C Programming II
2020 Spring
Final Project: Take 6!

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1 Take 6

Take 6! is a card game for 2-10 players designed by Wolfgang Kramer in 1994 and published by Amigo Spiele. In Taiwan, it has another famous name called 誰是牛頭王. This game received the Deutscher Spiele Preis award in 1994. Now I want you to develop this game as your final project.

For your reference, you can find its rule in the following links:

1. `https://en.wikipedia.org/wiki/6_Nimmt!`

2. `http://www.swanpanasia.com/products/take-6`

2 What You Should Do

You need to design a personal game. This time, you need to design your own interface. The minimum requirement is a terminal-based game. Of course, if you want to use other libraries, like SDL, to develop a game with a graphical interface, you will get bonus points. Since this is a personal game, you need to develop some computer agents to play with the human player.

As usual, **makefile** and **readme**. You also need to prepare a presentation about how you develop this game. For example, you need to introduce the process of your program, your structures and your functions. You also need to describe what the most difficult part is and how you solve this problem. Everyone must makes 15 minutes demonstration to me, maybe face-to-face or over the cloud. The demonstration includes presentation, game playing and FAQ.

The grading rules are as follows:

- Support 1 player and 1 computer agents: 6 pts.

- Support multiple computer agents: 2 pt.

- Support computer agents with more than 1 level: 2 pt.

- Your presentation: 3 pts.

- Your interface design: 2 pts.

- Any other interesting features: at most 3 pts.

Of course, all grading rules are based on the fact that the game is playable.

3 Agent Contest

You need to develop the following functions:

```
// Initialization
// id is 0 or 1
void CSIE_[ID]_setup( int32_t id );

// Deal 10 cards to you.
void CSIE_[ID]_deal( const int32_t cards[10] );

// Return the selected card number.
// Table is used to show the current status.
// Score array is the current score status.
// Last array is used to inform the last run cards.
// If the return value is not a valid card, you will lose.
int32_t CSIE_[ID]_pick( const int32_t table[4][5],
                        const int32_t score[2],
                        const int32_t last[2] );

// If the played card is lower than all the latest cards present
// on all rows, the function chooses a row and gather the cards
// on that row.
// card: the card your opponent pick in this run.
// Return value: 0 <--> 3
int32_t CSIE_[ID]_choose( const int32_t table[4][5], int32_t card );
```

TA will prepare a **Agent Contest**. Your agent will play with all other agents. Each agent contest runs the game 1000 times. The winner will get one point and the lose will get nothing.

The grading rules are as follows:

- 1-10: 3 pts.

- 11-20: 2.5 pts.

- 21-30: 2 pts.

- 31-40: 1.5 pts.

- 41-50: 1 pt.

- Others: 0 pts.