Coding Wizards

Activity Questions

Competition time: 1st Nov to 7th Nov

Rules and Regulation for submission:

1) Create GitHub account if you don't have one yet.
2) Create a repository and upload code files there.
3) You can solve these questions in Python, JAVA, C or C++.
4) Solutions code files should be named as question1, question2 or like q1, q2 etc. convenient and general.
5) After uploading all the solutions, send your repository link privately to any of the admin.
6) We will be checking your solution. If we find any copied work or plagiarism, we will have to remove you from the group.
7) You have 7 days to complete these questions. Any doubts regarding these questions or rules here you can ask in the telegram group. We will be happy to help.
8) Those who have completed all the questions genuinely will be part of the club.

Duck and Chick DNA

Joey, a so-called artist from the show "***Days of our Life's***" lived with Chandler, a man who has to do something with ***calculations***, in an apartment in Manhattan. They had a duck and a chick as their pets. Since then, Joey wishes chick to be more like duck. In order to do so, he decides to slowly **transcribe** chick's **DNA** into **RNA**. But he has to write a very short code in order to do the transcription so as not to make chick aware of the change.

The four nucleotides found in DNA are adenine (A), cytosine (C), guanine (G) and thymine (T).

The four nucleotides found in RNA are adenine (A), cytosine (C), guanine (G) and uracil (U).

Given a DNA strand, its transcribed RNA strand is formed by replacing each nucleotide with its complement:

- `G --> C`
- `C --> G`
- `T --> A`
- `A --> U`

Input: The input will always be a string of characters.

Output: The output should always be a string of characters. In the case of invalid input, you should output `Invalid Input` as a string.

Rules:

Your code should not consist of any numerical characters (0, 1, 2, 3, 4, 5, 6, 7, 8, 9)

The length of your code should be <= 103.

SAMPLE INPUT 1

C

SAMPLE OUPUT 1

D

SAMPLE INPUT 2

ACGTXXXCTTAA

SAMPLE OUPUT 2

Invalid Input

SAMPLE INPUT 3

ACGTGGTCTTAA

SAMPLE OUPUT 3

UGCACCAGAAUU

Rock, Paper, Scissors Game

This code ask user to input 'R' for Rock 'P' for Paper and 'S' for Scissors. Now the user needs a 2nd player to play with and finds computer as reliable partner. Now as Computer is the 2nd player it generates a random value between 'R' for Rock, 'P' for Paper and 'S' for Scissors and our program checks who has won the game, (either the computer or the user).

They play 3 rounds together to decide who has finally won the game of Rock, Paper, Scissors game.

Tie of Round: (Tie in the following round of the game. Same input of computer and user)

Tie of Game: (Case where user won 1 round and computer won 1 round and the other round is tie.)

Sample Case:

1ˢᵗ round:

Input:

Enter User's choice:

R

Computer's choice (randomly generated):

S

Output:

User won the round.

2ⁿᵈ round:

Input:

Enter User's choice:

S

Computer's choice (randomly generated):

S

Output: Tie of round.

3rd round:

Input:

Enter User's choice:

P

Computer's choice (randomly generated):

R

Output:

User won the round.

3 Rounds over, User scored 2, user won the game.

Question 3

Longest Collatz Sequence

The following iterative sequence is defined for the set of positive integers:

$$n \rightarrow n/2 \ (n \text{ is even})$$
$$n \rightarrow 3n + 1 \ (n \text{ is odd})$$

Using the rule above and starting with 13, we generate the following sequence:

$$13 \rightarrow 40 \rightarrow 20 \rightarrow 10 \rightarrow 5 \rightarrow 16 \rightarrow 8 \rightarrow 4 \rightarrow 2 \rightarrow 1$$

It can be seen that this sequence (starting at 13 and finishing at 1) contains 10 terms. Although it has not been proved yet (Collatz Problem), it is thought that all starting numbers finish at 1.

Which starting number, under one million, produces the longest chain?

NOTE: Once the chain starts the terms are allowed to go above one million.

Day Number

Write a program that determines the day number (1 to 366) in a year for a

date that is provided as input data. As an example, January 1, 1994, is day 1.

December 31, 1993, is day 365. December 31, 1996, is day 366, since 1996 is

a leap year. A year is a leap year if it is divisible by four, except that any year

divisible by 100 is a leap year only if it is divisible by 400. Your program should

accept the month, day, and year as integers. Include a function leap that returns 1

if called with a leap year, 0 otherwise.

Sample Run:

Input:

Enter a date: 1 st January 2020

Output*:*

Day Number:01

Sample Run 2:

Input:

Enter a date: 31 st December 2020

Output:

Day Number:366