First Assignment for MT471S

David Malone

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Please submit three programs by 16:00 on 2022-10-07. You should

- upload the `.c` files to the MT471S Moodle.

You **only** need to submit the `.c` file for each assignment. Your assignments are:

1. Write a program to calculate the two following sums using two loops:

$$s = \sum_{k=2}^{59999} \frac{1}{k^2-1} \qquad t = \sum_{k=59999}^{2} \frac{1}{k^2-1}$$

   Your program should print out 5 numbers: first print s sum using `printf` with `%f`; then print out t second sum with `%f`; then print out the difference, $s-t$, with `%f`, `%e` and `%g`.

2. Write a program that prints out a table of the years from 1922–2122 and how many days each month in the year had, plus the total number of days in the year. E.g. for 2018 it would print:

```
2018:  31 28 31 30 31 30 31 31 30 31 30 31 Total:  365
```

   Hint 1: A year is a leap year if it is divisible by 400 or if it is divisible by 4 and not divisible by 100. So, 2000 and 2004 were leap years, but 2100 will not be.

   Hint 2: There are multiple ways to write this program, try to think of an easy one. One way involves calculating remainders. In C you can calculate the remainder when x is divided by y by writing `x % y`.

3. Find a way to get the answer for the sum in Question 1 without having to add up all the terms. Then, write a program to calculate and print this answer q, as well as s and t. The program should then print out which of s and t are closest to q.

   Hint: Try partial fractions.