CS4303 P4 Stubborn Samurai

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INTRODUCTION (CONTEXT)

With the development of games, especially ACT games, some players started to feel bored to the traditional game mode and they wanted games to be more challenging. This is the origin of hardcore games. These games require higher ability and produce more sense of achievement at the same time. There are some recognized masterpieces in this area, such as Dark Souls series, Bloodborn and Nioh. With different background and systems, they have some noteworthy features, such as limitation of operation and high-strength enemies.

With some features as same as existing hardcore games discussed above, the game in this Practice is a hardcore scroll ACT game. Besides the dimension of the game, there are also some unique mechanisms in this game, which will be discussed later. This report will also introduce the implementation and evaluation of the game.

BACKGROUND

The world view of this game is based on Japanese samurai culture, which is similar to knighthood in Western culture.

In the world of the game, people generally fight with others with all kinds of thermal weapons. However, there is a Japanese samurai who still only believe in his sword, so he gets a nickname: Stubborn Samurai. His mission is to destroy a devil organization, which is the main content of this game. Furthermore, some mechanisms are also based on this world view.

BASIC MACHENISM

In this game, there would be a single player, who could only attack enemies by his sword. There are two basic attributes of the player: HP (health point) and energy. Player needs to spend energy to attack or rise. Losing all HP or falling to the ground would lead to the death of the player.

There are two kinds of enemies in this game: pawns and the boss. Different from the player, enemies could attack from distant places. Furthermore, two kinds of enemies have different attack methods.

Sword system is one of the most significant features of the game. Swords have two basic attributes: length and ATK (attack), influencing the attack range and damage of the player respectively. Initially, player has a basic sword, whose attributes are the lowest. Every time a pawn is killed, the player may get a new sword. Furthermore, except the initial sword, every sword has its lifetime, which would decrease with time. If the life of a sword runs out, the sword would disappear automatically. Especially, only if the player equips the sword, its life would reduce.

The goal of the player is supposed to be kill 10 pawns and one boss with minimal times of death in shortest time.

More details would be shown in later parts.

DESIGN AND IMPLEMENT

Panel

During the player is playing the game, there would be a panel at the bottom of the screen to show some information for players.

Figure 1. Panel

In the left part of the panel, the player could check his attributes and those of his current sword. The red circle indicates the left HP of the player. Figure 1 shows that this player has full 5 HP. The white border of the circle represents the left energy of the player. These two designs use some experience of Diablo2 and the Legend of Zelda: Breath of the Wild.


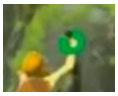

Figure 2. HP UI of Diablo2 (left) and energy UI of the Legend of Zelda: Breath of the Wild (right)

The two data next to the circle show the ATK and the left lifetime of the current sword. The initial sword would always show *00* because it does not have limitation in lifetime.

Figure 3. Lifetime UI of the initial sword

The middle part of the panel is used to show the game time and some information, including death hint and information of gotten sword.

Figure 4. Information of gotten sword (left) and death hint (right)

The game time is calculated with help of *millis()* function, the basic thinking is:

Game time = Total time – Invalid time

The calculation of lifetime of the sword also uses similar method.

The right part of the panel could be regarded as a part of the list of owned swords of the player. The large middle square shows the current sword, while the left and right small ones shows the last and the next sword respectively. ATK of these swords are shown upon the square, and the image of swords are drawn proportionally so that the player could compare their length directly by eyes.

Specially, the next sword of the last one is the first one. If there is only one sword, the small squares would show nothing.

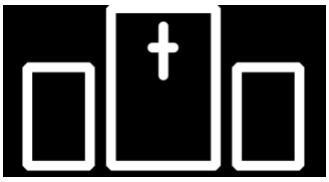

Figure 5. One-sword list

Player

In this game, the player is represented by a circle with some simple decorations on it.

Figure 6. Player image

Vertical movement

As it is mentioned before, players need to keep pressing the left mouse button and spend energy to obtain an acceleration upwards. Releasing the button and letting themselves fall would recover energy and the rate is faster than that of spending, so that players could have extra energy to attack, but not spend it all to avoid falling.

Another detail is that if the left energy come to 0, players would automatically lose the upward acceleration and start to fall even though they are still pressing the mouse button. In this situation, they need to release and press the mouse again to stop themselves from falling. This design is to avoid that players may keep pressing the mouse an make themselves never falling down, which would decrease the enjoyment of the game.

Horizontal movement

Although there is no limitation for horizontal movement, moving left or right is another essential method to avoid from damage. To simplify the design, players could only move in the area left to enemies. It also makes sense as people could only attack the target in front of them.

Attack

In Figure 6, it could be easily noticed that there is a white cross, which represents the sword held by the player.

Pressing the SPACE, the animation of attack would be triggered. The process of attack is shown in Figure7.

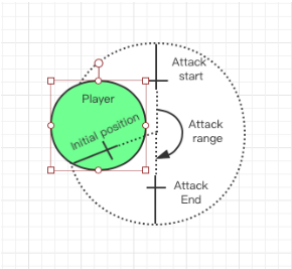

Figure 7. Process of attack

Especially, only if the animation of an attack is finished and the sword has returned to the initial position, the player is able to execute the next attack.

The implementation of the attack uses the *translate()* and *rotate()* functions, and the parameters of these functions would be used again in collision detection.

Attack collision detection

The collision detection is the most complex part of the implementation of the game. Basically, the collision between the sword and enemies is that between a line segment and a circle. Although all enemies are drawn as circles, boss is very larger than pawns, so that if the point of the blade is in the body of the boss, it could be seen as a successful hit, which could be found in Figure 8. Although there may be some lateness in detection, it is difficult to catch it by eyes.

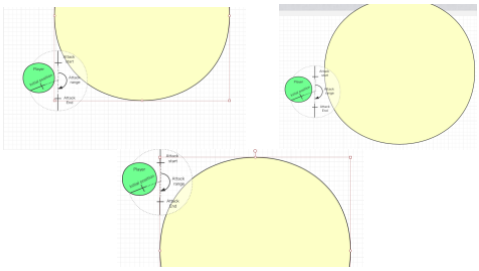

Figure 8. Collision detection with boss

So, to detect this kind of collision, the position of the point of the blade is calculated out and then compare the distance from it to the center point of the boss and the radius of it.

However, this method cannot work in the situation of collision to pawns, as the size of them are much smaller than that of boss, meaning that it could not dectect the collision through a certaion point of the sword. In this case, angle of the rotation of the sword would be combined with the distance between the ceter points of the rotation and the pawn. With the help of Figure 9, more details would be indicated.

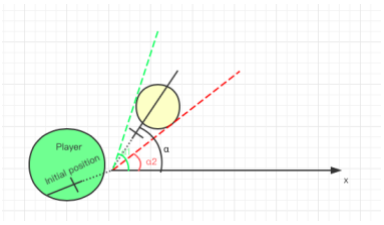

Figure 9. Collision detection with pawn

According to Figure 9, if the angle of the position of the sword α is larger than α1 and smaller than α2, the sword may collide with the pawn if the distance between ceter points of the rotation and the pawn is smaller than the sum of the length of the sword and the radius of the enemy.

Action

At the start of the game, or every time of resurrection, the player would fall from the upside of the upside to the vertical middle of the game area. Besides, every time the player kills a pawn, he would be forcedly pushed to the left of the screen. During these processes, the player could not do any operations and their attributes (HP, energy, game time and left lifetime of current sword) would not change. This design is to give the player an interval to have a little rest.

Weapon

As per that mentioned before, sword is the main kind of weapon of the player.

Attributes

There are three attributes of a sword posing influence on game experience: length, ATK and lifetime.

Generation

Swords are generated together with pawns as trophies. Since there are no level system and the strength of pawns are same, the attributes of swords are randomly generated in the same range, which is shown in Table 1.

Attribute	Minimal Value	Maximal Value
Length	Width / 60	Width / 20
ATK	1	2
Lifetime	30s	120s

Table 1. Range of attributes of swords

The range of length has been adjusted to be reasonable, and that of ATK makes players need to hit a pawn, who has 3 HP, minimal twice and maximal 3 times to kill it. Although it is not very different in battle with pawns, it may be very useful in the final battle with the boss, because the boss has 20 HP.

Color is another attribute which is not vital for the game, and the color of gauntlet and blade are generated randomly too.

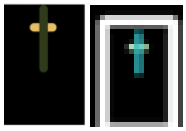

Figure 10. Swords gotten from killing pawns

Lifetime

The lifetime of swords is a very different design from that of existing games. It makes players more cautious on switching the sword and try more to avoid death while they are holding powerful swords, because death may waste much time.

Enemy

There are some differences between pawns and the boss in many aspects of both design and implementation.

Image & size

The image of pawns is a circle similar to that of player.s Its size is also nearly equal to that of players

Figure 11. A pawn

The image of the boss is quite different since it has more attack methods, the size is also much larger.

Figure 12. The boss

Warning

Before every enemy comes to the game area, there will be a warning message displayed in the screen.

Before pawns come, the message would shine at the top of the game area.

Figure 13. Screen before a pawn comes

The message shining before the boss comes would be larger and more striking.

Figure 14. Screen before a boss comes

AI of pawns

The actions of the enemy is decided by a variable called status. The switch between status of pawn is based on a finite-state machine.

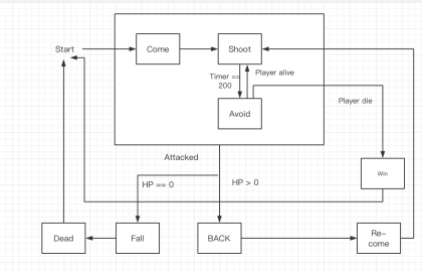

Figure 15. Switch of status of pawns

Here are details of status:

Come: Move the right part from out of the screen.

Shoot: The pawn shakes vertically and launches missiles at the leap or the bottom of shaking. Missiles are represented by small circles with the same color as the pawn which would firstly move vertically so that it could get an initial angle. The direction of missiles points to the position of the player at launching time.

Figure 16. A missile

Avoid: After launching several missiles or the timer equals to a certain value (200), the pawn would adjust its vertical position. The new position is decided by a simple decision tree.

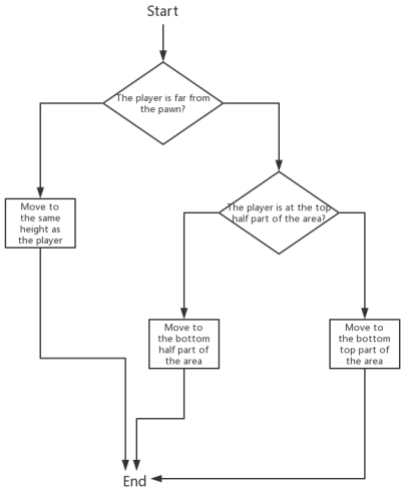

Figure 17. Decision tree of avoiding

If the player is far from the pawn, the pawn should get more superiority in attack, so it moves to the same level as the player to get the largest valid attack range. Otherwise, it should flee from the attack range of the play, hence it moves to the opposite half part of the game area.

Back & Re-come: If a pawn is attacked, it would change to red and go out of the screen and its position would be adjusted whose strategy is as same as that discussed in Avoid. Then it would return to the game area.

Fall & Dead: Losing all HP, the pawn would fall down, and the player would be pushed back which has been indicated in Player part.

Win: If the pawn kills the player, it would go out of the screen, similar to Back. Then the pawn would be reset.

Attack methods of the boss

Different from pawns, the boss has 3 attack methods, corresponding to three components of the body of the boss. Before the boss attack, the component attacking would firstly shine to warn to the player, making it possible to be dodged.

Missile: Similar to the attack method of pawns, two missiles would be launched from the gun barrels on the top and the bottom of the body of the boss respectively.

Laser: The boss could send laser from the barrels on two sides of its body. The laser would become thicker from a line and then gradually return to a line again.

Figure 18. Laser

Knife: There are 4 knives planted in the body of the boss, which could be easily identified in Figure 12. When the

player gets close to the boss, it could rotate its shell to attack the player. If the player is hit by a knife, he would be repelled.

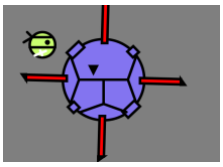

Figure 19. the boss rotating shell

The rate of triggering these methods is shown in Table 2.

Method	Rate (the player is far)	Rate (the player is close)
Missile	70 %	20 %
Laser	30 %	20 %
Knife	0	60 %

Table 2. Rate of attack methods

The average rate of laser is lower than the other two methods since the laser is more powerful.

Actions of the boss

Just like that of pawns, actions of the boss are decided by a simple finite-state machine.

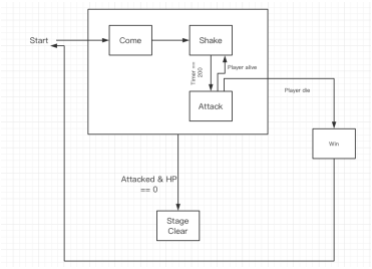

Figure 20. Switch of status of the boss

The meanings of the status are similar to those of pawns.

Welcome and win

At the time launch the game, players could come to the welcome interface. In this interface, players could press ENTER to start to play the game. Because of the limitation of time, there has not been an instruction embedded in the game.

Figure 21. Welcome UI

If the player kills the boss, which means he wins the game, then the game comes to the corresponding UI, in which the player could press ENTER to start a new game. The player could also know his performance of the game in this interface.

Figure 22. Win UI

Sound

There are 1 background music and 5 audio effects in the game. The audio effects are played when:

- Warning messages show
- The player dies
- The player attacks
- The player is hit
- The player hits an enemy

All audio sources are downloaded from aigei.

EVALUATION

Method

Some volunteers were recruited to test the game. Most of them gave up after dying several times because they think its too difficult. There are still 2 samples finished the game and reviewed it. One of them has never played scroll games before, and another have some in general scroll games like Metal Slug and ICEY. It may be a deficiency that there are no people with experience in hardcore games to take part into the test.

Result

Reviewed by 180009169 (no ACT game experience):

I spent about 20 minutes on this game to go through it. Even though I am not a fan of video games, I found it is enjoyable to play this little game. Controlling keyboards and the mouse at the same time is challenging and interesting for me. Another design I particularly like is the multiple choices of weapons, which have different properties. The only thing I think need to be improved is that the boss might be too weak. Making the final level harder may increase the sense of achievement for players.

Based on this review, the strength of the boss was increased. The maximal HP rose from 10 to 20, and the rate of triggering razer reduced since it is easy to dodge, but its damage extremely increased.

Reviewed by (some experience in scroll games)

Firstly, I want to thank the developer to invite me to evaluate his game. I think this game do has some common elements of scroll games and ACT games, such as regular attack methods of enemies. Players may feel a little hard at first, but the difficulty would decrease if they find some keys. There is a small shortcoming that the times of death may make the player cannot concentrate on the game and fell conscious, it may be better if it could be hidden. Besides, the valid attack range of normal enemies (pawns) is quite small and make the game a little bored before the boss fight.

Two problems are pointed out in this review: the display of death times and the narrow attack range of pawns. There had been text informing death times to the player in the panel, which was deleted after the test. The missile from pawns were launched from themselves and it changed to the current way.

CONCLUSION

To draw a conclusion, although hardcore games are mostly ATK games, combination of hardcore elements and scroll games is an interesting attempt. There are still some drawback in design and evaluation phases, which could be improved in later work.