Worldline UK&I DDU Group - Code Assignment

**Introduction:**

This document explains in detail about an Internal Assignment designed by Worldline UK&I DDU Group to test various programming skills of an individual. Along with the assignment details it also provides detailed instructions that should be followed while executing this assignment.

This is a fun assignment and is up to the individual to spread their wings and wear a thinking cap to design and implement the assignment in best possible way and delivery with high level of quality.

**Instructions:**

* You will find here 3 problems for you to solve.
* For each, you must send the result you find and the source code you have written to find that result.
* You can use any framework or library.

The assessment of your work will consider the following aspects:

* The result (because it is better if it works)
* The program execution’s speed (if it is performant, it is even better)
* The code quality & maintainability

**Few Key Notes:**

1. Read this instruction carefully. It’s futile to lose points just because you didn’t read this instruction properly. If something’s unclear, ask.
2. Take advantage of the best practices in Software development to deliver the best possible solution.
3. Start early, there is really a lot of time, but when programming one often encounters puzzling problems that take a lot of time to fix.
4. Avoid reinventing the wheel, if there are open source libraries / frameworks available which aides in fast development please feel free to use them.

**Problem 1:**

You are given the following information, but you may prefer to do some research for yourself.

* 1 Jan 1900 was Monday.
* September, April, June and November had 30 days. All the rest of the months have 31 days.
* Saving February alone, which has 28, rain or shine. And on leap years, twenty-nine.
* A leap year occurs on any year evenly divisible by 4, but not on a century unless it is divisible by 400.

**How many Sundays fell on the first of the month during the twentieth century (1 Jan 1901 to 31 Dec 2000)?**

**Problem 2:**

In the card game poker, a hand consists of five cards and are ranked, from lowest to highest, in the following way:

* High Card: Highest value card.
* One Pair: Two cards of the same value.
* Two Pairs: Two different pairs.
* Three of a Kind: Three cards of the same value.
* Straight: All cards are consecutive values.
* Flush: All cards of the same suit.
* Full House: Three of a kind and a pair.
* Four of a Kind: Four cards of the same value.
* Straight Flush: All cards are consecutive values of same suit.
* Royal Flush: Ten, Jack, Queen, King, Ace, in same suit.

The cards are valued in the order: 2, 3, 4, 5, 6, 7, 8, 9, 10 (Ten), Jack, Queen, King, Ace.

If two players have the same ranked hands then the rank made up of the highest value wins; for example, a pair of eights beats a pair of fives (see example 1 below).

But if two ranks tie, for example, both players have a pair of queens, then highest cards in each hand are compared (see example 4 below); if the highest cards tie then the next highest cards are compared, and so on. Consider the following five hands dealt to two players:

|  |  |  |  |
| --- | --- | --- | --- |
| Hand | Player 1 | Player 2 | Winner |
| 1 | 5H 5C 6S 7S KD Pair of Fives | 2C 3S 8S 8D TD Pair of Eights | 2 |
| 2 | 5D 8C 9S JS AC Highest card Ace | 2C 5C 7D 8S QH Highest Card Queen | 1 |
| 3 | 2D 9C AS AH AC Three Aces | 3D 6D 7D TD QD Flush with Diamonds | 2 |
| 4 | 4D 6S 9H QH QC Pair of Queens Highest Card Nine | 3D 6D 7H QD QS Pair of Queens Highest Card Seven | 1 |
| 5 | 2H 2D 4C 4D 4S Full House with Three Fours | 3C 3D 3S 9S 9D Full House with Three Threes | 1 |



The file poker.txt, contains one-thousand random hands dealt to two players. Each line of the file contains ten cards (separated by a single space): the first five are Player 1’s cards and the last five are Player 2’s cards.

You can assume that all hands are valid (no invalid characters or repeated cards), each player’s hand is in no specific order, and in each hand, there is a clear winner.

**How many hands does Player 1 win?**

**Problem 3:**

By starting at the top of the triangle below and moving to adjacent numbers on the row below, the maximum total from top to bottom is 23.

* 3
* 7 4
* 2 4 6
* 8 5 9 3

That is, 3 + 7 + 4 + 9 = 23.

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**Find the maximum total from top to bottom in triangle.txt file, a 15K text file containing a triangle with 100 rows.**