STEMLoyola Challenges

NO SWEAT NO GAIN

COVID-19 Challenge

(Challenge 08)

Begins at **12:00 a.m. EAT** on **Saturday 4th April 2020**

Ends at **11:59 p.m. EAT** on **Sunday 12th April 2020**

The Challenge contains five problems (A, B, C, D, & E) arranged in an increasing order of difficulty. Beginners are expected to solve problems A, B, and C; while experienced students are expected to solve all five problems. Score is determined by both the problems you manage to solve and how sooner you submit a correct solution

Visit contest.stemloyola.org to participate in the challenge and/or view live results

Visit contest.stemloyola.org/register to register, if you do not have an account yet

Visit challenges.stemloyola.org/article/contest-registration for registration instructions

Visit challenges.stemloyola.org to access various resources (guidelines, tutorials, articles, videos, solutions to previous challenges, etc.) that you may need to complete the challenge

Consult Mr. Albert, Mr. Samuel, or other Computer Department teachers with any questions or concerns you may have

Problem A: COVID-19

Description

The ongoing pandemic is due to viral disease called *COVID-19*. COVID-19 stands for *Corona Virus Disease 2019*. Someone was attempting to write "COVID-19" but did not complete it. Write the remaining part.

Input

The only line of the input contains the portion of the "COVID-19" name. It is guaranteed that the name is partially written and all characters are in capital letters.

Output

Print the remaining part of the name.

NB: *Kindly note that your solution will be run five times. Each time, it will be tested against a different set of input. The first few test cases are given below to help you check your solution. Some of the remaining tests will be hidden and some can be seen from the contest page for this problem.*

Test 1

Input	Output
COVID-1	9

Test 2

Input	Output
COV	ID-19

Test 3

Input	Output
C	OVID-19

Problem B: COVID-XX

Description

The ongoing pandemic is due to viral disease called *COVID-19*. COVID-19 stands for *Corona Virus Disease 2019*. As it can be seen, the number 19 in the name stands for the year 2019 when the virus was first identified to attack humans.

Hypothetically, if the disease came in 2030, the name would be COVID-30. You are given a hypothetical name and you should identify the hypothetical year.

Input

The only line of the input contains the hypothetical name in the format "COVID-XX" without the quotes, where "XX" stands for any two digits.

Output

Print the hypothetical year of the disease on its own line. Notice that the year will be from 2000 to 2099.

NB: *Kindly note that your solution will be run five times. Each time, it will be tested against a different set of input. The first few test cases are given below to help you check your solution. Some of the remaining tests will be hidden and some can be seen from the contest page for this problem.*

Test 1

Input	Output
COVID-19	2019

Test 2

Input	Output
COVID-52	2052

Test 3

Input	Output
COVID-11	2011

Problem C: Choosy Viruses

Description

There is a virus that is very selective on the kind of cells it can attack. After attacking a cell, the virus remains dormant for a period of up to one year.

Research has identified all the body cells that can be attacked by the virus. Also, it has identified the total number of viruses that can occupy each cell during the period that viruses remain dormant. You are given a group of cells and how many viruses are already inside the cell. You are also given the maximum capacity of the cell. Your task is to determine how many more viruses can live in the cells.

Input

The first line of the input contains the total number of cells in the group (1 <= **N** <=1000). Each of the following N lines, contains two whole numbers where the first indicates the current number of viruses in the cell, and the second indicate the maximum number of viruses that can live in the given cell.

Output

Print the total number of new viruses that can be accommodated by the group of cells.

NB: *Kindly note that your solution will be run five times. Each time, it will be tested against a different set of input. The first few test cases are given below to help you check your solution. Some of the remaining tests will be hidden and some can be seen from the contest page for this problem.*

Test 1

Input	Output
2 1 3 2 5	5

The first cell can accommodate two more viruses and the second can accommodate three more.

Test 2

Input	Output
5 4 4 67 67 1 1 10 10 9 9	0

All five cells are fully occupied

Test 3

Input	Output
4 0 4 6 67 1 1 1 10	74

Problem D: Viral Attack

Description

In an alien world, a cell DNA is made of four bases: adenine (A), guanine (G), cytosine (C) and thymine (T). Unlike in our world, in the alien world, the four bases can combine in any arbitrary way—causing unimaginable organisms.

In that world, there is a famous virus that attacks and mutate cells in a very systematic way. The virus looks for all repeating bases and collapse them to leave only a single copy.

Input

The only line of the input contains a cell DNA as a single continuous strand. The length of the strand does not exceed 1,000 bases. The bases are encoded using capital letters A, C, G, and T.

Output

Print the DNA strand on its own line after it has been attacked and mutated by the virus.

NB: *Kindly note that your solution will be run five times. Each time, it will be tested against a different set of input. The first few test cases are given below to help you check your solution. Some of the remaining tests will be hidden and some can be seen from the contest page for this problem.*

Test 1

Input	Output
ACCGTTTATTCCGGAGGG	ACGTATCGAG

Test 2

Input	Output
ACCGTTTTTCCGGA	ACGTCGA

Test 3

Input	Output
CCGG	CG

Problem E: Colony Structure

Description

Three types of micro-organisms are usually found together in super-colonies. Due to their structures, they organize themselves in mesmerizing cubes with beautiful cross-sections. Although no one knows how they organize themselves prior to the third day, we have clear understanding of how they organize themselves between the third and seventh day. Research has shown that these super-colonies grow in predictable patterns up to one month. Study carefully the existing samples and predict how the cross-sections of the super-colonies would appear on other days.

Input

The only line of the input contains the day (`3 <= D <= 30`) of the colony growth.

Output

Display the pattern of the cross-section of the super-colony. The three types of the micro-organisms are denoted by a hyphen "-", a plus sign "+", and a hash "#".

NB: *Kindly note that your solution will be run five times. Each time, it will be tested against a different set of input. The first few test cases are given below to help you check your solution. Some of the remaining tests will be hidden and some can be seen from the contest page for this problem.*

Test 1

Input	Output
3	--#-- -###- ##+## -###- --#--

Test 2

Input	Output
4	---#--- --###-- -##+##- ##+++## -##+##- --###-- ---#---

Test 3

Input	Output
5	----#---- ---###--- --##+##-- -##+++##- ##+++++## -##+++##- --##+##-- ---###--- ----#----

Test 4

Input	Output
7	------#------ -----###----- ----##+##---- ---##+++##--- --##+++++##-- -##+++++++##- ##++++++++## -##+++++++##- --##+++++##-- ---##+++##--- ----##+##---- -----###----- ------#------