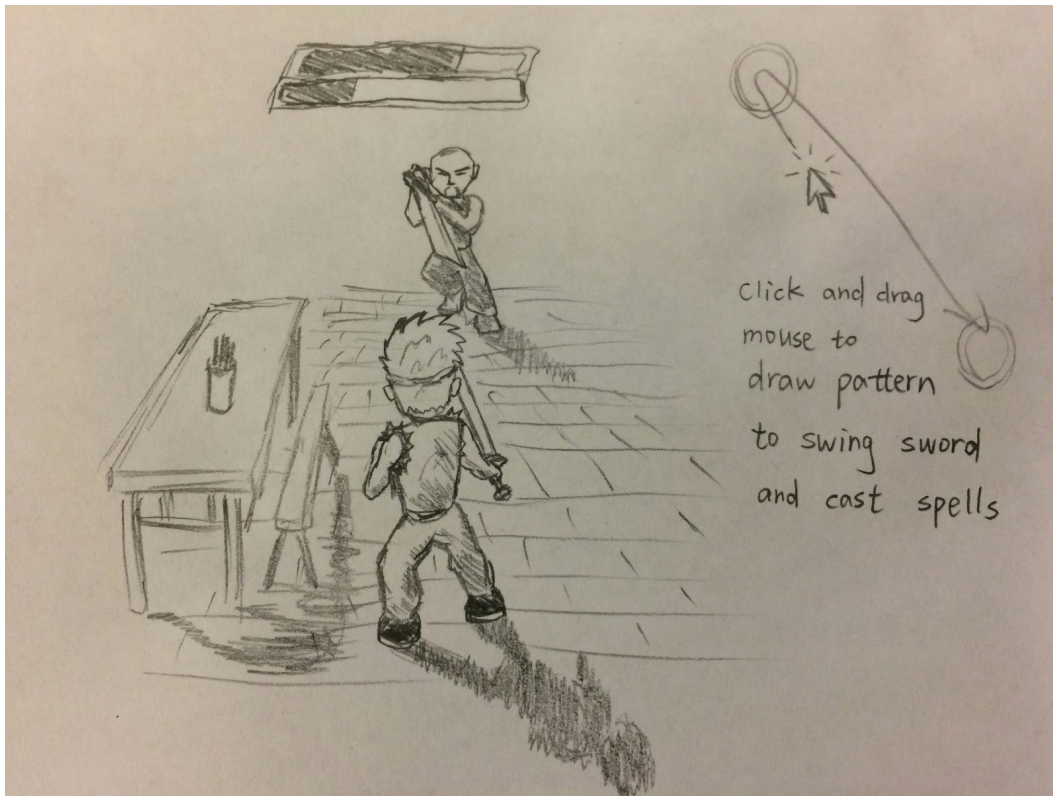# Swordsmanship Master - Design Doc

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1 Executive Summary

Swordsmanship master is a Chinese martial fighting game with non standard control scheme. The most attracting feature is that the player control how its character swing and stab sword by click and drag mouse to draw certain pattern. And the skeleton animation of characters are dynamically related to how fast and well the pattern is drawn. In addition, special moves with extra damage and range can be casted by drawing a complex pattern within a limited of time, which can best demonstrate the variety of swordsmanship usually described in martial arts and swordsman novel in a much better way than a traditional fighting can do. Swordsmanship ranging from Tornado Sword, focus on the speed and rapidity, to Darksteel Sword, slow but dangerously powerful can be well reflected in their effects in drawing patterns, damage, speed, hit test zone, skeleton moves, and so on.

The theme is set in a traditional swordsman novel scenario: a Chinese traditional tavern, where all sorts of swordsman from all over the China land will gather together and conflicts where arise due to many coincidences. Characters will be designed as 3-head-tall figures in order to decrease the difficulty in modeling and animation but convey a total new swordsman game

experience. Although it is a single scene fighting game currently, it is not a big deal to bring in stories and RPG elements as long as we implement a solid battle scheme.

Not only the players interested in swordsman novels will no doubt become a fan of this game, but players of traditional fighting game and RPG will find the great interest of this new battle scheme.

Focusing on the PC platform at present, the drag pattern control scheme is also easy to port to mobile devices in future.

We will choose Unity3D to implement the game due to some experience in using it and it's easiness and power. Only focusing on the fighting scheme will enable us to implement the game more complete in a 5-week-schedule. We will spend the first week to learn the difficulties in dynamic skeleton animation and interactive mouse input. After that we can do rapid and iterative development in terms of modeling, programming, and testing.

2   GAME Design - CREATIVE

2.1   High Concept

This is a Chinese martial fighting game with nontraditional playing control. Player will need to click and drag the mouse to make the character swing the sword to slash the enemy. Player can also use the mouse to draw particular patterns according to the prompts on the screen to cast special moves.

2.2   Design Goals

2.2.1 Main Design Features

Player will control the character fighting with opponents by the movement of mouse, which includes both speed and direction, to determine the attack's strength and type. Player can also cast a spell by drawing particular patterns according the prompts on the screen.

2.2.1.1   Player goals and objectives.

Goal: The main goal of *the Swordmanship Master* is to kill enemy by swinging sword. Additional goal is to control the sword-swinging by mouse elegantly and draw the particular patterns on screen promptly to cast powerful spells.
Conflicts & challenges: Challenges of the game include hand-eye coordination and speed of reaction. Players' motion will be constrained by the space of scene in game. Conflicts come from the same opportunities of attacking with opponents. Fast reaction to enemies' motion is the key of winning.
Winning condition: Players can win the game by defeating the enemy.

2.2.1.2   Main rules and procedures

Player will decide different states of motion including attack or defence by dragging the mouse using specific ways. Player can swing the sword by moving the mouse rapidly in order to get higher damages. Left click of mouse will lift sword and keep the left mouse button holding will cause a steady preparation pose, then swing the mouse as rapid as possible and lose the left mouse button will make the sword attack toward enemy. Holding of right mouse button will result in a defence pose.
The real interesting point of this fighting game to provide players a real feeling of "swing the sword" during battles. Compared with other fighting game, in which players can perform an entire attack motion by pushing one single button, *Swordmanship Master* will let players feel the whole process of hold the weapon, swing the sword and finally attack. How much damage the attack will cause also determined by the speed and motion of player's "swinging". Every seconds during the fighting, player have to try to coordinate hands and eyes to get a perfect

defending time or attack opportunity. Swinging as fast as possible when the enemy is vulnerable.

2.2.1.3   Player Resources

Time is the key resource in the game. Faster reaction towards enemies' motion or the prompts on screen will help players obtain more advantages in defending and attacking. If player can predict the attack from enemies properly before attacks happen, player will have more opportunities to defend themselves. Finishing drawing the patterns on screen faster will cast more powerful spell.

Additional, health value is also important resource in this game. Attacked by enemy will reduce the health, player will lose the game when health value come to zero.

2.2.1.4   Boundaries and Constraints

Players will be constrained in the space of scene in game. Total amount of time of fighting also limits player's motion. Player have to reduce the health value or kill enemy in limited time. During fighting, player cannot perform any attacks as they want since the motion of opponents will also limit the motion of player. Attacked by enemy will cause some stiffness, player cannot perform further movement during these negative effects.

2.2.2 Appeal

The Swordmansip Master is an all-age, realistic fighting-feel and also enjoyable fighting game. Players can get the realistic control feelings of lifting the sword and swinging the weapon. In addition of defending the enemy by holding mouse button. Real master will expertise in hand-eye coordination, just like the same idea of the game.

Another selling point of the *Swordmanship Master* is the spell casting system. The novel control system of drawing particular patterns on the screen distinguishes the game from other normal fighting or action game. The quality of drawing will affect the effect of spell, and also the damage of spell. Faster and better the drawing that player performs, bigger and more powerful attacks will be obtained.

2.2.3 Look and Feel

This game will be a comic style fighting game, it focus more on providing a relaxing and enjoyable fantastic world. A similar game like Mount and Blade that provides a similar combat system.

2.3 <u>Worlds, Characters and Story</u>

2.3.1 Back Story

A Chinese-tradition-style tavern, a place that appears most frequently in Chinese swordsman novels because it is the place where heroes from all over China is gathered. There are masters, outlaws, newbies, avengers, and etc. All with a sword, all with martial skills, and any coincidence or conflicts will lead to a fight.

2.3.2 Spaces/Worlds

A Chinese-tradition-style tavern, with tables, benches, stairs, rooms, counters, lanterns etc.

2.3.3 Characters

For this demo, we will only create one character for testing. The complete version of this fighting game will have a series of characters with different appearances, weapons, and swordsmanships.

Di Ke 狄克 - a lonely swordsman with fast movements.

shrekshao
狄學長

2.3.4 Levels of Difficulty

There is no explicit levels in this game, but a difficulty setting will be available which will change how wise the enemy acts slightly. Players will gain experience and get used to the control as they play the battles again and again. Players will get a sense of accomplishment when they master the swordsmanship and kill the enemy at ease.
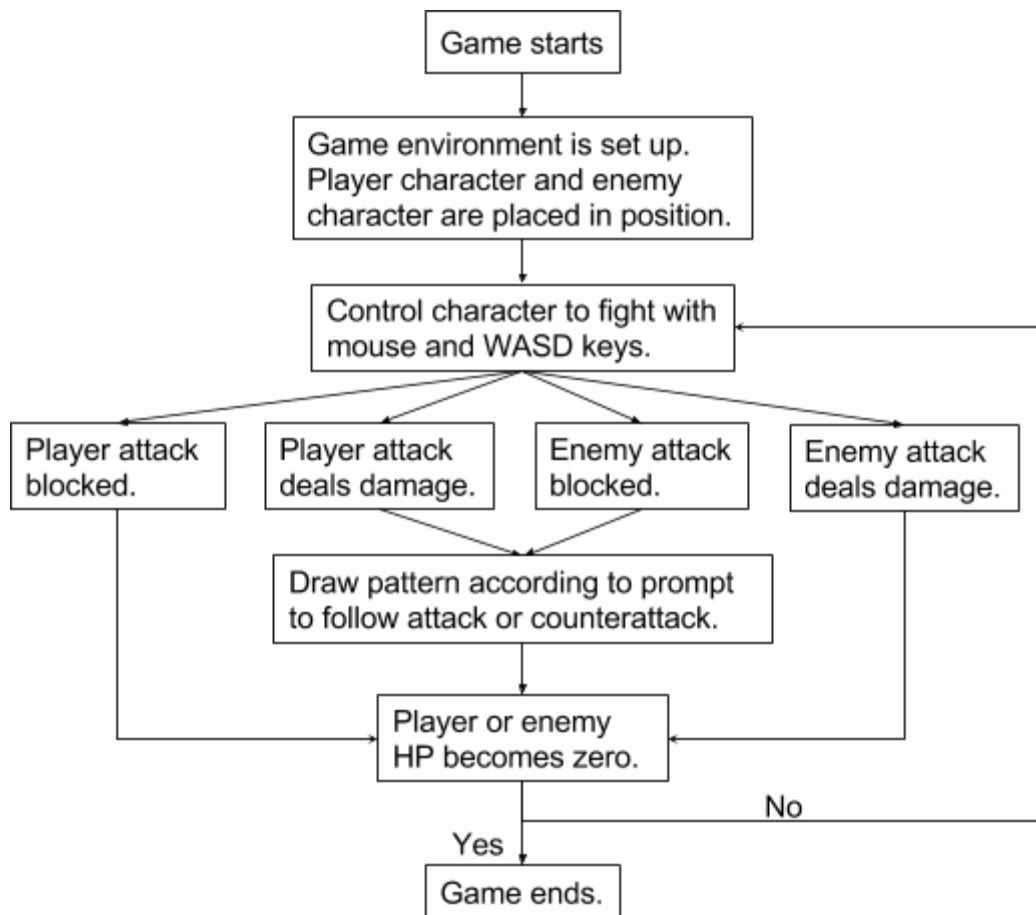
The game has the potential to expand to a full RPG game with stories and open world.

2.4   Interaction Models

2.4.1 User Interface - Navigation and Movement

The game is played in third-person view mode. The environment of the game is a tavern and the characters are dressed in Chinese martial art style. The player character is centered at the screen and the enemy character is some distance away in front of the player.

2.4.2 Game Play Sequence and Levels

```
                         ┌─────────────────┐
                         │   Game starts   │
                         └─────────────────┘
                                  │
                 ┌────────────────────────────────────┐
                 │ Game environment is set up.         │
                 │ Player character and enemy          │
                 │ character are placed in position.   │
                 └────────────────────────────────────┘
                                  │
                 ┌────────────────────────────────────┐
                 │ Control character to fight with     │◄──────┐
                 │ mouse and WASD keys.                │       │
                 └────────────────────────────────────┘       │
                                  │                            │
       ┌──────────────┬───────────┼───────────┬──────────────┐│
┌──────────────┐┌──────────────┐┌──────────────┐┌──────────────┐
│ Player attack ││ Player attack ││ Enemy attack  ││ Enemy attack  │
│ blocked.      ││ deals damage. ││ blocked.      ││ deals damage. │
└──────────────┘└──────────────┘└──────────────┘└──────────────┘
       │            └────────┬────────┘                │
       │       ┌──────────────────────────────────┐    │
       │       │ Draw pattern according to prompt  │    │
       │       │ to follow attack or counterattack.│    │
       │       └──────────────────────────────────┘    │
       │                      │                         │
       │          ┌────────────────────────┐            │
       └─────────►│ Player or enemy         │◄───────────┘
                  │ HP becomes zero.        │
                  └────────────────────────┘        No
                        Yes │
                  ┌────────────────┐
                  │ Game ends.     │
                  └────────────────┘
```

There is no level in this game.

2.4.3 User/Environment – Obstacles and Props

The characters are placed in an inn on the ground. To achieve this, we assign mesh colliders that matches the shape of the inn model and the character models well to the model and make

them rigid bodies, thus characters cannot go across the wall, out of the inn, or sink into the ground.

2.4.4 User/Character

Kinematics of the player character is controlled by player input such as mousing moving, mousing button clicking, and keyboard tapping. Player character swings the sword to attack as player moves the mouse across the screen horizontally, vertically, or diagonally with RMB pressed, and moves in the inn as player presses WASD keys on the keyboard. When prompts of pattern occur on the screen, player holds the RMB and moves the mouse to draw pattern to perform special skills. Player can holds LMB to block enemy attacks. Player cannot physically control the enemy character.

2.4.5 Character/Character

As player character is controlled by player input, enemy character is controlled by a simple AI program. It periodically changes position by stepping forward to approach player character, sidestepping to move around, and back off to keep away from the player character. It will also swing its weapon to attacks the player character and can block player attacks at some chance.

2.4.6 Motion Tracking

There is no motion tracking mechanics in this game. All control input are through mouse and keyboard.

2.4.7 Multi-Player

There is only a single player to play this game. Other characters are controlled by simple AI program.

2.4.8 Mobile

This game is developed for PC. However, we may consider building the game for mobile platform.

2.4.9 Networked Play

The game is a single player game thus no networking is needed.

2.5 Performance and Scoring

2.5.1 State Variables

CharacterStatus:
- HP
- MP (Nei Li / Inner Power)
- agility
- strength
- swordsmanship[]
- isAttacking
- isBlocking
- isGrounded

DragPatternCanvas:
- isActive
- swordsmanshipType
- completePatternCircleID

2.5.2 Feedback

- Positive feedback:
    - successfully finish a special move: cast the special move with some particle system effects.
    - Hit the enemy: Hit Particle system, sound feedback
    - Block attack from enemy: enemy unable to move for a short while
    - Knock out the enemy: win the combat
- Negative feedback:
    - Fail to finish a special move
    - Hit by enemy: Lose HP, Sound feedback, hit particle system, sound feedback
    - Attack blocked: unable to move for a short while
    - Knocked out by the enemy: lose the combat

2.5.3 Performance and Progress Metrics

> The player wins by reduce the enemy's HP to zero. The player loses when his or her HP reaches zero.

3   Game Design - Implementation Details

3.1   Design Assumptions

3.1.1 Hardware

PC, Windows/Mac/Linux, Keyboard, Mouse

3.1.2 Software

Game Engine: Unity 5.3
Operating System: Windows 7 or higher
DirectX: DX10 or higher
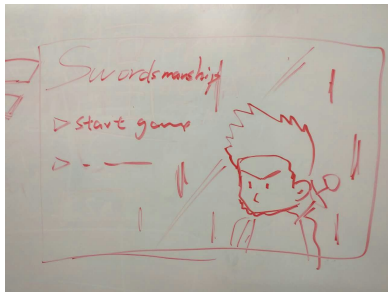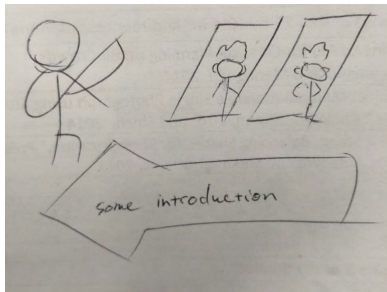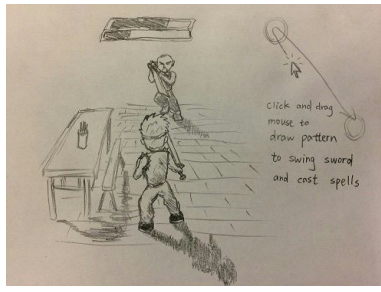
3.1.3 Algorithms and Techniques

For game models, the inn and the characters will be modeled in Maya and exported as OBJ file then imported into Unity. Models will be kept having a low count of polygons.
Player character's kinematics is controlled by mouse movement. To achieve this, we bind the character models with a skeleton in Unity, create some skeleton animation presets for different actions, such as, swing the sword, walking, blocking, and so on.
Since the player can move and attack at the same time, the upper body and lower body are separately animated and finally blended together.
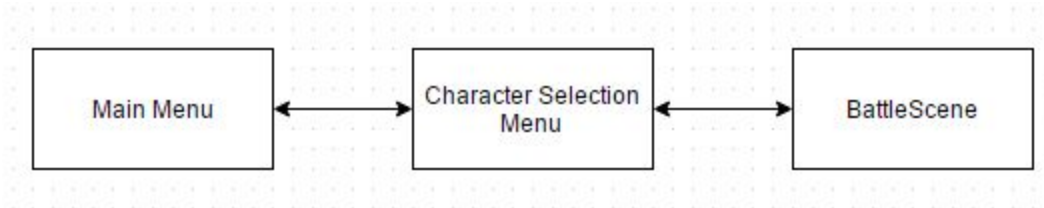Objects like table, benches may come in between the player and the enemy, so A* search is used for the enemy to find the path to approach the player character.

3.2   Storyboards

Main Menu	Character Select	Game Interface

3.3 Design Logic

3.3.1 FSM - State/Effect

3.3.2 User Solution/Actions

Player draw patterns with mouse to swing sword to attack, block, and cast special swordsmanship spell to combat with the enemy. Reduce the enemy HP to zero will lead to the winning of the game. Having HP reduced to zero will game over.

3.4 Software Versions

3.4.1 Alpha Version Features (vertical slice through total experience)

Alpha version should implement the the basic gameplay, enemy AI could be a basic framework. Rigging system should have the basic functionality. Player can control the character's motion by the mouse movement. Spell-casting system can display prompts on canvas and detect player's drawing input then cast specific spell. Tested basic gameplay should be finished in alpha version.

3.4.2 Beta Version Features

More special spells should be added to the system in beta version, such as Swing Action 2,3 and Stab. Particle effects and some special move logic like dodge should be implemented. More fluent gameplay in beta version. Most important feature in beta version is the enemy AI system. Based on the basic game logic and system, add enemy AI to beta version will ensure the entire game be plausible to play with.

3.4.3 Description of Self-running Demos

In this version of the game, more GUIs will added. Game display should be polished after these UIs' involvement. Like special move UI and game menu can provide more detailed and elegant gameplay performance. The final refinement of the game will be implemented here. Entire functional game logic, fighting system, special move system logic and all GUIs will be tested and connected together for this version.

4   Work Plan

4.1   Tasks

Task #	Sub mission	Member	Due date
1	Build and import models; Bind skeletons; Basic running and walking movements; Basic keyboard moving control;	Shuai Zimeng Liang	Feb 19
2	Separate animation of leg skeletons and upper body skeletons; Motion blending; Attacking animation rigging: Swing1; Mouse Input; Canvas prompts;	Shuai Zimeng Liang	Feb 27
3	Basic game logic; Connect Mouse Input and skeleton animation; Complete character and control; Testing;	Shuai Zimeng Liang All	March 1; Alpha version
4	Enemy AI; Animation Rigging: Swing 2,3 , Stab, Block, Special Move 1; Special Move logic and particle effects;	Shuai Zimeng Liang	March 7
5	HP,MP, Special Move UI; Game Menu;	Shuai Zimeng Liang	March 15; Beta Version
6	Final refinement; Testing; Trailer Video;	All	March 22; Final Version

4.2   Milestones

4.2.1 Minor

Week #	Demonstration
1	Build and import models; Bind skeletons; Basic running and walking movements; Basic keyboard moving control;
2	Separate animation of leg skeletons and upper body skeletons; Motion blending; Attacking animation rigging: Swing1; Mouse Input; Canvas prompts;
3	Basic game logic; Connect Mouse Input and skeleton animation; Complete character and control; Testing;
4	Enemy AI; Animation Rigging: Swing 2,3 , Stab, Block, Special Move 1; Special Move logic and particle effects;
5	HP,MP, Special Move UI; Game Menu; Final refinement; Testing;

4.2.2 Major

Alpha Version

Alpha version should implement the the basic gameplay, enemy AI could be a basic framework. Rigging system should have the basic functionality. Player can control the character's motion by the mouse movement. Spell-casting system can display prompts on canvas and detect player's drawing input then cast specific spell. Tested basic gameplay should be finished in alpha version.

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More special spells should be added to the system in beta version, such as Swing Action 2,3 and Stab. Particle effects and some special move logic like dodge should be implemented. More fluent gameplay in beta version. Most important feature in beta version is the enemy AI system. Based on the basic game logic and system, add enemy AI to beta version will ensure the entire game be plausible to play with.

Final Version

In final version of the game, more GUIs will added. Game display should be polished after these UIs' involvement. Like special move UI and game menu can provide more detailed and elegant gameplay performance. The final refinement of the game will be implemented here. Entire functional game logic, fighting system, special move system logic and all GUIs will be tested and connected together for this final version.

4.3 Development Schedule

The Swordsmanship Master

Task Name	Feb 14	Feb 21	Feb 28	Mar 6	Mar 13	Mar 20
1 ☐ <the Swordsmanship Master>						<the Swordsman...
2 <Task 1>	<Task 1>					
3 <Task 2>		<Task 2>				
4 <Task 3>			<Task 3>			
5 <Task 4>				<Task 4>		
6 <Task 5>					<Task 5>	
7 <Task 6>						<Task 6>
8 Alpha Version			◆Alpha Version			
9 Beta Version					◆Beta Version	
10 Final						◆Final