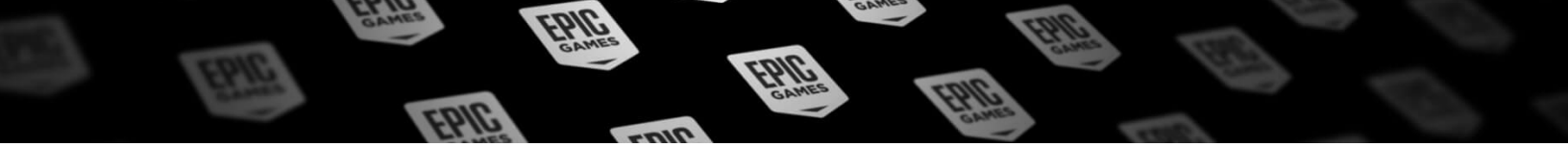

Epic Games - Backend Programming Assignment

Thank you for taking the time to complete our assignment. Use the language that is most comfortable to you. Please return a zip archive of your responses when ready. We'd also like to request that you keep the answers to these questions private. If you post them to a web link, github account etc. please do your best to make them private. We do our best to eliminate bias in our review process, to that end we ask that you don't include any identifying information, such as your name anywhere in your submission (e.g. in Java package names, document names, etc.). If you have any questions, don't hesitate to ask!

Overview

- State any assumptions when you solve each problem.
- There may be multiple ways to solve some of the questions.
- Note that all code is run through a test suite to test its production quality.
- An engineer from Epic will also review your code.
- Please approximate the time that it takes to solve each question. This is only for us to calibrate the test itself and does not factor into your assessment result.
- Please keep these questions and your answers private.

Question 1

Write a function that, given a matrix of integers, builds a string with the entries of that matrix appended in clockwise order.

Feel free to use any language you would like, but here are some example function signatures:

> Java signature: `String clockwiseMatrix(int[][] input)`
> JavaScript signature: `function clockwiseMatrix(input)`

For instance, the 3x4 matrix below:
2, 3, 4, 8
5, 7, 9, 12
1, 0, 6, 10
would make the string "2, 3, 4, 8, 12, 10, 6, 0, 1, 5, 7, 9".

How can you verify that your solution is correct?

Question 2

You have a popular mobile game that supports a variety of multiplayer modes. To help players decide which game mode to play, the game performs two API operations:

1. The game reports the user's region and game mode, and
2. The game queries the current most popular game modes for the region in which the player is located.

To standardize the lookup of regions, the game uses two-letter country codes (ISO 3166) to represent regions.

Please design a RESTful web service to support this functionality, which will easily scale to millions of concurrent users. Note that we're looking for a detailed high-level design, but no actual implementation. Your design should include, but is not limited to:

- A REST API specification (end points, input parameters, and output)
- A service layer design
- A persistence layer design (at a minimum should explain data access patterns)
- An explanation of how your design will scale to handle millions of concurrent users