

Project on Knowledge Products Development

CCIT4080

Group-based project Final Report

Group 04

< Develop mobile game application >

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1 Introduction

The purpose of this project was to develop typing game mobile application. This is a summary that offers an overview of our final project. It is direct and details the advantages of the final project.

The objectives of the project were:

- apply the theoretical and practical knowledge acquired in their studies to solve problems particularly.
- understanding of the complexity of real-life problems in society.
- ability to connect knowledge and practice.
- investigate the underlying approaches
- solve the identified real-life problem.
- produce the deliverables.
- assess the social impact of the final product to reflect improvements on the existing work
- introduce new initiatives to improve human life

1.1 Target user group

In this project, we decided to make a Cangjie app as there is a handwriting Chinese keyboard on mobile phone. As many people rather use voice messages and handwriting on the phone to send the message, so our main target of users is people who do not understand to use the Cangjie typing method or cannot use the Cangjie typing method smoothly.

Cangjie typing method is important, as people need to use it when they are working for example work on documents, presentations etc. Furthermore, our Chinese final exam also required to do Chinese typing and they will not accept any handwriting answers. If they do not know Cangjie, they will have trouble. They need to require lots of time to finish documents by Cangjie typing method.

Our Cangjie app can conveniently help them learn the Cangjie typing method. as we have used the gaming method to help them memorize Cangjie words. It is different from other Cangjie apps which only give the Cangjie words when users are searching for the Chinese word. It is hard to let users memorize easily. Moreover, if people cannot use the Cangjie typing method fluently, they also use our app to improve their Cangjie typing method skills, as we have different types of game modes provided to users. After they play our app for a long time, and their Cangjie typing method skills will be improved.

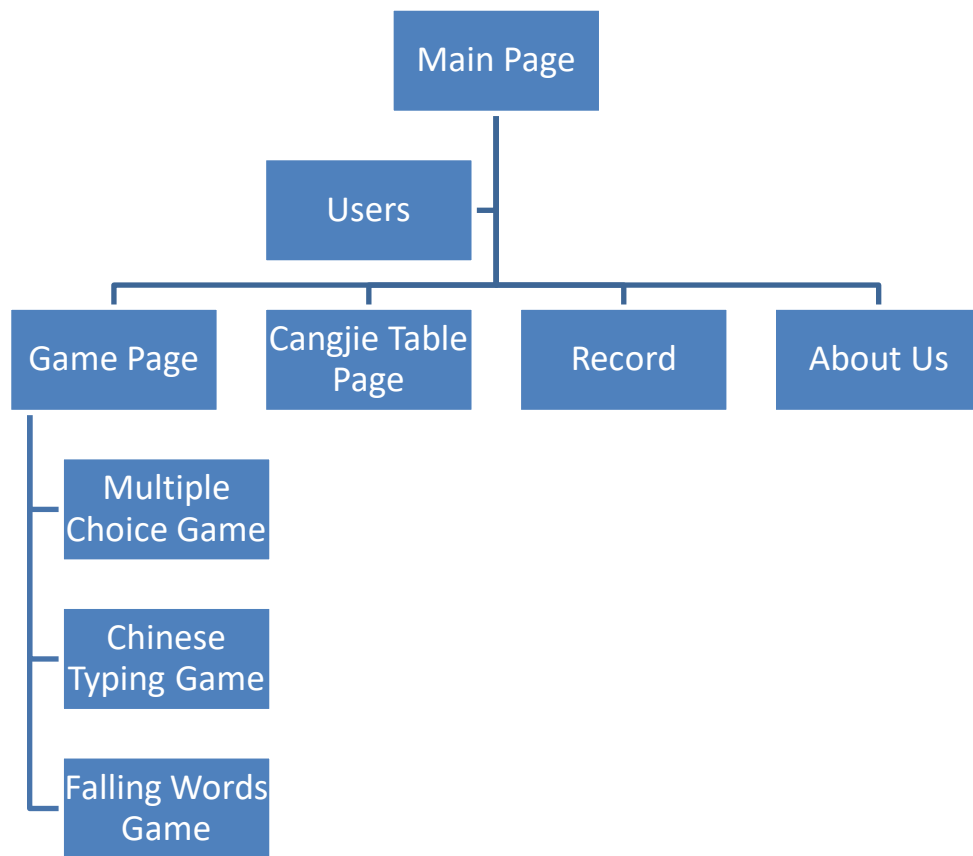
2 The progress of project

2.1 System diagram

The project is divided into different modules, e.g. main page, users, game page, Cangjie table page, record and about us.

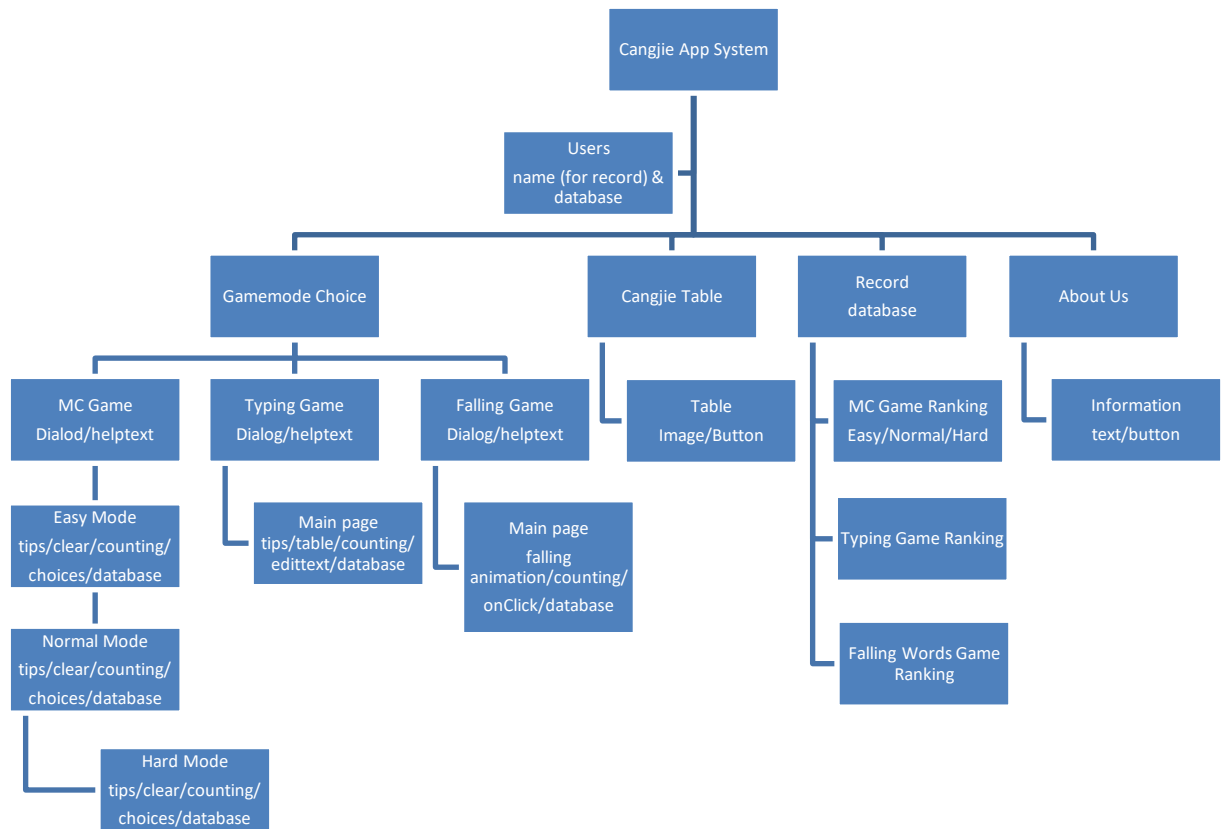
Game page contains multiple choice game, Chinese typing game and falling words game.

The system diagram is shown below:



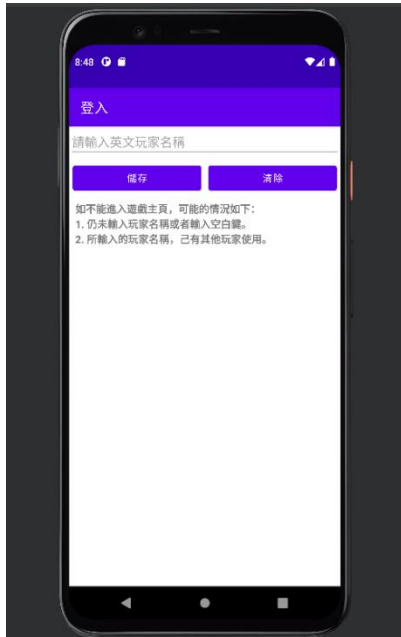
2.2 Work breakdown diagram

The work breakdown of the project is shown below. One of the members (Chan Kwan Ting, Silence) is responsible for connecting all the system development. One member (Lui Yeung Yin, Kelvin) is responsible for database setup. Three of the members (Tam Pui Yee, Sally & Lee Cheuk Yin, Billy & Chan Kwan Ting, Silence) are responsible for game mode system development. One of the members (Yip Yin Hei, Bevan) is responsible for text and app layout design.



2.3.2 Text and List

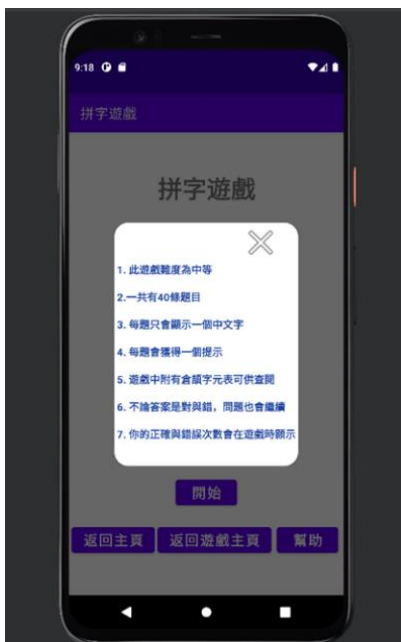
For texting, in the login page (Figure 2.2). There are some instructions are provided for players to followed. For Mode 1 (抉擇時刻) (Figure2.3), Mode 2(拼字遊戲) (Figure 2.4), Mode 3(從天而降)(Figure 2.5).After pressing the help button , dialog will be appear with the rules and instructions of that mode . For the "About Us" page (Figure 2.6), which indicates why we're doing this game, the purpose of the game and the information that we want to bring out.



(Figure 2.2)



(Figure 2.3)



(Figure 2.4)



(Figure 2.5)



(Figure 2.6)

2.3.3 Multiple choice game

In a multiple-choice game, there are 3 modes which are easy mode, normal mode, and hard mode. The easy mode has random 25 questions with 4 choices (Figure 3.1), the normal mode has random 35 questions with 4 choices (Figure 3.3) and the hard mode has random 45 questions with 5 choices (Figure 3.5). Users can not choose normal and hard mode initially. They require to finish the easy mode first and then they can choose the normal mode. After they finished normal mode, they can challenge hard mode. There is a next level button to help users go to the next level or there is the main page button they can choose to go back to the multiple-choice game main page (Figure 3.7) after they finished one of the modes (Figure 3.2, 3.4, 3.6).

In all 3 modes, there is a count-up timer which is let users know the time played in the game and it will be recorded when they finished one of the modes (Figure 3.2, 3.4, 3.6). Moreover, there is a countdown timer in which the time limit is 5 mins (Figure 3.1, 3.3, 3.5). If the user can not finish their game in 5 mins, the game will force users to go back to the multiple-choice game main page and let users choose to retry it (Figure 3.7).

In all 3 modes, there is a hint button and users can use it 5 times only in each mode. The hint button will disappear if the user presses it after 5 times. After users press the hint button, it will show the first of the Cangjie word text by toast (Figure 3.1, 3.3, 3.5). In the scoring system, if users choose a correct answer, it will add 1 mark. Otherwise, it will add the 0 mark. It shows on the top of the layout while users are playing, and the score will record after users finished one of the modes (Figure 3.2, 3.4, 3.6). There is submit button which users need to press it after they choose one of the answers (Figure 3.1, 3.3, 3.5).

When the user chooses the correct answer, it will show a “correct” notification in Chinese. On the other hand, if the user chooses the wrong answer, it will show a “wrong” notification in Chinese. Moreover, it will not show the correct answer if the user chooses the wrong answer.

If the user finished one question, it would go to the next question automatically. There is a different order of the question. When the user retries the game, there will not have the same question order as last time.



(Figure 3.1)



(Figure 3.2)



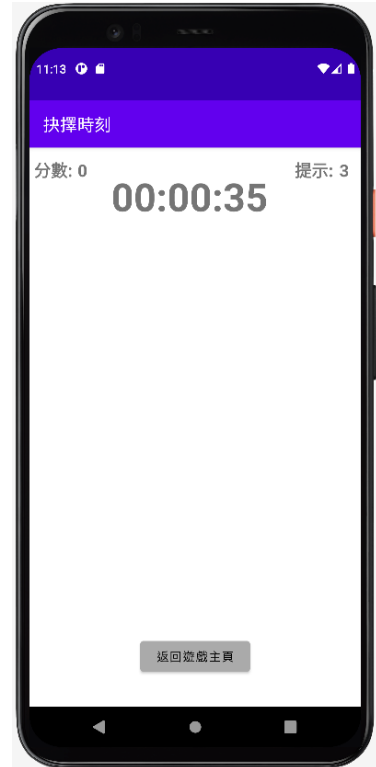
(Figure 3.3)



(Figure 3.4)



(Figure 3.5)



(Figure 3.6)



(Figure 3.7)

2.3.4 Chinese typing game

In a Chinese typing game, the user has to enter all the correspondence codes of each character shown on the screen. There are 40 questions that will be shown on the screen randomly. User has to finish it as fast as they can within 5 minutes.

Figure 3.8 is the layout of this game mode. When users click on this mode, a keyboard will be shown, and the window focus is placed on the first column of the space provided for users to enter a code automatically. The question will be displayed under the countdown timer. Also, there are three buttons placed below the question displayed. They are the hint button, Cangjie button and submit button respectively. Moreover, the score will be counted in the top right corner near the star symbol and cross symbol.

Also, we have applied button events with `onClickListener` in this mode. For the hint button (Figure 3.9), it shows the first code of a character on the first column when users click on it. Similarly, a Cangjie table button (Figure 3.10) shows the Cangjie table with all the codes if users need it. Besides the `onClickListener`, the table is displayed on the screen with help of dialog. The reason for using dialog is that it can show the additional information without full filling the entire screen the size of the small window is adjustable. So, using dialog is a suitable method for us to provide a table with the scroll bar for the users.

Furthermore, for the submit button, it will compare the answer inputted by the users with the answer stored in a database. And then display a message with the help of toast. When the user inputs the corresponding codes of a character correctly, it will show a toast message "Correct" (Figure 3.11). In contrast, it will also show a "Wrong" message (Figure 3.12) if the user enters the wrong codes. Score counting is handled at the same time. If users get a correct answer, 1 score will be added next to the star symbol. Otherwise, it will be added next to the cross symbol. That updated result saves in the database. Therefore, users can know the number of questions they get correct or wrong. The next question can be seen simultaneously. The value of the previous answer is cleared and subsequently, reset the focus on the first column. The order of those questions is different and maybe repeated every time.

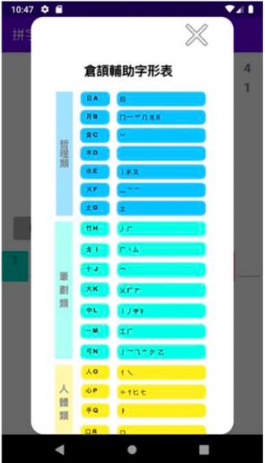
If a user answers 40 questions within 5 minutes, it would go to a page with the countdown timer, score count and a button only (Figure 3.13). Users can click on the button to go back to the game main page and tries another two-game mode. In addition, if a user cannot finish all the questions, it will go back to the mode2 game main page with a "Times up" notification. And users can retry this game or choose to go back to the main page.



(Figure 3.8)



(Figure 3.9)



(Figure 3.10)



(Figure 3.11)



(Figure 3.12)



(Figure 3.13)

2.3.5 Falling words game

In that mode, we apply falling animation to the choices. Also, we add a timer and score counting function. Besides, we set a random duration list. Therefore, the player will get a different duration for each question. It can make sure that the choices animation will not fall same speed each time.

This is the most challenge mode. Challenger will need to answer the question continually which are limited by two rules. The first rule is when the choices arrival to the ground, user will lose the game. The second rule is when user click a wrong answer, it will game over instantly. Falling mode will not provide any hints because that mode is testing the user whether is familiar with Cangjie input method.

When the user clicks the start button, the game will start instantly. The figure 3.54 is the mode 3 layout; we provide 5 choices for user to choose which one is the correct answer. It applies text view listener to let user click the choices. If user click the correct one, the screen will seem like figure 3.53. It will show correct message below and continue to next question automatically. If the user can get all the question correct, the app will show the counted time and mark (figure 3.52). Then, the result will save to the record. In contrast, if the user gets wrong answer, the app will jump back to the mode 3 main page and show the wrong message below (figure 3.51). Also, if the user cannot get all the question correct it will not show any results. Besides, it will not count to the record.



(Figure 3.51)



(Figure 3.52)



(Figure 3.53)



(Figure 3.54)

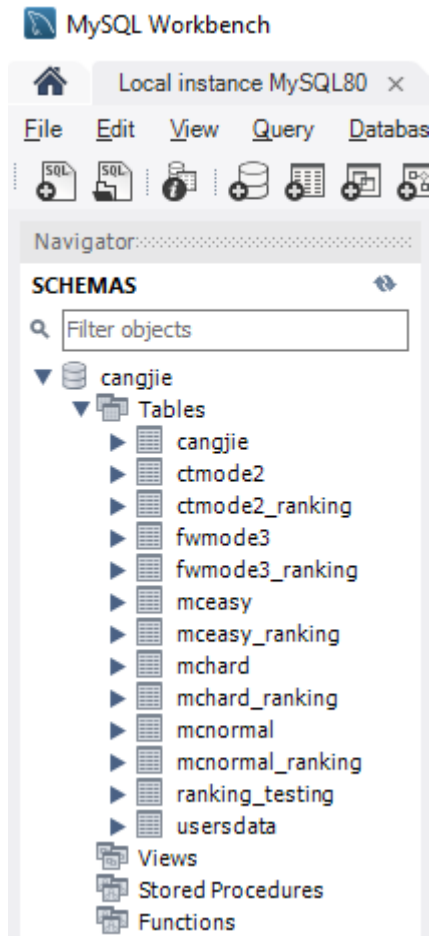
2.3.6 Database

In this app, the database system was used to store most of the data. We created a database called cangjie, which contains separate tables for every different part of the application that is required to store data (Figure 6.1). We can divide the app into 3 parts that use the database system, the first one is the login system, the second one is the ranking system, and the third one is the words in different game modes and difficulties.

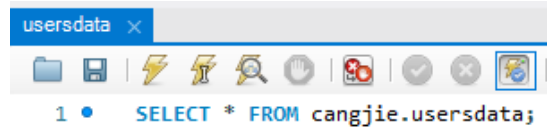
For the login system, we created a table called usersdata (Figure 6.2). The usersdata table has 2 columns in it, the first is userID, and the second is username. Whenever a user opens the app and tries to start the game after installation, they will be asked to set their username in the login page for once (Figure 6.3). The username cannot be blanked, including space or used by other users, otherwise it cannot be saved, and they would not be able to start the game until they input a username that fulfills the above requirements. If the username is not used by others, then it will be inserted into the usersdata table. With the property of auto increment of the userID column, the system will automatically sign a unique integer value for the user without repeating in the table.

For the ranking system, each of the game modes and difficulties has its own ranking tables to store the data. After the user input their username at first, the username not only added to the usersdata table, but also created records for all the ranking tables with 3 columns, being the username column, score column and time column. When the record is created, the default value of score would be 0, and the default value of time would be NULL (Figure 6.4). Then, after the user finishes a game, the score and time used will be inserted into the corresponding ranking tables (Figure 6.5). Finally, the user can see the ranking list on the ranking page. The user who scores higher ranks higher, if two users scored the same, then the one who spent less time ranks higher (Figure 6.6).

For the words in different modes, each of the tables contain 8 columns in it, including id, word, how, choice1, choice2, choice3, choice4 and hint (Figure 6.7). The column id is a unique id for every single word in the table, word is the Chinese word that may be the question, how is the way of how the Chinese word is typed, choice 1-4 includes 3 wrong answers and 1 correct answer, and hint is one of the cangjie part of the correct answer. All the words in the tables can be the questions shown in the gameplay. When the user starts any game modes, corresponding table will be accessed and records will be randomly selected to be the questions, returning a list of the chosen record.



(Figure 6.1)



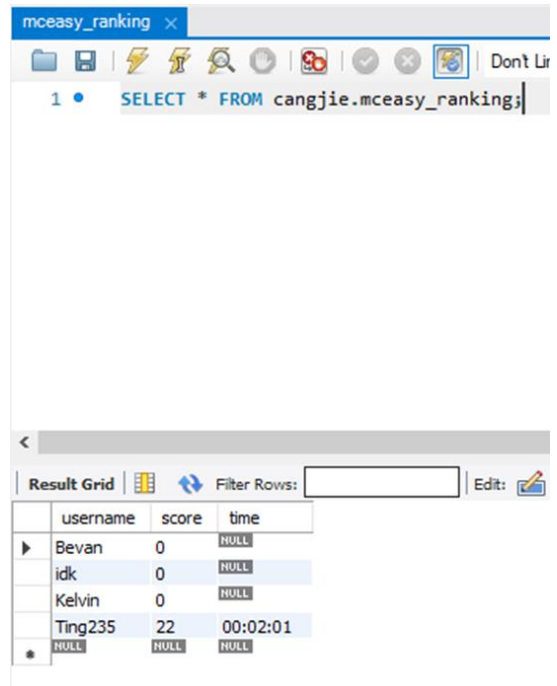
The screenshot shows the 'Result Grid' pane displaying the results of the query. The grid has two columns: 'userID' and 'username'. The results are as follows:

	userID	username
	1	Ting235
	2	idk
	3	Bevan
*	NULL	NULL

(Figure 6.2)



(Figure 6.3)



(Figure 6.4)

```
mceasy_ranking x  
1 • SELECT * FROM cangjie.mceasy_ranking;
```

Result Grid | Filter Rows: | Edit:

username	score	time
Bevan	0	NULL
idk	18	00:01:35
Kelvin	22	00:02:26
Ting235	22	00:02:01
NULL	NULL	NULL

(Figure 6.5)

4:57 排名榜
抉擇時刻:容易模式

排名	玩家名稱	分數	時間
1.	Ting235	22	00:02:01
2.	Kelvin	22	00:02:26
3.	idk	18	00:01:35
4.	Bevan	0	null
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

(Figure 6.6)

The screenshot shows a database query tool window titled 'mceasy'. The query entered is 'SELECT * FROM cangjie.mceasy;'. The results are displayed in a grid with the following columns: id, word, how, choice1, choice2, choice3, choice4, and hint. The results are as follows:

id	word	how	choice1	choice2	choice3	choice4	hint
1	用	月手	十月	月十十	月手	手月	月
2	作	人人尸	人人尸	人尸	人人一一	人尸尸	人
3	可	一弓口	一弓弓	口弓一	一弓口	口一弓	一
4	全	人一土	人一土	人弓土	土一人	一一土	人
5	文	卜大	廿大	山大	卜十	卜大	卜
6	字	十弓木	一弓木	十弓一	十弓木	一弓十	十
7	有	大月	一月	大月	一一月	日月	大
8	没	水弓水	弓水弓	戈弓水	水一水	水弓水	水
9	我	竹手戈	竹手戈	竹手人	十手戈	手竹戈	竹
10	你	人弓火	人弓土	人弓火	竹弓土	火弓人	人
11	未	十木	木十	十十	一一十	十木	十
12	來	木人人	木人人	人木人	人人人	木木人	木

(Figure 6.7)

2.4 Project progress status

After semester 1&2, we have completed some tasks. Table 1 shows the progress status.

Task	% completed	Status	Member(s) in charge
Design the system	100	Completed	Chan Kwan Ting, Yip Yin Hei, Lee Cheuk Yin Billy, Tam Pui Yee, Liu Yeung Yin
Schedule the project	100	Completed	Tam Pui Yee, Liu Yeung Yin
Data collection (the order of Cangjie)	100	Completed	Chan Kwan Ting
Develop multiple choice exercise module	100	Completed	Yip Yin Hei, Lee Cheuk Yin Billy
Develop typing exercise module	100	Completed	Chan Kwan Ting, Tam Pui Yee
Develop falling game module	100	Completed	Liu Yeung Yin
Adjust the layout of the game	100	Completed	Yip Yin Hei
Testing and Debug	100	Completed	Lee Cheuk Yin Billy
Data collection and input	100	Completed	Chan Kwan Ting, Yip Yin Hei, Lee Cheuk Yin Billy, Tam Pui Yee, Liu Yeung Yin
Write project proposal	100	Completed	Chan Kwan Ting, Yip Yin Hei, Lee Cheuk Yin Billy, Tam Pui Yee, Liu Yeung Yin

Table 1

2.6 Other screen capture of system components

Figure 7.1 shows screen capture of Cangjie app main page in the system. Start button, which is game mode page, Cangjie table button, which is show the Cangjie table image, record button which is show the game ranking and about us button which is show the app's information.



(Figure 7.1)

The game mode page screen is shown in below (Figure 7.2).



(Figure 7.2)

2.7 Limitation and Coming Features

There is limitation during making the app, and there will list some features will come.

2.7.1 Limitation

1. Users only can input English, special characters, numbers as their username. If user input Chinese name, it will affect the list of the ranking table. As Chinese words text size are bigger than English, special characters, numbers in MySQL database.
2. Users need to finish the multiple choices game or Chinese typing game or falling words game first when they want to play another game mode. As the counter down and up timer is still running in the multiple choices game or Chinese typing game or falling words game if users leave the game. There will have bug after the countdown timer in multiple choices game and Chinese typing game or animation in falling words game is finished.
3. Users need to wait for 1 second to 3 seconds to let android studio load the Chinese words and the ranking information from the MySQL database.

2.7.2 Coming Features

1. Improve falling words game animation.
2. Separate the Chinese typing game into easy, normal, and hard mode
3. Separate the falling words game into easy, normal, and hard mode
4. More function on users setting, for example:
 - I. input password to make their account while users create a username.
 - II. users can change username.
 - III. users can request to delete their account.
 - IV. users can check their best record in their own information page.
5. Add the search Cangjie word's function.
6. Improve the app layouts design.

3 Individual progress

Each member needs to write individually what was done, what was learned and how those would contribute to the project.

3.1 Liu Yeung Yin, Kelvin

In semester 1, I participated in scheduling the project to make sure we can have enough time to finish the project in reasonable time without working overload. Also, I have learned about Intents, Intents Filters and Database from <https://developer.android.com/>, <https://www.geeksforgeeks.org/> and <https://www.tutorialspoint.com/>. Database is quite useful in this project because it can be used to stores large amounts of data like all the Chinese words and corresponding order of Cangjie. With this, we can easily add new words into the game if needed and ensuring every users can get same contents of the game correctly, since they are all receiving data in the same database.

3.2 Tam Pui Yee, Sally

Through my work on the final year project, I have learned the actual operation of the development of a simple app. This experience also strengthens my knowledge and enhances my practical skill.

At the beginning of the project, we have divided into five parts, and everyone has assigned to learn two practical skills of Android Studio. I am responsible to conduct mode 2 of the Cangjie typing game and learn how to use toast and list view. However, when I am conducting mode 2, I have found that what I have learned is not sufficient. Also, it cannot perform as I prefer. Therefore, I have tried to find a better way to achieve the goal. Firstly, the keyboard needs to be changed as a radical keyboard which can input the code for the Cangjie input method only. Secondly, I have used a hint button to show the hint directly on the user's input text view instead of using the toast message. It reduces the screen occupancy and reserves more space for further development. Moreover, the hint shown required to link up with a database in order to obtain higher flexibility. At that time, I have discovered that I have to study the use of a database to complete my part. Consequently, I have started to learn more methods through <https://developer.android.com/>, <https://abhiandroid.com/programming/custom-toast-tutorial-example.html>, <https://www.geeksforgeeks.org/android-tutorial/>, and YouTube. I have not studied those

materials in very detail since other groupmate have taken part in them. But, it is enough for me to build up a general mind map.

Apart from the technique experience during the project, time management is another problem I faced. After the first few meetings, our group has made a timetable roughly. Nevertheless, it is difficult to finish it on time, especially in February and March. The target of these two month is to complete the development of the app including debugging and testing. However, the progress becomes slower due to the extra self-study time due to insufficient preparation. In addition, the problem also occurs when linking up different modes together. It takes some time to tackle it. Therefore, the actual time required is longer than expected.

Looking back at these few months' experiences provides me insight into the fact that well preparation plays a major role in the development process. The time required is decided by how preparation is conducted. I should study more relevant sources instead of just focusing on what I have been assigned only. Furthermore, I should reserve more time for the whole development to avoid competing against the time when the different problems occurred. To conclude, my experience in this project helps me to improve my time management skill and strengthen my ability to self-study. Apart from the skill, it provides an opportunity for me to know more about the actual operation of the app development. In the future, I will keep enhancing technique knowledge to participate in different development and reminding myself to maintain appropriate time management no matter special project or in daily life.

3.3 Lee Cheuk Yin, Billy

In the project, I am responsible for the app's design and function of the project. During the semester 1, I tried to play another Chinese word typing game that is effective for me to find their game's advantages and disadvantages from the player's perspective. Besides, it can let me reference their great function and improve the drawback that help our game be more user-friendly and clearer. After semester 1, I have learned java and some of the android studio coding. I have studied the button and animation parts.

Between semester 2, I start to create the mode 3 coding. Let the falling animation apply to the mode 3 correctly. Also, I choose textview be the choices. And I set the onclick listener for the choices that let the user click the answer. That is the first version of mode 3.

3.4 Yip Yin Hei, Bevan

In this Chinese typing game, I was mainly responsible for the texting part, button, and the layout design. In the past days, “Google” and “YouTube” are my coding teachers, I learnt lots of text view and layout which can help to enrich the apps and beneficial for us to test and provide a comfortable experience to players by not being messy. Since the first impression of the design is very important, it depends on whether the players are interested in playing. Moreover, with the help on the helping text which show up a dialog with rules and instructions, through text we can communicate with players indirectly, therefore texting is playing a vital role in here, that’s why the toast message is not going to use in here by letting players to understand the rules before pressing the image button to dismiss the message. We hope that this game can help the new generation or people who want to practice Cangjie a helping hand. Moreover, using the MySQL to enter the data is just like a revision for me about Introduction to Database. Although the system that we learned was SQLite however which is similar to MySQL, it can help me enhance my knowledge and skills as well.

3.5 Chan Kwan Ting, Silence

After semester 1, I completed some tasks. At the beginning of the semester, I prepared to learn basic Java online via <https://www.w3schools.com/java/default.asp> weekly (30 mins daily). I followed the tutorials and do exercises on the website. Those I learned are useful to the project because developing android mobile games Java programming is required.

During semester 1, I am learning Android programming online via <https://www.geeksforgeeks.org/android-tutorial/?ref=lbp> weekly (30-60 mins daily) I have studied text view and image view, for example formatting the text view, size of the text view, changing text style, changing the text colour, letter spacing and all caps, adding Icons for text view etc. I suggest using the same format, different colours and bold text style of the text view in the game will be better as it can attract users to read it and let users read our information clearly. For image view, I suggested using text view to show Chinese words in the game.

Apart from self-learning and strengthening my programming knowledge and skill, I study some tasks as delegated. For example, I have read some source programming about Chinese typing games. In source programming, some of them have used array or array lists to store Chinese words and Cangjie code and I have tried to code some features in Android Studio which are work.

After semester 2, I started to learn MySQL database, as I wanted to put Chinese words into the database and connect to android studio and show them in the app. Also, I want to make a ranking system through the MySQL database. It can make the app have more fun. Moreover, I have learnt falling animation to help my teammates to make falling words games.

I am still learning android programming and MySQL, as there are lots of other functions that I have not learned. I wish I can have lots of time to learn more android programming and MySQL advanced skills in the future. Also, I want to learn Blockly in the future, which is modern android app development, it is simple, faster than having Java programming and it is efficient to create the apps.

Period	Self-learned technologies
Sep 2021	HTML (learned)
Oct 2021	CSS (learned)
Nov 2021	JavaScript(learned)
Dec 2021	jQuery, Canvas, Java (learned), Android Programming (learning)
Jan 2022	Android Programming (learning)
Feb 2022	Android Programming (learning)
Mar 2022	Android Programming (learning), MySQL (Learning)
Apr 2022	Android Programming (learning), MySQL (Learning)

A2 Poster:

CCIT4080A-CLO2 Group 4

Chinese Typing Game

倉頡

Name: Chan Kwan Ting, Lee Cheuk Yin Billy
Yip Yin Hei, Tam Pui Yee, Liu Yeung Yin

Introduction

This is the Chinese Cangjie Typing Game. The purpose of making this game as we have noticed that the advancement of technology has made the new generation almost do not know how to use the Cangjie. Most of them write Chinese characters in Jiufang, Pinyin, strokes and even phonetics. In order to improve people's understanding of Cangjie characters, we specially made this Cangjie game, allowing players to learn in the game so as to meet their unexpected needs in work or life in the future

抉擇時刻

This is the easiest mode. In this mode, players need to choose the correct answers from the multiple choice to match the words that has provided.

This mode is suitable for beginners who are the first time to practice Cangjie.

拼字遊戲

This is the normal mode. Players need to type the correct Cangjie characters to match the word that provided.

This mode is suitable for senior players who know the basic structure of Cangjie.

從天而降

This is the hardest mode. In this mode, words will be falling from the top to the bottom. Players need to as fast as possible to click the correct words before the words touch the bottom which demands players' response capability.

This advanced mode is suitable for players who know the basic structures of Cangjie.

Cangjie Table

This table can help you to do Cangjie typing method faster or help them to pick up their memories.

It is highly recommended for players to have a look when they are stucked in the games.

Score & Time Test

After playing each game, your score will be produce, therefore you can compare with yourself which can help you to gain better score in the next time.

Ranking

There is a say "Where there is competition, there is progress". Here you will see your record between you and others. Overtime you will see your success on Cangjie.

排名榜

排名	同學名稱	分數	時間
1.	Ting205	22	00:02:01
2.	Bryan	0	null
3.	skk	0	null