

## Problem 2: Cribbage Scores<sup>1</sup>



Source filename:      `cribbage.(cpp|java)`  
 Input filename:        `cribbage.in`  
 Output filename:       `cribbage.out`

The goal of this problem is to count the points in a Cribbage hand.

### Detailed Problem Description

Cribbage is a card game played by two players and uses a standard deck of cards. For those unfamiliar, a standard deck of cards has 4 suits (hearts, diamonds, clubs, and spades) and each suit contains 13 cards with face values: ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, jack, queen, and king. For this problem a 2 character code will be used to designate a card. The first character designates the face values and will be one of the following: A, 2, 3, 4, 5, 6, 7, 8, 9, T, J, Q, K. The character 'A' represents an ace and corresponds to a face value of 1. The character 'T' represents a 10 card (and obviously has a face value of 10). The character 'J' represents a jack. The character 'Q' represents a queen. The character 'K' represents a king.

The second character designates a suit and will be one of the following: H, D, C, S.

Since there are 13 distinct face values that occur in each of 4 suits, the complete set of 52 cards = {AH 2H 3H 4H 5H 6H 7H 8H 9H TH JH QH KH AD 2D 3D 4D 5D 6D 7D 8D 9D TD JD QD KD AC 2C 3C 4C 5C 6C 7C 8C 9C TC JC QC KC AS 2S 3S 4S 5S 6S 7S 8S 9S TS JS QS KS}.

A Cribbage hand consists of 5 distinct cards taken from these 52 possibilities. Four of the cards are held by a player while the fifth card (called the “starter” card) is placed face up on the table and is used by both players to complete their hand of 5 cards.

Scoring a Cribbage hand is a little involved (thus the desire for a computer program). Here are the rules:

1. 2 points are awarded for each pair within the 5 cards. (A pair is 2 cards of the same face value, disregarding suit.)
2. 4 points are awarded if all 4 cards that a player is holding have the same suit (but the starter card is of a different suit). However, if all 5 cards are of the same suit, award 5 points instead of 4.
3. 3, 4, or 5 points are awarded for each *distinct* straight of 3, 4, or 5 cards. (The use of the word, *distinct*, here means that given two such straights, at least one card is different.) A straight consists of cards with consecutive face values, disregarding suit (note: a card with face value ten 'T' follows a 9, a jack follows a ten, a queen follows a jack, and a king follows a queen). For instance, the cards: 8D 9C TD JH QS constitute a 5 card straight. Aces always represent a value of 1. (Some card games refer to this as “aces low”). Points are *not* awarded for a straight that is completely contained within a larger straight. For example, a 5 card straight only gets 5 points, not  $5 + 2*4 + 3*3 = 22$ . You don't get to count the 4 card and 3 card straights contained with the 5 card straight.
4. 2 points are awarded for each combination of cards whose face values add up to 15. (Again, aces count as 1. Jacks, Queens, and Kings all count as 10.)
5. 1 point is awarded if a player is holding a jack of the same suit as the starter card.

### Some examples

Example 1. If a player is holding the four cards: 5H, 5D, 7D, JD and the starter card is 8D, the hand should score:

2 points for the pair (5H & 5D)  
 2 points for the combination 5H & JD that adds to 15  
 2 points for the combination 5D & JD that adds to 15  
 2 points for the combination 7D & 8D that adds to 15  
 + 1 point for holding the jack of the same suit as the starter card

<sup>1</sup> This problem appeared at the CCSC:MidSouth Student Programming Contest April 4, 2008.

9 points total

Example 2. If a player is holding the four cards: 5H 5D 6C 7S and the starter card is 8H, the hand should score:

2 points for the pair (5H & 5D)  
 4 points for the straight: 5H 6C 7S 8H  
 4 points for the straight: 5D 6C 7S 8H  
 + 2 points for the combination 7S & 8H that adds to 15  
 12 points total

### Input File (`cribbage.in`)

The input file contains several test cases, one test case per line. Each line contains the representation for 5 cards. The first four cards on the line are those that a player is holding and the fifth card on the line is the “starter” card. Each card will be represented by a 2 character code. The first letter represents the face value of a card, while the second letter represents a suit. Each card will be separated from the others by a single space; and a card may occur at most once in a given test case. The end of the file is indicated by a line that contains a single zero (0).

### Output File (`cribbage.out`)

For each test case your program should output the corresponding Cribbage score. The output for each test case should be printed on a separate line. There should be NO spaces in the output.

### Example Input File

```
5H 5D 7D JD 8D
5H 5D 6C 7S 8H
5C 4C 6C JS TS
0
```

### Example Output

```
9
12
10
```