

ACM Spring 2022 Programming Contest

Upper Division

April 2nd, 2022



Special thanks to the CS Department Faculty, Alumni, students and one Mr. Preston Hamlin for their contributions!

Do not open until contest starts Instructions for Participants

- Contest URL: <https://domjudge.cs.fsu.edu>
- You have 5 hours to answer questions.
- You may submit solutions in the following languages:
 - C/C++14
 - Python 3.9.2
 - Java 11
 - C# 7.0
- You are only allowed access to official language documentation and COP3014/COP3363 reference material. You are restricted to:
 - C/C++14: <http://www.cplusplus.com/reference/>
 - Java 11: <https://docs.oracle.com/en/java/javase/11/docs/api/index.html>
 - Python 3.9.2: <https://docs.python.org/3/>
 - C# 7.0 <https://docs.microsoft.com/en-us/dotnet/csharp/>
 - COP3014/COP3363 Reference:
 - * <https://www.cs.fsu.edu/~vastola/cop3014/>
 - * <https://www.cs.fsu.edu/~vastola/cop3363/>
 - * <https://www.cs.fsu.edu/~jayarama/prog1.html>
- You are also allowed one textbook or material no larger than 8.5" x 11" x 2" volume.
- No other resources (e.g. Stack Overflow, Google, Wikipedia) are permitted. Using non-permitted materials will lead to disqualification.

- Teams are restricted to using one workstation (computer) each.
- Use of a cell phone to circumvent these restrictions will lead to disqualification. Use of cell phones in contest rooms is not permitted.
- The Clarifications tab on Domjudge may be used to submit questions pertaining to each problem. Do not use this feature to request troubleshooting help.
- **All input is redirected via STDIN.**
- **All output must be formatted to specification in terms of capitalization and spacing. Please refer to the example output for each question.**
- Do not include a shebang in your submissions.
- **Scoring:**
 - Teams are ranked according to score. A higher score is rewarded by answering more questions while acquiring fewer penalties.
 - The team that solves the greatest number of questions in the quickest time wins.
 - Teams which solve the same number of problems are ranked by least total time.
 - Teams may resubmit solutions as many times as needed, but incorrect submission attempts will result in time penalties (and thus a lower score.)
 - The scoreboard may be accessed during the first four hours of the contest. The scoreboard will freeze during the final hour.

Question Writers:

- | | |
|----------------------|-----------------|
| • Preston Hamlin | • Supriya Palli |
| • Sharanya Jayaraman | • Benjamin Zech |

A special thank you to all the question writers, proctors and volunteers for helping make this contest possible!

1 Meshed Manifold Messages

One Preston Hamlin, esq. is fond of puzzles. Despite his decades-long association with this fascinating pursuit, he is yet to encounter a puzzle that confounds him. Disenchanted with incessant non-fulfilment. he endeavors to construct a puzzle that is equivalent to his prowess in puzzle solving.

Preston, also fond of variety in implications of nomenclature, has dubbed his magnum opus the Manifold String. A string is a collection of characters. A **folded string** is a string that contains a mirrored string - a substring of at least 2 case-sensitive characters that is the reverse of another substring. The 2 mutually mirrored substrings could overlap, be adjacent, or be completely disjoint. A **manifold string** is a string that has been “folded” 2 times, an action Preston has named the manifold.

Preston now challenges you to thwart him at his self-professed preeminence and determine the number of manifolds in a string. For example, the string “xyzABCD1e1Djkl34jD1e1DCBwrnq” has been folded twice - The text “BCD1e1Dj” appears backwards elsewhere in the string and within that text, the text “D1” appears forwards and backwards. So, the test contains 1 “manifold”.

1.1 Input

Please note that all input read into the program is done via STDIN, (e.g. using cin statements in C++).

Please note that the program may be run multiple times on different inputs. The input will be a single string of length L ($10 \leq L \leq 50000$). The string will only consist of uppercase letters, lowercase letters, and decimal numerals (0-9). It will not contain any spaces or special characters.

1.2 Output

Please note that the output to the program should match exactly how it is in the sample output provided. (e.g. Do not prompt for user input, “Please enter the input: ”, do not print out things such as “The number is: ”, etc.)

Please print as a single integer, the number of manifolds in the string,

1.3 Sample Input/Output

Domjudge will have sample Input and Output that you can download directly, so you do not need to manually type out the sample provided.

Sample Input 1	Sample Output 1
xyzABCD1e1Djkl34jD1e1DCBwrnq	1
Sample Input 2	Sample Output 2
PatrickSpongebobegSquidward2425242draw9000	2