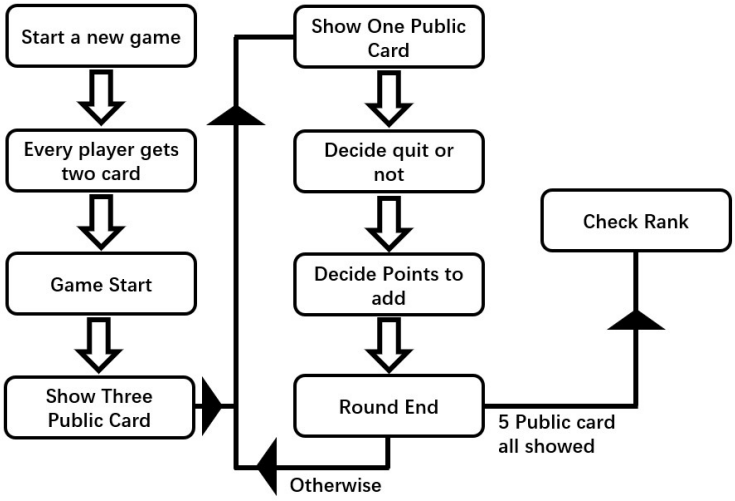
Lab 7 Texas Hold'em poker

(120+30(attendance)+25(bonus) points)

In this lab, you can use C or C++ to solve the problem. Please use the knowledge of 'structure' and 'class'. The logic of your program will be graded this time, so please make your program clear and make it easy to get understood. Besides, you are encouraged to earn the bonus points.

Texas Hold'em poker is a community card poker game. In each game, everyone will get two individual cards and five public cards. For the last round, the player with cards combination ranking first will win. Here, you need to finish a system to carry on the game (Simplified).

I. Procedure



1. Start a new game:

Input:

```
Y
n
play1_name play1_points
play2_name play2_points
...
playn_name playn_points
```

'Y' shows the start of a game.

n is an integer representing the number of players.

Each line, a string and an integer representing the corresponding name, and initial points.

Screen Output:

```
Start?
Please input the number of players.
Please input data for player1.
...
Please input data for playern.
```

Assume there's 3 players with name in order: "Alice", "Bob", "C++"

2. Every player gets two cards:

Output:

Screen Ouput: (Words in bracket is for illustration)

```
Alice(player1_name) please see your cards.
Bob(player2_name) please see your cards.
...
C++(playern_name) please see your cards.
```

Document Output:

File "Alice_initial_card.txt", "Bob_initial_card.txt", "C++_initial_card.txt"

In each file (e.g. "Alice_initial_card.txt"),

```
Alice, your card is: H5 H13
```

The meaning for cards H5 and H13 will be illustrated later.

3. Game Starts and show three public cards:

Screen Ouput:

```
Game Starts!
Public card 1 is: S7
Public card 2 is: C5
Public card 3 is: D8
```

Please generate the public cards randomly and don't be the same with players' cards.

4. Show one public card:

Screen Ouput: (Words in bracket is for illustration)

```
Public card 4(or 5) is: S9
```

5. Decide quit or not and decide points to add:

If one wants to quit, just choose not adding points.

Screen Ouput: (Words in bracket is for illustration)

```
Alice, do you want to add?
```

Input

Y 2	or	N

6. Round end:

Screen Ouput: (Words in bracket is for illustration)

```
Round end.

Alice points: 10
Alice cards: H3 S11
Bob points: 0
Bob cards: D2 C13
C++ points: 5
C++ cards: S1 S2

Check rank! (if 5 public cards showed)
```

7. Check Rank:

Screen Ouput(e.g.): (Words in bracket is for illustration)

```
Ranks:
C++ ranks the first
with S1 S2 S3 S4 S5 (Optional)

Alice final points: 8
Bob final points: 7
C++ final points: 15

Game ends!
```

II. Tasks and scores (120p+25p)

- Finish procedure (45p)
  - Finish all procedures 45p
  - Finish most procedures 40p
  - Finish important procedure 35p
  - Well explained and can run some procedures 25p

- Judge ranks (Bonus: 25p)

This points will be add to your lowest lab(1~6) score and add that score to at most 90.

- Figure out final points (25p)

If you can't judge who win the game, just input a name and let that player rank first.

- Program structure and explanation (50p)
  - Excellent 50p
  - Good 45p
  - Fair + Well explained 40p
  - Fair 35p
  - Bad 30p

III. Cards

A card includes its color(suits) and its number.
Color can be: Diamond(D) Heart(H) Spade(S) Club(C)
Numbers can be: 1, 2, 3, …, 13.
To represent a card, we use color + number, e.g., D2, C3.
Generate randomly cards for individual and for public.

IV. Rank Rules <u>(Simplified)</u>

When checking the rank, one's cards are his or her own card combined with public cards and pick five cards which have the highest rank. <u>Guarantee that no same type of rank.</u>

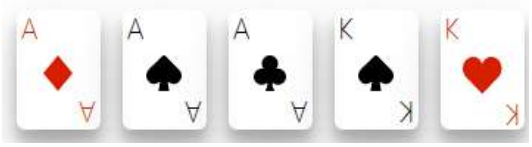
1. Royal Flush & Straight Flush

A straight with all five cards of the same suit. In poker all suits are ranked equally.

2. Four of a Kind

Any four cards of the same rank. If two players share the same Four of a Kind (on the board), the bigger fifth card (the "kicker") decides who wins the pot.

3. Full House



Any three cards of the same rank together with any two cards of the same rank. Our example shows "Aces full of Kings" and it is a bigger full house than "Kings full of Aces."

4. Flush

Any five cards of the same suit (not consecutive). The highest card of the five determines the rank of the flush. Our example shows an Ace-high flush, which is the highest possible.

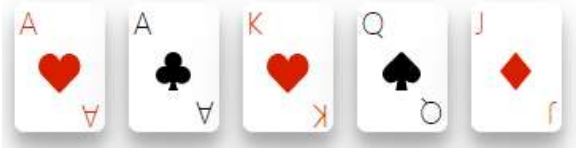
5. Three of a Kind

Any three cards of the same rank. Our example shows three-of-a-kind Aces, with a King and a Queen as side cards - the best possible three of a kind.

6. Two Pair

Any two cards of the same rank together with another two cards of the same rank. Our example shows the best possible two-pair, Aces and Kings. The highest pair of the two determines the rank of the two-pair.

7. One Pair



Any two cards of the same rank. Our example shows the best possible one-pair hand.

8. High Card

Any hand not in the above-mentioned hands. Our example shows the best possible high-card hand.

V. Points Rules

The one ranks first will earn all the points added by players and other players will lose the points they added. One's final score is its initial score add or minus scores earned or lost in this game.

VI. Hint

- **Use structure to save player, cards, (game).**
  For you structure, it includes variable to save information and it has functions to do some tasks like print a name or a number.
- **Output "Public card 1 is: S7"**
  "Public card" + "%d" + " is:" + *print_card(card a)* + "\n"
  (divide one task to printf and other functions (can be void))
- **Output "Alice, your card is: H5 H13"**
  print_name(player x) + ", your card is: " + *print_card(card x.card[0])* + *print_card(card x.card[1])* + "\n"
- **Design Input Function**
  void my_lab_input(int num_of_parts, char ret_s[][100])*
  input one line
  divide one line into parts by space (no space in name)
  *num_of_parts = total parts
  ret_s[i] = each part
  After you call it, you can directly get all parts of one line and you can easily deal with them then.

VII. Reference:

http://sports.163.com/special/poker_rule/
https://www.pokerlistings.com/poker-rules-texas-holdem
https://www.pokerlistings.com/poker-hand-ranking