

Full-stack Challenge - Engineering Mastery

Nordeus - Job Fair 2024

Conquer the Challenge and become a complete developer!

Intro

On most projects at Nordeus there are 3 developer roles working together: **Backend**, **Client**, and **QA (Quality Assurance)**. Imagine you are a part of a small handpicked team at, and as the only developer in the team, you will get to tackle all parts of the project that are usually done by these three separate roles.

About the challenge

A small game project was designed and the team needs you to use your skills to turn that design into reality.

Game description

Users are shown a grid map of 30x30 cells with each cell having a height value assigned to it. A cell can either be **water** 💧 (**height = 0**) or **land** 🏝️ (**height > 0**). Connected land cells represent an **island** 🏝️. The goal of the game is to find which island has the greatest average height. Users can make their guess by clicking on any island and they have 3 attempts to guess the correct island. After 3 wrong guesses or after a successful guess the game finishes and they can choose to restart.

It's up to you to decide the appropriate representation of the cells to make it easier/intuitive for the user to visually distinguish different heights.

Client

The idea is to represent the grid as a matrix of heights, each height is an integer value in the range from 0 to 1000 (inclusive). If the height is 0 the cell should be considered water 💧, otherwise its land 🏝️. Use the appropriate algorithm to figure out what the correct island is and judge the user on their input. **The average height of an island is calculated as the sum of all of the heights in its cells divided by the number of cells the island has.**

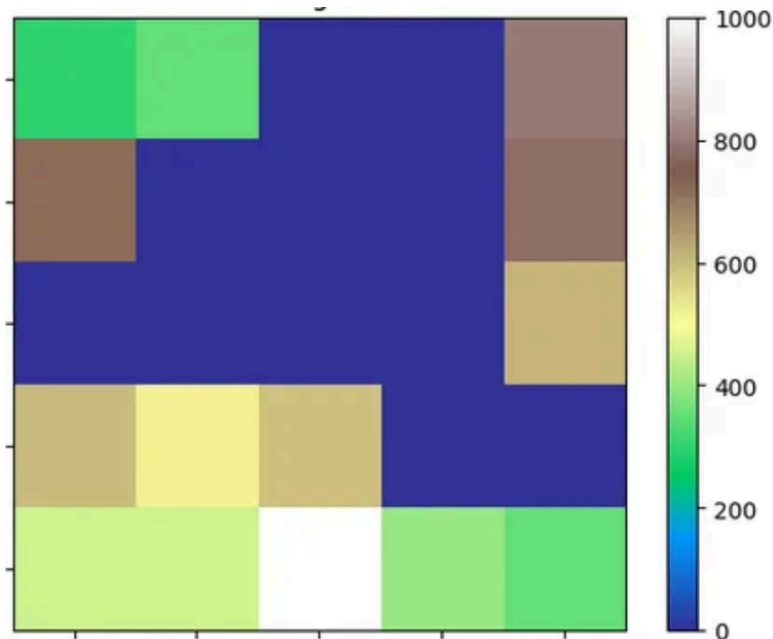
Implementation guidelines on the client side:

- Graphical representation of the grid map
- An algorithm for determining the island with the greatest average height
- A way to know which island the user selected as their guess (clicking on any cell of an island selects it)
- Compare the users selected island average height against the found solution
- Terminate the game if the user ran out of guesses or has won

Example of input for a 5x5 matrix:

```
300 350 0 0 797
720 0 0 0 779
0 0 0 0 611
600 519 590 0 0
450 450 1000 400 350
```

Possible graphical representation for this example:



Backend

We provided you with this url: <https://jobfair.nordeus.com/jf24-fullstack-challenge/test>. You can send a GET request to it to receive 1 out of 10 of our map inputs at random. Each map is 30 rows of 30 integer values ranging from 0 to 1000 representing the height of each cell. Values in one row are separated by a single white space and rows are separated by a new line (a 30x30 version of the 5x5 example above).

There is a link in the **Useful Links** section that you can check out to get the idea of how to implement this request.

QA

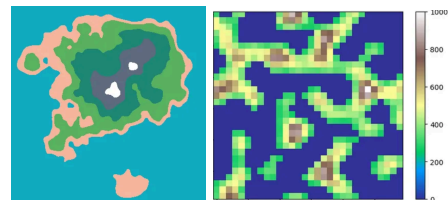
Describe the following things in a txt file:

- Description of bugs that came up - how you noticed and fixed them
- Ways you would test the projects of other contestants (inputs, actions you would do etc.)
- Improvements/features you would make if you had a magic wand (able to do anything you wish for)
- Think of how some factors could affect your solution (e.g. map size, number of lives...)

Note: You can't go wrong here, so don't be afraid to let your imagination run wild!

Bonus Points

Adding your twist to the project is highly encouraged. Some ideas include:



- Making the map more visually appealing. Examples:
- Quality of life features such as adding a distinction to already selected islands.
- Creating a real game loop (game over/victory screen, multiple levels, player accuracy stat, etc...)

Submission

- Should be sent via email to jobfair@nordeus.com. The email subject should be: **FullStack Challenge**. Please add your full name to the email. 😊
- Can be in any format (e.g. a link to your Github repo, zipped project, a link to your web page if you're making a web application, or **anything else**) but **please, make it easy for us to access and view your work**.
- Attach the txt file for the QA part of the challenge.
- **Not necessary**: you can provide a screen recording of you using your project to make sure we see all the features you've implemented

Feel free to work in any environment you're comfortable with. You can find content that can help you with this challenge in the section below. All the links reference python or pygame but it is NOT necessary to work in Python.

Useful information

- [📺 How to make Minesweeper in Pygame - Step-by-Step Tutorial for beginner](#)
- [Python get request](#)
- [📺 How to do GRID | Python | Pygame](#)

This challenge is purposefully left open for personal interpretation. We want to give you the freedom to show your creativity in all aspects. But if you have any questions about the challenge that you feel are blocking your progress, reach out to jobfair@nordeus.com.

*Interested in the **Full-Stack Trainee Program**? We have great news! If you successfully complete the challenge, then you will skip one round of interviews for the Full-Stack Trainee Program if you apply for it.

The challenge is open until November 17, 2024, end of the day. Good luck!