**10802 CPP Final Exam**

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| **Contributor︰CZQ** |
| **Subject：Highest-Ranking Straight** |
| **Main testing concept：string**   |  |  | | --- | --- | | **Basics** | **Functions** | | ■ C++ BASICS  ■ FLOW OF CONTROL  □ FUNCTION BASICS  □ PARAMETERS AND OVERLOADING  ■ ARRAYS  □ STRUCTURES AND CLASSES  □ CONSTRUCTORS AND OTHER TOOLS  □ OPERATOR OVERLOADING, FRIENDS,AND REFERENCES  ■ STRINGS  □ POINTERS AND DYNAMIC ARRAYS | □ SEPARATE COMPILATION AND NAMESPACES  □ STREAMS AND FILE I/O  □ RECURSION  □ INHERITANCE  □ POLYMORPHISM AND VIRTUAL FUNCTIONS  □ TEMPLATES  □ LINKED DATA STRUCTURES  □ EXCEPTION HANDLING  ■ STANDARD TEMPLATE LIBRARY  □ PATTERNS AND UML | |
| **Description：**  In poker, players construct sets of five playing cards, called hands. Each hand has a rank, which is compared against the ranks of other hands participating in the showdown to determine who wins the pot.  A straight of a poker hand contains five cards of sequential ranks, such as ♠2 ♦3 ♠4 ♣5 ♦6. As part of a straight, an ace can rank either above a king (e.g. A K Q J 10 is an ace-high straight) or below a two (e.g. 5 4 3 2 A is a five-high straight). However, the ace cannot rank both high and low in the same hand (e.g. Q K A 2 3 is not a straight). Additionally, while two cards have the same number, they are ranked by their suit where ♠(S)> ♥(H)> ♦(D)> ♣(C). There have one kind of straight called Straight flush, it means all of hands have same suit, and it’s rank is higher than regular straight. For example, ♦5 ♦6 ♦7 ♦8 ♦9. Based on the above description, the followings list exemplary straights in a descending order.  ♠10 ♠J ♠Q ♠K ♠A  ♥10 ♥J ♥Q ♥K ♥A  ♠5 ♠6 ♠7 ♠8 ♠9  ♣A ♣2 ♣3 ♣4 ♣5  ♠10 ♥J ♠Q ♦K ♠A  ♣A ♦2 ♦3 ♣4 ♣5  This task asks you to set up a hand of a straight with the highest rank from a set of cards.  **Input：**   1. The first line inputs an integer N, where 0<N<100, that is the number of sets. 2. The following N lines describe the sets of cards where each card is separated with a space. Each card is described by two notations to represent its suit and number respectively.    1. The first notation is a character representing its suit where ‘S’ is for spades, ‘H’ is for hearts, ‘D’ is for diamonds, and ‘C’ is for clubs.    2. The second notation represents the number. For example, 9→9、10→10、J→11、Q→12、K→13、A→1 or 14).   Here shows a few examples: SK→Spades 13、H5→heart 5   1. User can keep entering sets until reading EOF.   Note:   1. Each input set may have more than one straight but it has only one highest-ranking straight. 2. You should check N in the range of (0, N). While it is not, you should print out a message of “The number of the set is not in the range of (0, N)\n”. 3. If the number of input lines is larger than N, you should use the first N lines. 4. If the input line is less than N, you should print out a message of “The number of the line is less than N\n” and you should output the result of available lines. 5. If there are not 13 cards in the set, you should print out a message of “The number of the card in the i-th set is \n” where is the number of cards in the set, and output the result of available cards. 6. While detecting an invalid card in the set, you should print out a message of “XXX does not exist\n” for each of them, remove it, and output the result of the set. 7. While there are more than two cards in the same number and suit, you should output “XXX is the same” for each happening, remove it, and output the result of the set. 8. The order of error message: Note2 = Note4 > Note5 > Note6 > Note7, Note6 and Note7 should output before the result of error input and after the result of previous input.   **Output：**  Output the five cards of the highest-ranking straight.  **Sample Input / Output :**   |  |  | | --- | --- | | **Sample Input** | **Sample Output** | | 2  S3 D5 DA H6 S8 DQ S9 C10 C7 CJ SK S5 SA  SA CA HQ C2 CK C3 DJ C4 D10 C5 HA DA S2  SA CA HQ C2 CK C3 DJ C4 D10 C5 HA DA S2 | The number of the set is not in the range of (0, 2)  C10 CJ DQ SK SA  CA C2 C3 C4 C5 | | 3  S3 D5 DA H6 S8 DQ S9 C10 C7 CJ SK S5 SA  SA CA HQ C2 CK C3 HQ C4 D10 C5 HA WW | The number of the line is less than 3  The number of the card in the 2-th set is 12  C10 CJ DQ SK SA  WW does not exist  HQ is the same  CA C2 C3 C4 C5 | |
| **備註:** |
| **□** **Easy, only basic programming syntax and structure are required.**  **□ Medium, multiple programming grammars and structures are required.**  **■ Hard, need to use multiple program structures or complex data types.** |
| **Expected solving time:**  40minutes |
| **LTE:**  1Sec |
| **Other notes:** |