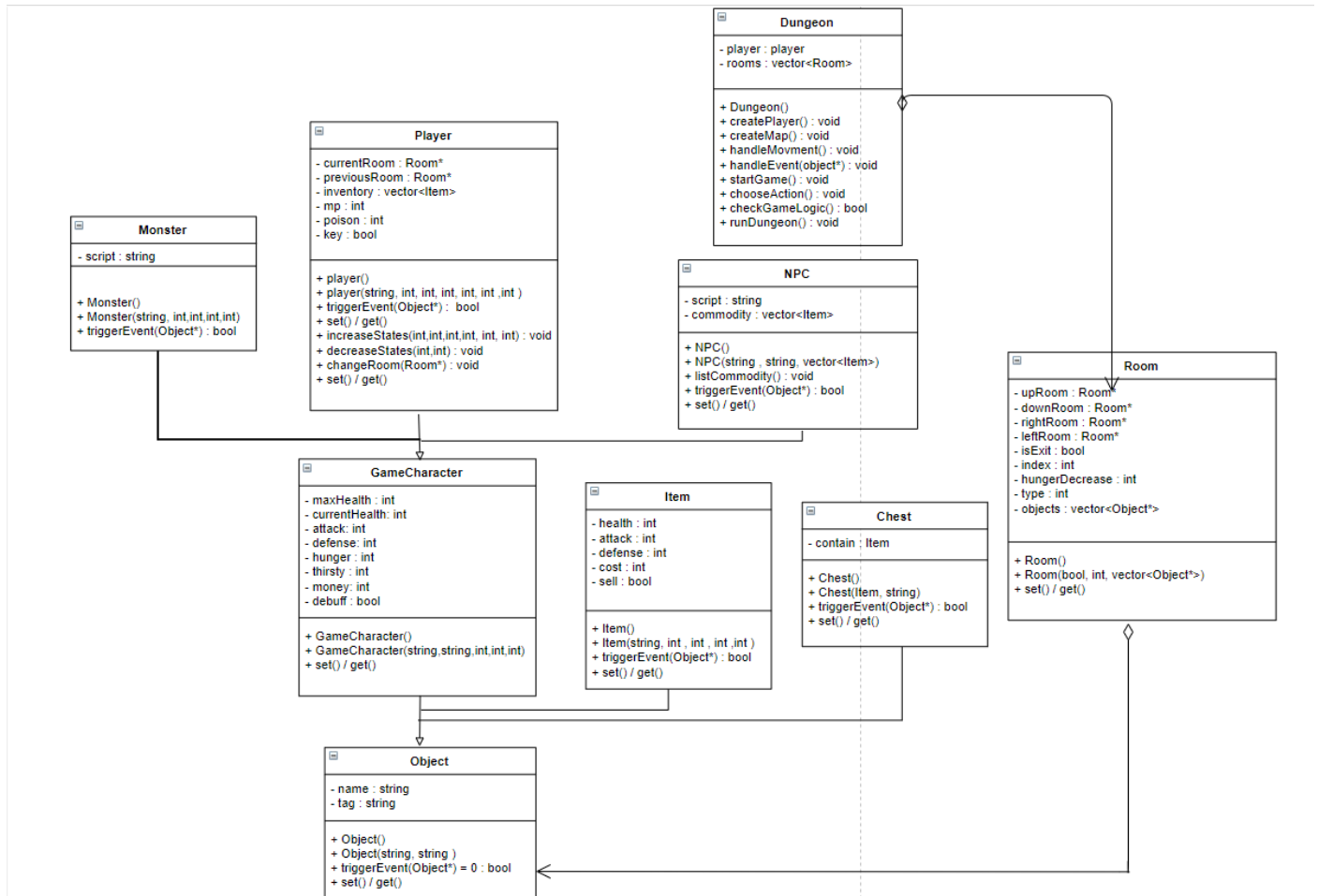


Dungeon 報告

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1、Dungeon NML



2、Implementation detailed

- 進入一個房間可以選擇此房間可做的對應選項 Eg：開寶箱、跟 NPC 買東西、跟牛拿牛奶、綠洲取水、玩特別遊戲等等。(之後會一一介紹)

```
In Room 0 (normal room)
choose an action

1 move
2 talk with NPC Chris
5 player status

Enter your choose :
```

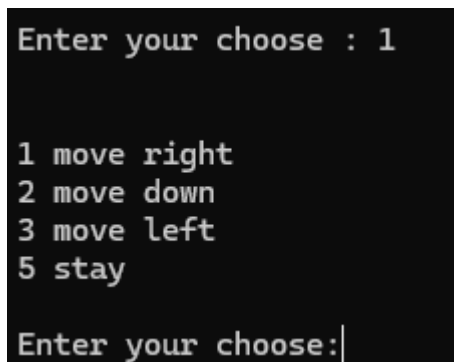
第一個房間有三件事可做

遍歷房間的 object，如果有怪物、NPC 或 chest，再把對應選項印出來。

```
for(Object* u: position->getObjects()){
    if(u->getTag()=="Npc"){
        npc=true;
    }
    else if(u->getTag()=="Chest"){
        chest =true;
    }
    else if(u->getTag() == "Monster"){
        monster=true;
    }
}
if(npc){
    for(Object* u: position->getObjects()){
        if(u->getTag()=="Npc"){
            cout<<"2 talk with NPC "<<u->getName()<<"\n";
            break;
        }
    }
}
if(monster){
    for(Object* u: position->getObjects()){
        if(u->getTag()=="Monster"){
            cout<<"3 fight the monster "<<u->getName()<<"\n";
            break;
        }
    }
}

}
if(chest){
    cout<<"4 open the chest \n";
}
cout<<"5 player status \n";
```

- 選擇 1 會印出可以走的路，要選擇你想停留或是往其他房間走。



```
Enter your choose : 1

1 move right
2 move down
3 move left
5 stay

Enter your choose:|
```

把能走的路印出來。

```
Room* position = player.getCurrentRoom();
if(position->getRightRoom()!=NULL){
    cout<<"1 move right\n";
}
if(position->getDownRoom()!=NULL){
    cout<<"2 move down\n";
}
if(position->getLeftRoom()!=NULL){
    cout<<"3 move left\n";
}
if(position->getUpRoom()!=NULL){
    cout<<"4 move up\n";
}
cout<<"5 stay\n";
cout<<"\nEnter your choose:";
```

- 選擇 5(player status)會呼叫 `player.triggerEvent(Object*)` (**virtual function**) 會顯示出當前玩家的資訊。

```
In Room 0 (normal room)
choose an action

1 move
2 talk with NPC Chris
5 player status

Enter your choose : 5

johnny's status:
Current health : 198
Defense       : 20
Attack        : 60
Hunger        : 140
Thirsty       : 100
Poison        : 0
Mp            : 20
Money         : 0
Inventory :
Iron sword.wooden sword.shield.apple.
```

```
bool Player::triggerEvent(Object* Obj){
    cout<<"\n";
    cout<<this->getName()<<"'s status:\n";
    cout<<"Current health : "<<this->getCurrentHealth()<<"\n";
    cout<<"Defense       : "<<this->getDefense()<<"\n";
    cout<<"Attack        : "<<this->getAttack();
    if(getDebuff()) cout<<" (debuff)";
    cout<<"\n";
    cout<<"Hunger        : "<<this->getHunger()<<"\n";
    cout<<"Thirsty       : "<<this->getThirsty()<<"\n";
    cout<<"Poison        : "<<this->poison<<"\n";
    cout<<"Mp            : "<<this->mp<<"\n";
    cout<<"Money         : "<<this->getMoney()<<"\n";
    cout<<"Inventory : \n";
    for(string s: inventory){
        cout<<s<<" ";
    }
    cout<<"\n\n";
    return true;
}
```

- 選擇 3(fight monster) 會呼叫 `monster` 的 `triggerEvent(Object*)` (**virtual function**) ，會先列出怪物資訊並決定是否要打，打死後此房間的選項 3 就會消失(沒怪物了)。

```
1 move
3 fight the monster Banana
5 player status

Enter your choose : 3

I am Monter Banana
I won't let you pass!!!!

Monster Status :
Health       : 50
Defense      : 0
Attack       : 12

Do you want to fight Banana? 1 Fight : 0 RUN
Enter your choice :
```

打架是回合制的，你先打怪物一下，如果怪物沒死就會還手，打死後會掉食物、回復血量與掉落金幣。

```

Do you want to fight Banana? 1 Fight : 0 RUN
Enter your choice : 1

Fight start!!!

Your current health 100
Monster current health 50

Choose an action :
0 or Invalid Input RUN
1 normal attack
Enter your action : 1
Your deal 30 damages to Banana
Banana deal 2 damage to you

Your current health 98
Monster current health 20

Choose an action :
0 or Invalid Input RUN
1 normal attack
Enter your action : 1
Your deal 30 damages to Banana
You defeat Banana
You get money 20
You get carrion which decrease your hunger by 40
You get a health potion which increase your health by 50

```

Monster 的 triggerEvent()

```

while(1){
    cout<<"\n\nYour current health "<<Obj->getHel()<<"\n";
    cout<<"Monster current health "<<getCurrentHealth()<<"\n\n";
    cout<<"Choose an action : \n0 or Invalid Input RUN\n1 normal attack\n";
    if(Obj->getMP()>=50){
        cout<<"2 special attack\n";
    }
    cout<<"Enter your action : ";
    cin>>req;
    if(req==0){
        cout<<"Run~\n\n";
        setCurrentHealth(getMaxHealth());
        return false;
    }
    else{
        if(req==1){
            cout<<"Your deal "<<Obj->getAtt()<<" damages to "<<getName()<<"\n";
            Obj->setMP(10);
            setCurrentHealth(getCurrentHealth()-Obj->getAtt());
        }
        else if(req==2){
            if(Obj->getMP()<50){
                cout<<"Run~\n\n";
                return false;
            }
            else{
                cout<<"Your deal "<<100+Obj->getAtt()<<" damages to "<<getName()<<"\n";
                Obj->setMP(-50);
                setCurrentHealth(getCurrentHealth()-(Obj->getAtt()*2));
            }
        }
    }
}

```

while 迴圈回合制對戰

```

if(getCurrentHealth()<=0){
    cout<<"You defeat "<<getName()<<"\n";
    cout<<"You get money "<<getMoney()<<"\n";
    cout<<"You get carrion which decrease your hunger by 40\n";
    cout<<"You get a health potion which increase your health by 50\n";
    Obj->increaseStates(50, 0, 0, -getMoney(), 40, 0);
    setTag("Died");
    break;
}
int damage=(getAttack()-Obj->getDef()<0)? 0: getAttack()-Obj->getDef();
cout<<getName()<<" deal "<<damage<<" damage to you\n";
Obj->setHel(damage);
if(Obj->getHel()<=0){
    cout<<"\nYou are killed by "<<getName()<<"\n";
    return false;
}

```

贏給獎勵、輸則結束

每使用一次普通攻擊會加上 10MP(MP 系統) 50 可以發動特殊技能

```
johnny's status:
Current health : 148
Defense       : 10
Attack        : 30
Hunger        : 150
Thirsty       : 110
Poison        : 0
Mp            : 20
Money         : 30
```

```
Choose an action :
0 or Invalid Input RUN
1 normal attack
2 special attack
Enter your action : 2
Your deal 130 damages to skelton king
You defeat skelton king
You get money 20
You get carrion which decrease your hunger by 40
You get a health potion which increase your health by 50
```

- 選擇 2 會呼叫 NPC 的 `triggerEvent(Object*)` (**virtual function**)，可以跟 NPC 互動。
會先說一句台詞，再拿出自己賣的東西資訊，供玩家選擇。
下圖買了一個護盾，花費了 10 元。

```
choose an action
1 move
2 talk with NPC Chris
5 player status

Enter your choose : 2

Welcome to dungeon.
Try your best to kill the boss and leave here

Current money : 10
Here the Items you can buy:

0 wooden sword cost : 10
Health : 0
Defense : 0
Attack : 10

1 shield cost : 10
Health : 0
Defense : 10
Attack : 0

2 apple cost : 10
Health : 50
Defense : 0
Attack : 0

Which one do want to buy? (Invalid Input : None) : 1
Buy a shield
```

NPC 的 `triggerEvent` 印出所有物品，確認買哪個再呼叫 item 的 `triggerEvent`

```
bool NPC::triggerEvent(Object* Obj){
    cout<<getScript()<<"\n";
    cout<<"Current money : "<<Obj->getm()<<"\n";
    cout<<"Here the Items you can buy: \n\n";
    listCommodity();
    cout<<"Which one do want to buy? (Invalid Input : None) : ";
    int req;
    cin>>req;
    if(req<commodity.size() && req>=0){
        Item item = commodity[req];

        item.triggerEvent(Obj);
    }
    return true;
}
```

Item 的 triggerEvent() 處理撿起物品系統

```
bool Item::triggerEvent(Object* Obj){
    if(Obj->getm()>=cost){
        Obj->increaseStates(health, defense, attack, cost, 0, 0);
        bool contain = false;
        for(string s: Obj->getInventory()){
            if(s==getName()){
                contain=true;
            }
        }
        if(!contain){
            Obj->addItem(getName());
        }
        if(cost)cout<<"Buy a "<<getName()<<"\n";
    }
    else{
        cout<<"no enough money\n\n";
    }
}
```

- 如果房間有寶箱，選擇 4 會觸發 chest 的 triggerEvent(Object*) (**virtual function**)，可以獲得寶箱內的東西。獲得之後選項 4 會消失。

```
In Room 2 (normal room)
choose an action

1 move
3 fight the monster skelton king
4 open the chest
5 player status

Enter your choose : 4

Opening a iron chest
You get a Iron sword
Increase your health : 0
Increase your defense : 0
Increase your attack : 20

In Room 2 (normal room)
choose an action

1 move
3 fight the monster skelton king
5 player status

Enter your choose :
```

Chest 的 triggerEvent()處理開寶箱的過程，再呼叫 item 的 triggerEvent()撿起物品

```
bool Chest::triggerEvent(Object* Obj){
    cout<<"Opening a "<<getName()<<"\nYou get a "<<contain.getName()<<"\n";

    cout<<"Increase your health : "<<contain.getHealth()<<"\n";
    cout<<"Increase your defense : "<<contain.getDefense()<<"\n";
    cout<<"Increase your attack : "<<contain.getAttack()<<"\n";

    cout<<"\n";
    contain.triggerEvent(Obj);
    return true;
}
```

- GameLogic: class Dungeon 裡的 checkGameLogic() 會幫忙檢查
血量歸零就會死亡，有不同死亡方式例如(被打死、被餓死、被毒死、被渴死、玩遊戲死掉等等)
會顯示不同的死亡資訊

```

Your current health 20
Monster current health 100

Choose an action :
0 or Invalid Input RUN
1 normal attack
2 special attack
Enter your action : 1
Your deal 50 damages to slime
slime deal 30 damage to you

You are killed by slime

GameOver!!!

In Room 1 (normal room)
choose an action

1 move
3 fight the monster Banana
5 player status

Enter your choose : 1

1 move right
2 move down
3 move left
5 stay

Enter your choose:1
Health - 15 because of Hunger
Health - 10 because of Thirsty
You died because of Thirsty

GameOver!!!

```

打贏 boss 就勝利了(下圖應測試需要已手動調整玩家數值)

```

Choose an action :
0 or Invalid Input RUN
1 normal attack
Enter your action : 1
Your deal 3000 damages to Boss
You defeat Boss
You get money 0
You get carrion which decrease your hunger by 40
You get a health potion which increase your health by 50
Health - 10 because of Thirsty
Health -10 because of Poison

johnny's status:
Current health : 9960
Defense       : 10
Attack        : 2400 (debuff)
Hunger        : 40
Thirsty       : 0
Poison        : 10
Mp            : 10
Money         : 10

You win !!

```

跳出 runDungeon()裡 while 迴圈的方式

```

bool Dungeon::checkGameLogic(){
    if(player.getCurrentHealth()<=0){
        cout<<"\nGameOver!!!\n";
        return false;
    }
    if(rooms[11].getObjects()[0]->getTag()=="Died"){
        player.triggerEvent(&player);
        cout<<"\n\nYou win !!";
        return false;
    }
    return true;
}

void Dungeon::runDungeon(){
    while(1){
        chooseAction();
        if(!checkGameLogic()) break;
    }
}

```

- Hunger system：每次移動或打死怪物會扣 10 點飢餓值還有 10 點口渴值(在 forest 和 desert 雙倍)扣到 0 時開始扣血，口渴值到 0 會有 DEBUFF(攻擊*0.8)

下圖第一張口渴值為 0 所以被扣血，而且有 debuff 的效果。第二張飢餓值為 0 所以扣血

```

Health - 10 because of Thirsty
Health -10 because of Poison

johnny's status:
Current health : 9960
Defense       : 10
Attack        : 2400 (debuff)
Hunger        : 40
Thirsty       : 0
Poison        : 10
Mp            : 10
Money         : 10

```

```

In Room 6 (forest)
choose an action

1 move
5 player status
6 get some milk from the cow
7 get some water from the lake

Enter your choose : 1

1 move right
5 stay

Enter your choose:5
Health - 15 because of Hunger
Health -10 because of Poison

```

下兩張圖展示如果走路，飢餓值與口渴值都會減 10(140->130)

```

1 move
3 fight the monster Banana
5 player status

Enter your choose : 5

johnny's status:
Current health : 10000
Defense       : 10
Attack        : 3000
Hunger        : 140
Thirsty       : 140
Poison        : 0
Mp            : 0
Money         : 10

In Room 1 (normal room)
choose an action

1 move
3 fight the monster Banana
5 player status

Enter your choose : 1

1 move right

```

```

2 move down
3 move left
5 stay

Enter your choose:2
Going into a swamp, you are poison
Try to find some milk
Health -10 because of Poison

In Room 3 (swamp)
choose an action

1 move
3 fight the monster slime
5 player status

Enter your choose : 5

johnny's status:
Current health : 9990
Defense       : 10
Attack        : 3000
Hunger        : 130
Thirsty       : 130
Poison        : 10
Mp            : 0
Money         : 10

```


NPC 會販售食物、水、牛奶，打任何怪都會掉食物，綠洲湖泊也有水，牛可以取牛奶(之後有解釋)

```
In Room 4 (normal room)
choose an action

1 move
2 talk with NPC Vendor
5 player status

Enter your choose : 2

I sell lots of essential items for survival

Current money : 10
Here the Items you can buy:

0 water cost : 10
decrease your thirsty
1 banana cost : 10
decrease your hunger
2 milk cost : 15
eliminate poison
Which one do want to buy? (Invalid Input : None) :
```

每次走路會扣飢餓值，getHungerDecrease()會根據房間種類而不同(後面房間系統會提到)

```
if(req==1){
    handleMovement();
    player.decreaseStates(10*position->getHungerDecrease(), 10*position->getThirstyDecrease());
}
```

如果有成功打怪(逃跑不算)也會扣飢餓值。

```
else if(obj->getTag()=="Monster"){
    if(obj->triggerEvent(&player)){
        player.decreaseStates(10*player.getCurrentRoom()->getHungerDecrease(), 10*player.getCurrentRoom()->getThirstyDecrease());
    }
}
```

● Room system : normal、forest、desert、swamp

Swamp：進入會中毒 10，沒次移動或打怪扣 10 滴血，提示需要牛奶解毒

```
In Room 1 (normal room)
choose an action

1 move
3 fight the monster Banana
5 player status

Enter your choose : 1

1 move right
2 move down
3 move left
5 stay

Enter your choose:2
Going into a swamp, you are poison
Try to find some milk
Health -10 because of Poison

In Room 3 (swamp)
choose an action

1 move
3 fight the monster slime
5 player status

Enter your choose :
```

Forest：會遇到湖泊可以解渴、牛可以解毒，還有獅子與熊兩種野獸。

In Room 6 (forest) choose an action 1 move 5 player status 6 get some milk from the cow 7 get some water from the lake	In Room 7 (forest) choose an action 1 move 3 fight the monster Tiger 5 player status Enter your choose :	In Room 8 (forest) choose an action 1 move 3 fight the monster Bear 4 open the chest 5 player status Enter your choose :
---	---	--

Forest 的這個參數被設為 2，每次結算時，飢餓值減少比一般房間兩倍快

```
int hungerDecrease;
```

Desert 中會遇到綠洲，可以解渴

```
In Room 9 (desert)
choose an action

1 move
2 talk with NPC Vendor
5 player status
6 get some water from the Oasis

Enter your choose : 6

Acquire some water from the Oasis !!! You don't fell thirsty now
```

進入 desert 也會遇到沙塵暴，口渴值直接減 40

```
Enter your choose : 1

1 move right
2 move down
3 move left
5 stay

Enter your choose:2
Sand storm!!!
Your thirsty increase 40
Health -10 because of Poison

In Room 13 (desert)
choose an action
```

Desert 的這個參數被設為 2，每次結算時，口渴值減少比一般房間兩倍快

```
int thirstyDecrease;
```

- Virtual function:

Class NPC、chest、monster、player 都有 override class Object 裡的 virtual function (triggerEvent())，上面皆已經有解釋各用途。

- Optional Enhancement:

除了 MP 系統、金錢交易買賣、開寶箱等等，還有以下幾個。

進入第十間後面的房間需要在之前的關卡找到鑰匙，不然進不去。

<pre>In Room 9 (desert) choose an action 1 move 2 talk with NPC Vendor 5 player status 6 get some water from the Oasis Enter your choose : 1 1 move right 2 move down 3 move left 5 stay Enter your choose:1 You have no key Health -10 because of Poison</pre>	<pre>In Room 9 (desert) choose an action 1 move 2 talk with NPC Vendor 5 player status 6 get some water from the Oasis Enter your choose : 1 1 move right 2 move down 3 move left 5 stay Enter your choose:1 Use the Key to open the door Health -10 because of Poison In Room 10 (normal room)</pre>
---	--

判斷有無鑰匙

```
if(position->getRightRoom()==&rooms[10]){
    if(player.getKey()){
        player.setCurrentRoom(position->getRightRoom());
        cout<<"Use the Key to open the door\n";
    }
    else{
        cout<<"You have no key\n";
    }
}
```

第十間還有 1A2B 遊戲，有自信的話可以一直挑戰，回復足夠的血量再去挑戰 boss。每猜錯一次扣 10 滴血量，最後會加 150 血，15 次以內猜對就可以回血，輕輕鬆鬆。(此圖中的血量為了測試手動調整的)

```

In Room 10 (normal room)
choose an action

1 move
5 player status
6 play an 1A2B game (may deal a lot of damage and cannot leave)

Enter your choose : 6

Welcome to 1A2B

You will -10 health for each guess and gain 150 health for the correct answer!
Health : 9950
Enter the number(Eg: 1234) : 1234
0A2B
You -10 health
Health : 9940
Enter the number(Eg: 1234) : 5678
0A1B
You -10 health
Health : 9930
Enter the number(Eg: 1234) : 1238
0A2B
You -10 health
Health : 9920
Enter the number(Eg: 1234) : 1237
0A1B
You -10 health
Health : 9910
Enter the number(Eg: 1234) : 2489
0A3B
You -10 health
Health : 9900
Enter the number(Eg: 1234) : 9841
Congratulation!! You win 1A2B and gain 150 HP

```

選擇六開始玩 1A2B

```

if(position==&rooms[10]){
    if(req==6){
        cout<<"Welcome to 1A2B\n\nYou will -10 health for each guess and gain 150 health for the correct answer!\n";
        srand(time(NULL));
        int A[4];
        for(int i=0; i<4; i++){
            A[i]=rand()%9+1;
            for(int j=0; j<i; j++){
                if(A[i]==A[j]){
                    i--;
                    break;
                }
            }
        }
        //for(int i=0; i<4; i++) cout<<A[i];
        string s;
        while(1){
            cout<<"Health : "<<player.getCurrentHealth();
            cout<<"\nEnter the number(Eg: 1234) : ";
            cin>>s;
            int a=0;
            int b=0;
            for(int i=0; i<4; i++){
                if(A[i]==s[i]-'0') a++;
            }
            for(int i=0; i<4; i++){
                for(int j=0; j<4; j++){
                    if(i!=j&&s[i]-'0'==A[j]){
                        b++;
                    }
                }
            }
            if(a==4){
                cout<<"Congratulation!! You win 1A2B and gain 150 HP\n";
                player.setCurrentHealth(150);
                break;
            }
            else{
                cout<<a<<'A'<<b<<"B\n";
                cout<<"You -10 health\n";
                player.setCurrentHealth(player.getCurrentHealth()-10);
                if(player.getCurrentHealth()<=0){
                    cout<<"You died because of a fun game\n";
                    break;
                }
            }
        }
    }
}

```

Result:

成功做出了一個可以運作的 **dungeon** 遊戲，從一開始 **player** 數值(health:100、defense:10、attack:30) 開始，需要一步步打敗 **monster** 獲得金幣，跟 **NPC** 交易、開寶箱，讓自己的數值變高，過程中也會有許多的事件可以挑戰，還要拿到鑰匙，才能解鎖後面的房間並遇到 **Boss**，打敗後就可以獲勝。

Discussion:

1. 因為房間的任何東西都是一間一間一個一個設定的，設定時花了許多的時間，而且每次遇到的東西都是一樣的。
2. 因為 **monster**、**NPC**、**chest** 的 `triggerEvent(Object*)` 後面的參數都是放 **Class player** 的指標，但 **player** 轉成 **Object** 後，都存取不到 **player** 的數值，因為 **Object** 只有 **tag** 與 **name** 而已，其他都寫在 **derived** 的 **GameCharacter** 裡，所以我再 **object** 裡面要多加了許多 **virtual function** 單獨給 **player** 使用。
3. 剛剛做完這遊戲難度實在太難，幾乎無法通關，我花了一些時間慢慢調整各物品與怪物的數值，還有玩家的數值。
4. 攻擊與特殊技能也很單調，打架是回合制的，會覺得無聊。
5. 沒有顯示地圖的功能，所以第一次玩在裡面走路會感到很困惑。

Conclusion:

在開發這個 **text-based dungeon** 遊戲的過程中，我學到了許多有關 **C++** 的重要概念，特別是 **class** 的繼承和 **virtual function** 的使用。這些概念不僅幫助我組織和管理程式碼，還使得遊戲的結構更加靈活和易於擴展。

首先，繼承讓我可以共享數值和函式，這樣可以避免程式碼的重複，同時也使得程式碼更具有結構性和可讀性。通過繼承的方法，我能夠有效地管理它們的特性和行為。

除了這些概念之外，我還學會了如何有效地組織程式碼，例如為每個類別開一個 **header** 檔案，在用一個 **.cpp** 檔定義它，使用檔案分割等技巧，這有助於提高程式的可維護性與可讀性，**debug** 也相對容易許多。

在寫這個遊戲時，我也寫出很多 **bug**，每次都從中學習，了解為甚麼不能這樣寫，因為它是 **private** 類別或指標轉換等等常犯錯誤，每次 **debug** 時從中學習新的東西。

總而言之，通過開發這個 **text-based dungeon** 遊戲，我不僅加深了對 **C++** 語言的理解，還提升了自己的設計和開發能力。我相信這些經驗將對我未來的程式設計之路產生積極的影響。