Game of Life

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CIS 4930: Concurrent Programming

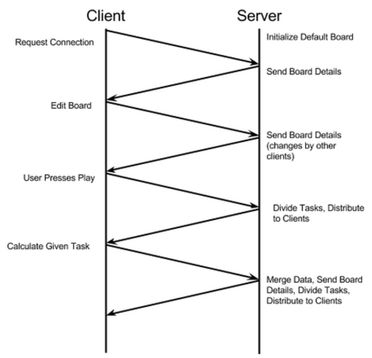
Introduction

Jon Conway devised an algorithm to mimic cell automation in 1970, called the 'Game of Life'. Essentially, the game consists of a finite grid of cells that are either 'alive' or 'dead' and are dependent on the following rules:

- Any live cell with fewer than two live neighbours dies, as if caused by under-population.
- Any live cell with two or three live neighbours lives on to the next generation.
- Any live cell with more than three live neighbours dies, as if by overcrowding.
- Any dead cell with exactly three live neighbours becomes a live cell, as if by reproduction.

Objective

Our Game of Life implementation uses a server-client architecture, controlled and played on multiple clients. Iterations are computed on multiple clients; the server will constantly transmit the grid to clients after each iteration. When played, the server will distribute tasks of calculating iterations amongst the clients, and the calculations are returned to the server; it then merges the calculations, distribute the board and tasks to the clients again. Clients update grid size and initialize living cells in order to play and then receive commands to calculate the next iteration. After these calculations are complete and sent to the server, client waits for future information.



Member Contributions

- **Devan Patel** developed a concurrent algorithm determining neighboring cells, calculating the next iteration, and synchonously updating the grid.
- **Kyle Koceski** managed the appropriate synchronization of multiple client threads and communication between clients and server.
- **Daniel Fuentes** designed the graphical user interface that allowed clients to interact with the board, as well as displaying the board's current status, and the changes as the game progressed.

Important Result

ADD SCREENSHOT OF THE GAME

Mathematical Section

Nam quis odio enim, in molestie libero. Vivamus cursus mi at nulla elementum sollicitudin. Nam quis odio enim, in molestie libero. Vivamus cursus mi at nulla elementum sollicitudin.

$$E = mc^2 \tag{1}$$

Nam quis odio enim, in molestie libero. Vivamus cursus mi at nulla elementum sollicitudin. Nam quis odio enim, in molestie libero. Vivamus cursus mi at nulla elementum sollicitudin.

$$\cos^3\theta = \frac{1}{4}\cos\theta + \frac{3}{4}\cos 3\theta \tag{2}$$

Nam quis odio enim, in molestie libero. Vivamus cursus mi at nulla elementum sollicitudin. Nam quis odio enim, in molestie libero. Vivamus cursus mi at nulla elementum sollicitudin.

$$\kappa = \frac{\xi}{E_{\max}} \tag{3}$$

Methods

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Results

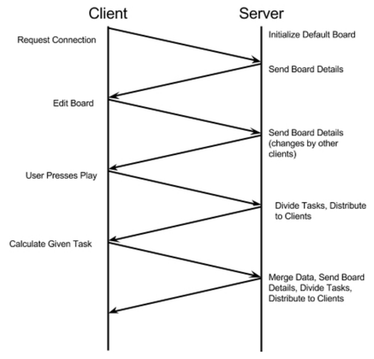

Figure 2: Figure caption

NEED TO ADD GRAPH

Treatments	Response 1	Response 2
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

Table 1: Table caption

Conclusion

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Technologies

The following technologies were required to complete the project:

- Java 1,8
- JUnit 1.4
- JavaFX 2.0.3
- Java Swing

References

Acknowledgements

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