Challenge Statement

An engineer named Junior was assigned to create the pen and paper game “Sim” inside of Unity. Here’s a link explaining the rules of “Sim”:

http://www.papg.com/show?2UQ3

Details

Junior had been working on the project for weeks, when Junior suddenly quit the company. Now you have been given their project, and you must get the project over the finish line. Here are the requirements from your manager:

- Implement some AI for the player’s computer opponent. Junior did not understand how to implement a min-max algorithm. Please implement some sort of AI for the computer player (it does not need to be min-max). It must be something more than the computer randomly selecting available line segments. Please note, Junior was not following your company’s rules about writing tests. The code must implement Edit Mode and Play Mode tests, or your CTO will not sign off on the project. (You can read more about Edit Mode and Play Mode tests here.)

  Also, it is okay if the computer player AI is not fun for the human player or never loses.

- The Art Director had asked Junior to implement “something interesting” in the background. Junior spent too much time working on a C# script to implement Perlin Noise on the background layer of the main menu scene, and had no time to implement this in the main game scene. The Art Director likes the idea of using animated noise in the background of the main game scene, but is displeased with Junior’s implementation. Please either modify Junior's code to make the background more interesting, or implement your own animated noise shader, or implement your own completely new shader to make the experience more engaging.

In addition, your manager wants either a document on future improvements

for this project. She would like you to cover the following:

- How would you refactor the code and/or project? What would you prioritize as "must happen" versus "nice to have" changes?

- How would you make this game online? Please be specific on your networking options, which protocol you would use and how you might prevent cheating.

- The Game Designer really wants to be able to make versions of the game that use any other polygons (from pentagon to icosagon and more). Please note, this refers specifically to the shape of the "Sim" game board, and not to a mesh or in-game geometry. Briefly describe how you would modify the existing code to reach this goal. Please do not describe a total rewrite, but how the current structure could be modified.

Your document should also have brief summaries of what AI algorithm you used for the opponent AI, and your change that you made to the animated background code.

*Please use **Unity LTS Release 2020.3.29f1** for this project, which you can get at the following link:*

https://unity3d.com/unity/qa/lts-releases

Hints & Tips

When working on this challenge, be sure to implement your solution as if you were in a production setting (think about things like maintainability and extensibility). Specifically, some things to think about include:

- Code cleanliness
- Project and code structure
- Proving your implementation is correct

All of your code should be original, and not copied from another source.

What to Return Back to Us

1. The project folder and all its contents

2. A README file containing answers to the questions above and any additional information you wish to provide
3. Please zip or tar everything in a directory named **yourfirst.lastname/** and return via email
4. In your e-mail response please let us know roughly how many hours you spent on this exercise (we will not grade you on this answer -- it is helpful for us to normalize the difficulty of challenges).