Documentation of the task

"Comparing the strength of Texas Hold'em Hands"

Author: Ilja Repko

1. How to run the program?

1. Download files: HW-poker.cpp. input.in, output.out files from GitHub;
2. Replace files to the one map;
3. Open the input.in file and write Texas Hold'em hands and board cards according to the task description (input file has default cards, which have already tested)
4. Save and close the input.in file
5. Open the HW-poker.cpp file using CodeBlocks, Visual Studio Code or another tool.
6. Build, run and compile the code
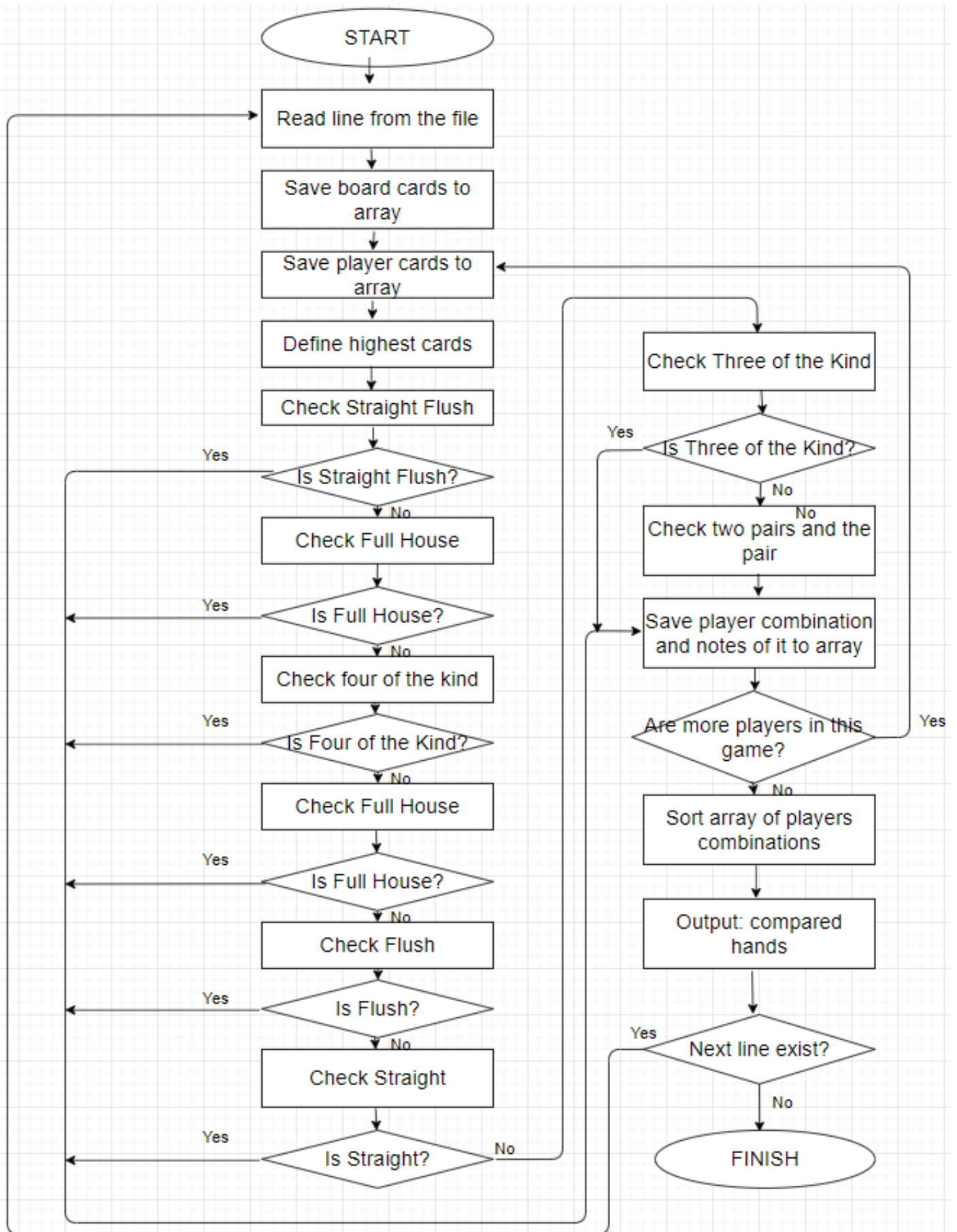7. Program result can be seen in the output.out file.

2. General information

1. Programming language: C++
2. Tool for programming: Code::Blocks (v.17.12)
3. After compiling the program, the .exe file will be created automatically in the folder of HW-poker.cpp file.
4. The number of rows input is equal to the number of rows in output, therefore rows in the input file should not be empty.

3. Restrictions

1. The program cannot check the correctness of the input.in file
2. The program cannot work with Omaha
3. Minimal count of players for one game – 2 players
4. If cards of 2 players have the same strength, the order of hand cards is not important. If AsAd=AhAc ⇔ AhAc=AsAd

4. The model of the program

```
                          START
                            |
                            v
                  Read line from the file
                            |
                            v
                  Save board cards to
                        array
                            |
                            v
                  Save player cards to          <----
                        array                        |
                            |                        |
                            v                        |
                  Define highest cards              Check Three of the Kind
                            |                             |
                            v                             v
                  Check Straight Flush          Yes    Is Three of the Kind?
                            |                   <----
     Yes                    v                             | No
     <----         Is Straight Flush?                     v    No
                            | No                  Check two pairs and the
                            v                           pair
                  Check Full House                       |
                            |                             v
     Yes                    v                   Save player combination
     <----         Is Full House?               and notes of it to array
                            | No                         |
                            v                             v
                  Check four of the kind        Are more players in this    Yes
                            |                           game?
     Yes                    v                             | No
     <----         Is Four of the Kind?                   v
                            | No                  Sort array of players
                            v                         combinations
                  Check Full House                       |
                            |                             v
     Yes                    v                   Output: compared
     <----         Is Full House?                     hands
                            | No                         |
                            v                             v
                  Check Flush                   Yes    Next line exist?
                            |                   <----
     Yes                    v                             | No
     <----         Is Flush?                              v
                            | No                      FINISH
                            v
                  Check Straight
                            |
     Yes                    v            No
     <----         Is Straight?    ---->
```

5. Testing

The Result '+' => The Result is equal to the expected(correct) output

№	Input	Expected (correct) output	what is being checked	Explanations	Result
1	4cKs4h8s7s Ad4s Ac4d As9s KhKd 5d6d	Ad4s=Ac4d 5d6d As9s KhKd	Given	Ac4d=Ad4s => ThreeKind (three 4, kickers: A,K) Qh2s => Straight from 4 to 8 As9s => Flush As Ks 9s 8s 7s KhKd =>FullHouse (three K, two 4)	+
2	2h3h4h5d8d KdKs 9hJh	KdKs 9hJh	Given	KdKs =>Pair(K), Kickers: 8,5,4 9hJh =>Flush(h), (2,3,4,9,J)	+
3	3h2s7h5d8d ThKh 9dAs	ThKh 9dAs	High Two different hand cards	ThKh=> High (K,T,8,7,5) 9dAs=> High (A,9,8,7,5) A>K	+
4	3h2s7h5d8d ThKh 9dKs	9dKs ThKh	High One same card for 2 pl.	ThKh=> High (K,T,8,7,5) 9dKs=> High (K,9,8,7,5) K=K, but T>9	+
5	3h2s7h5d8d 9hKh 9dKs	9hKh=9dKs	High Two same cards for 2 pl.	9hKh=> High (K,9,8,7,5) 9dKs=> High (K,9,8,7,5)	+
6	JhTs7h5d8d 2h3h 3d4s	2h3h=3d4s	High 5 highest cards from the board	2h3h=> High (J,T,8,7,5) 3d4s=> High (J,T,8,7,5)	+
7	JhTs7h5d8d 2h3h 3d6s	2h3h 3d6s	High 4 highest cards from the board	2h3h=> High (J,T,8,7,5) 3d6s=> High (J,T,8,7,6) 6>5	+
8	7d2s8sTsAs AdKd 8hJh	8hJh AdKd	Pair Two different pairs	AdKd=> Pair(A) Kickers(K,T,8) 8hJh=> Pair(8) Kickers(A,J,T) A>8	+

9	7d2s8sTsAs AdKd AhJh	AhJh AdKd	Pair Similar pairs	AdKd=> Pair(A) Kickers(K,T,8) AhJh=> Pair(A) Kickers(J,T,8) A=A, but K>J	+
10	2dQs8s9sAs Qd3d Qh4h	Qh4h=Qd3d	Pair Similar pairs	Qd3d=> Pair(Q) Kickers(A,9,8) Qh4h=> Pair(Q) Kickers(A,9,8) Q=Q ; Kickers=Kickers	+
11	2dQs8s9sAs QdJd QhTh	QhTh QdJd	Pair Similar pairs	QhTh=> Pair(Q) Kickers(A,T,9) QdJd=> Pair(Q) Kickers(A,J,9) Q=Q ; J>T	+
12	2d8d8s9sAs TdJd 3hTh	3hTh TdJd	Pair Pair from the board	TdJd => Pair(8) Kickers(A,J,T) 3hTh=> Pair(8) Kickers(A,T,9) 8=8 ; J>T	+
13	2d8d8s9sTs TdJd 3hTh	3hTh TdJd	Two pairs 1st pair – board 2nd pair – different	3hTh=>Two pairs(T,8) Kick (9) TdJd=> Two pairs(T,8) Kick(J) T=T ; 8=8 ; J>9	+
14	Ts3d7s9sJs TdJd 3hTh	3hTh TdJd	Two pairs 1st pair – different 2nd pair – different	3hTh=>Two pairs(T,3) Kick(J) TdJd=>Two pairs(J,T) Kick(9) T<J	+
15	Ts3d7sAsJs TdJh ThJd	TdJh=ThJd	Two pairs Similar pairs	TdJd=>Two pairs(J,T) Kick(A) ThJh=>Two pairs(J,T) Kick(A) J=J ; T=T ; A=A	+
16	Ts3d7s3sJs TdJh ThJd	TdJh=ThJd	Two pairs 3 pairs –>choose the best	TdJd=>Two pairs(J,T) Kick(7) ThJh=> Two pairs(J,T) Kick(7) J=J ; T=T ; 7=7	+
17	AsAdKsKdJs QdQs ThJd	ThJd QdQs	Two pairs 3 pairs –>choose the best	ThJd=>Two pairs(A,K) Kick(J) QdQs=>Two pairs(A,K) Kick(Q) Q>J	+
18	9s9dKsKdJs QdQs ThJd	ThJd QdQs	Two pairs 3 pairs – >choose the best	ThJd=>Two pairs(K,J) Kick(T) QdQs=>Two pairs(K,Q) Kick(J) Q>J	+
19	2d4d5s7h8h 7d7s 5d5h	5d5h 7d7s	Three of a Kind Different three of kind	7d7s=>ThreeKind(7) Kick(8,5) 5d5h=>ThreeKind(5) Kick(8,7) 7>5	+
20	2d4dTs4h3h 7d4s 4c5h	4c5h 7d4s	Three of a Kind Similar three of kind	4c5h=>ThreeKind(4) Kick(T,5) 7d4s=>ThreeKind(4) Kick(T,7)	

				4=4 ; T=T ; 5<7	
21	5h4dTs4h7d 3h4s 4c2d	3h4s=4c2d	Three of a Kind Similar three of kind	3h4s=>ThreeKind(4) Kick(T,7) 4c2d=>ThreeKind(4) Kick(T,7) 4=4 ; T=T ; 7=7	+
22	5h4d4c4h7d 3hTs 3d2d	3d2d 3hTs	Three of a Kind ThreeKind on the board	3hTs=>ThreeKind(4) Kick(T,7) 3d2d=<ThreeKind(4) Kick(7,5) 4=4 ; T>7	+
23	7s5c6dAsAd 3d4c 4d8s	3d4c 4d8s	Straight Different straights	3d4c=>Straight (from 3 to 7) 4d8s=>Straight (from 4 to 8) 3-7 < 4-8	+
24	7s5c6d8s9d 3d4c 4d8h	3d4c=4d8h	Straight Similar straights	3d4c=>Straight (from 5 to 9) 4d8h=>Straight (from 5 to 9)	+
25	4s5cAdJs3d Qd2c 2d6s	Qd2c 2d6s	Straight Straight from A to 5	Qd2c=>Straight (from A to 5) 2d6s=>Straight (from 2 to 6) A-5 < 2-6	+
26	4s5sAsJs3s Qd2c 2d6d	Qd2c=2d6d	Flush Flush with 5 board cards	Qd2c=>Flush (A,J,5,4,3) 2d6d=> Flush (A,J,5,4,3)	+
27	4s5sAsQc3s Qs2c KsJs	Qs2c KsJs	Flush Flush with 4 board cards	Qs2c=>Flush (A,Q,5,4,3) KsJs=>Flush (A,K,J,5,4) K>Q	+
28	4s5sAsQs3s Ts7s KsJs	Ts7s KsJs	Flush 7 cards –> choose the best	KsJs=>Flush (A,K,Q,J,5) Ts7s=>Flush (A,Q,T,7,5) A=A ; K>Q	+
29	4s5s5d5c3s 4hJh Ts3d	Ts3d 4hJh	Full House Three on the board Two – different	4hJh=>FullHouse (5,3) Ts3d=>FullHouse (5,4) 5=5 ; 3<4	+
30	4sKsKd5c3s 5s5h 3h3d	3h3d 5s5h	Full House Two on the board Three – different	3h3d=>FullHouse (3,K) 5s5h=>FullHouse (5,K) 3<5	+
31	5hKsKd5c5s 2d3c 4h6d	2d3c=4h6d	Full House Three on the board Two on the board	4h6d=>FullHouse (5,K) 2d3c=>FullHouse (5,K) 5=5 ; K=K	+
32	4h4s5h4c4d 5d2h 5c6s	5d2h 5c6s	Four of a Kind Four on the board	5d2h=>FourKind (4) Kick(5) 5c6s=>FourKind (4) Kick(6) 4=4 ; 5<6	+

33	4h4s5hAhAd 4d4c AcAs	4d4c AcAs	Four of a Kind Two on the board	4d4c=>FourKind (4) Kick(A) AcAs=>FourKind (A) Kick(5) 4<A	+
34	Ac3c4c5cJc 2cTh 6c7c	2cTh 6c7c	Straight Flush from A to 5	2cTh=>StraightFlush (A-5) 6c7c=>StraightFlush (3-7) A-5 < 3-7	+
35	7c3c4c5c6c 2hTh 6h7h	2hTh =6h7h	Straight Flush 5 cards from the board	2hTh=>StraightFlush (3-7) 6h7h=> StraightFlush (3-7)	+
36	AhThJhQh2c Kh2h AcAd	AcAd Kh2h	Straight Flush Royale 4 cards from the board	AcAd=>ThreeKind(A) Kick(Q,J) Kh2h=>Royale	+
37	AhThJhQhKh Kc2h AcAd	Kc2h=AcAd	Straight Flush Royale 5 cards from the board	AcAd=>Royale Kc2h=>Royale	+
38	4s5cJdJs3s Qd2c Jc3d 5d5h AhAc KsQs	Qd2c AhAc KsQs 5d5h Jc3d	5 players	Qd2c=>Pair(J) Kick (Q,5,4) AhAc=>TwoPairs(A,J) Kick(5) KsQs=>Flush(K,Q,J,4,3) 5d5h=>FullHouse(5,J) Jc3d=>FullHouse(J,3)	+