CMSC 447

SAR and Demo for Game of Life

TEAM 3

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Agenda

1. *Overview*
2. *User Story*
3. *Requirements*
   a. *Status of Testing*
   b. *Test Results*
4. *UML/Use Case Diagram*
5. *Documentation Status*
6. *Trade Offs*
7. *Reviews*
8. *SW Summary*
   a. *SLOC*
   b. *Libraries*
9. *Screenshots & Demo*
10. *Conclusion*
    a. *Improvements*
11. *Questions*

Overview & Introduction

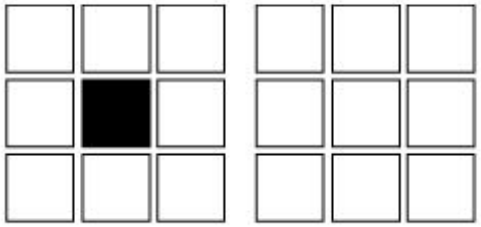
Goal:

Develop a version of Conway's Game of Life that follows the rules and implements our specific requirements given to us by our customer.

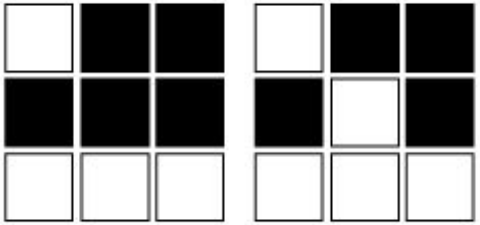
Conway's Rules:

1. *A cell with one or no neighbors dies*
2. *A cell with more than four neighbors dies*
3. *A cell with 2-3 neighbors lives*
4. *A cell 3 neighbors becomes populated*

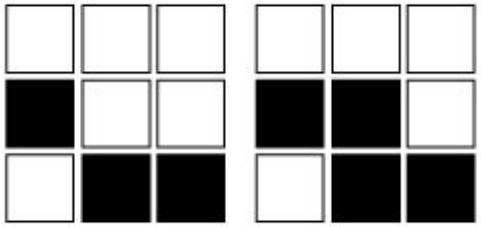
Overview & Introduction



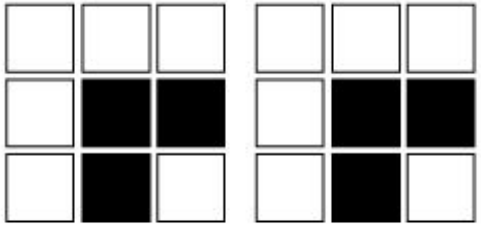
Loneliness
A cell with less than 2 adjoining cells dies.



Overcrowding
A cell with more than 3 adjoining cells dies.



Reproduction
An empty cell with more than 3 adjoining cells comes alive.



Stasis
A cell with exactly 2 adjoining cells remains the same.

User Story

- *"As a customer, I need a single executable, so I do not need to compile a bunch of files on my computer."*
- *"As a customer, I want to be able to click on cells to turn them on and off throughout the game."*
- *"As a customer, I want an adjustable board size that scales to the screen"*
- *"As a customer, I want the game to have a virus that contaminates the cells it neighbors."*
- *"As a customer, I need to be able to save the current board state and load from a file."*

User Story

Rules including Virus:

1. *A cell with one or no neighbors dies*
2. *A cell with more than four neighbors dies*
3. *A cell with 2-3 neighbors lives*
4. *A cell 3 neighbors becomes populated*

5. ***A virus populates one neighbor at a time***
6. ***A virus with no non-infected neighbors dies***
7. ***A virus infects one neighbor at random if it has more than one non-infected neighbor***

REQUIREMENTS

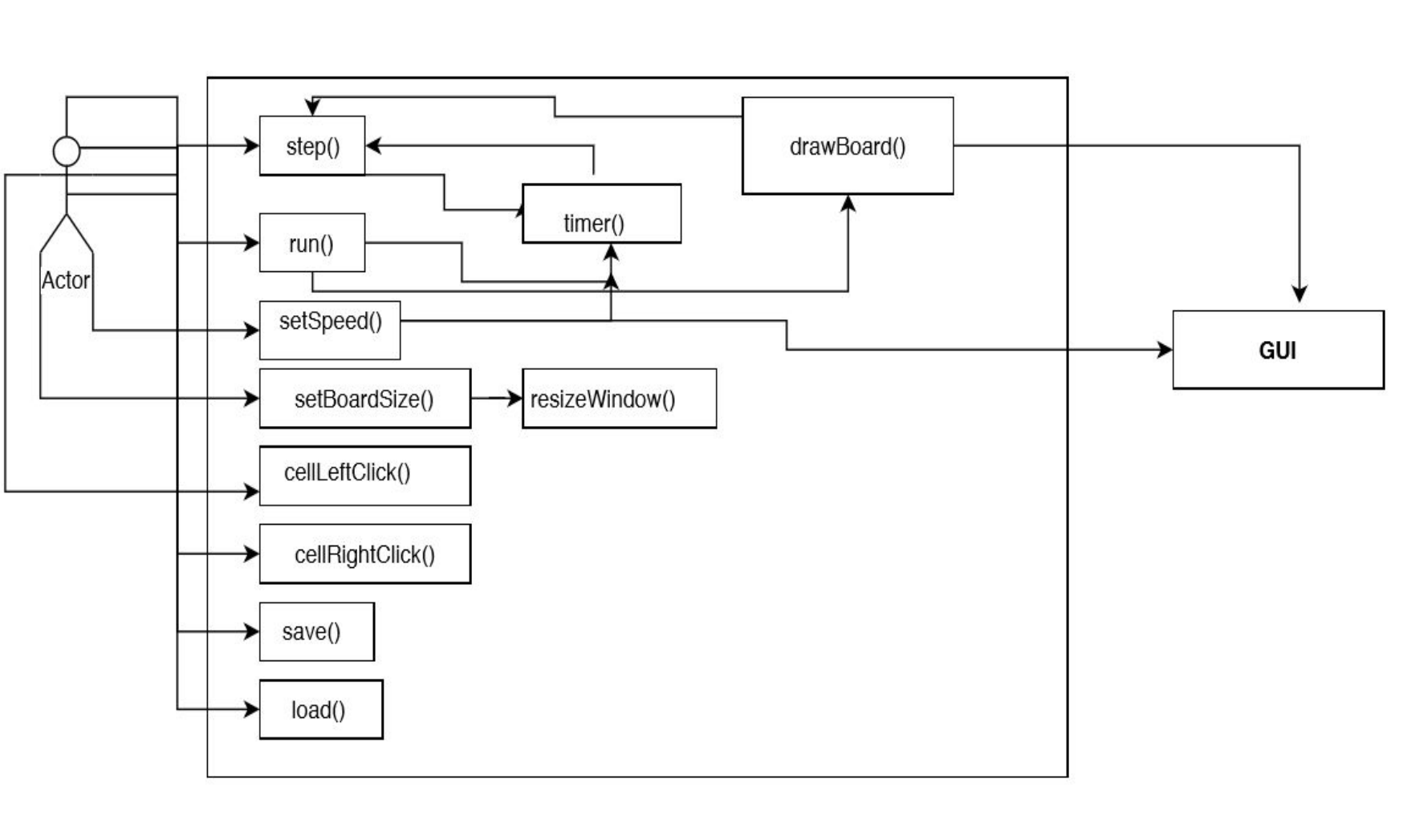
Functional Requirements	Status of Tests	Test Results	Type of Test	Tests run by	Number of Trials Run
Game shall have a GUI	Completed	Met	Proof by Inspection (self-explanatory)	Alex Flaherty, Eoin Fitzpatrick Hannah Russell, Gabriel Kilungya	4
Game shall have a step button	Completed	Met	Populate board & press button n times to see discrete run	Alex Flaherty, Eoin Fitzpatrick Hannah Russell, Gabriel Kilungya	4
Game shall have a run button	Completed	Met	Populate board & press button once and see continuous run	Alex Flaherty, Eoin Fitzpatrick Hannah Russell, Gabriel Kilungya	4
Game shall have a right click button to generate a virus	Completed	Met	Populate board with viruses by right clicking on the mouse	Alex Flaherty, Eoin Fitzpatrick Hannah Russell, Gabriel Kilungya	4
Game shall have a left click button to generate a normal cell	Completed	Met	Populate board with cells by left clicking on the mouse	Alex Flaherty, Eoin Fitzpatrick Hannah Russell, Gabriel Kilungya	4
Game shall have a speed slider	Completed	Met	Move the slider left to right; game speed from fast to slow	Alex Flaherty, Eoin Fitzpatrick Hannah Russell, Gabriel Kilungya	4
Game shall have a save option	Completed	Met	Save the game at initial state, changed state and final state	Alex Flaherty, Eoin Fitzpatrick Hannah Russell, Gabriel Kilungya	4
Game shall have a load option	Completed	Met	Load the saved game from a file, continue from saved state	Alex Flaherty, Eoin Fitzpatrick Hannah Russell, Gabriel Kilungya	4
Game shall generate cells automatically	Completed	Met	Seed in a value or press Randomize button	Alex Flaherty, Eoin Fitzpatrick Hannah Russell, Gabriel Kilungya	4
Game generates viruses	Completed	Met	Seed in a value or press Randomize button	Alex Flaherty, Eoin Fitzpatrick Hannah Russell, Gabriel Kilungya	4

REQUIREMENTS

Non- Functional Requirements	Status of Tests	Test Results	Type of Test	Tests run by	Number of Trials Run
Game shall have window scalability	Completed	Met	User input (both valid & invalid input)	Alex Flaherty Eoin Fitzpatrick Hannah Russell Gabriel Kilungya	4
Game shall be portable	Completed	Met	.exe runs fine on multiple machines	Eoin Fitzpatrick Hannah Russell Gabriel Kilungya	3

Platform Requirements	Status of Tests	Test Results	Type of Test	Tests run by	Number of Trials Run
Game shall run on Windows environment	Completed	Met	Code built on Visual Studios (Windows only IDE)	Alex Flaherty Eoin Fitzpatrick Gabriel Kilungya	3
Game shall be a single .exe file	Completed	Met	Visual Studios outputs source code as an .exe file	Alex Flaherty Eoin Fitzpatrick Gabriel Kilungya	3

Use Case Diagram



DOCUMENTATION

- *System/Software Requirements Specification (SRS)*
  - *Status: Complete*
  - *% complete: 100%*
  - *Author(s): Gabriel, Hannah*
  - *Completion expectation: DONE*

- *System/Software Design Document (SDD)*
  - *Status: In Progress*
  - *% complete: 100%*
  - *Author(s): Mohammed, Evan, Eoin, Hannah, Gabriel*
  - *Completion expectation: DONE*
  -
- *Software Test Description(STD)*
  - *Status: In Progress*
  - *% complete: 100%*
  - *Author(s): Hannah, Eoin, Gabriel*
  - *Completion expectation: DONE*

DOCUMENTATION

- *System/Software Testing Report (STR)*
  - *Status: In Progress*
  - *% complete: 100%*
  - *Author(s): Gabriel*
  - *Completion expectation: DONE*
- *Software User Manual (SUM)*
  - *Status: In Progress*
  - *% complete: 100%*
  - *Author(s): Alex*
  - *Completion expectation: DONE*

Trade Offs

C #

- *built in libraries that can be used for Windows platform and GUI*
- *using System.Windows.Media*
  - *multimedia framework for media production*
  - *consists of a software development kit with several API*
- *some experience using C#*
  (great for creating Windows apps!)
- *single executable*

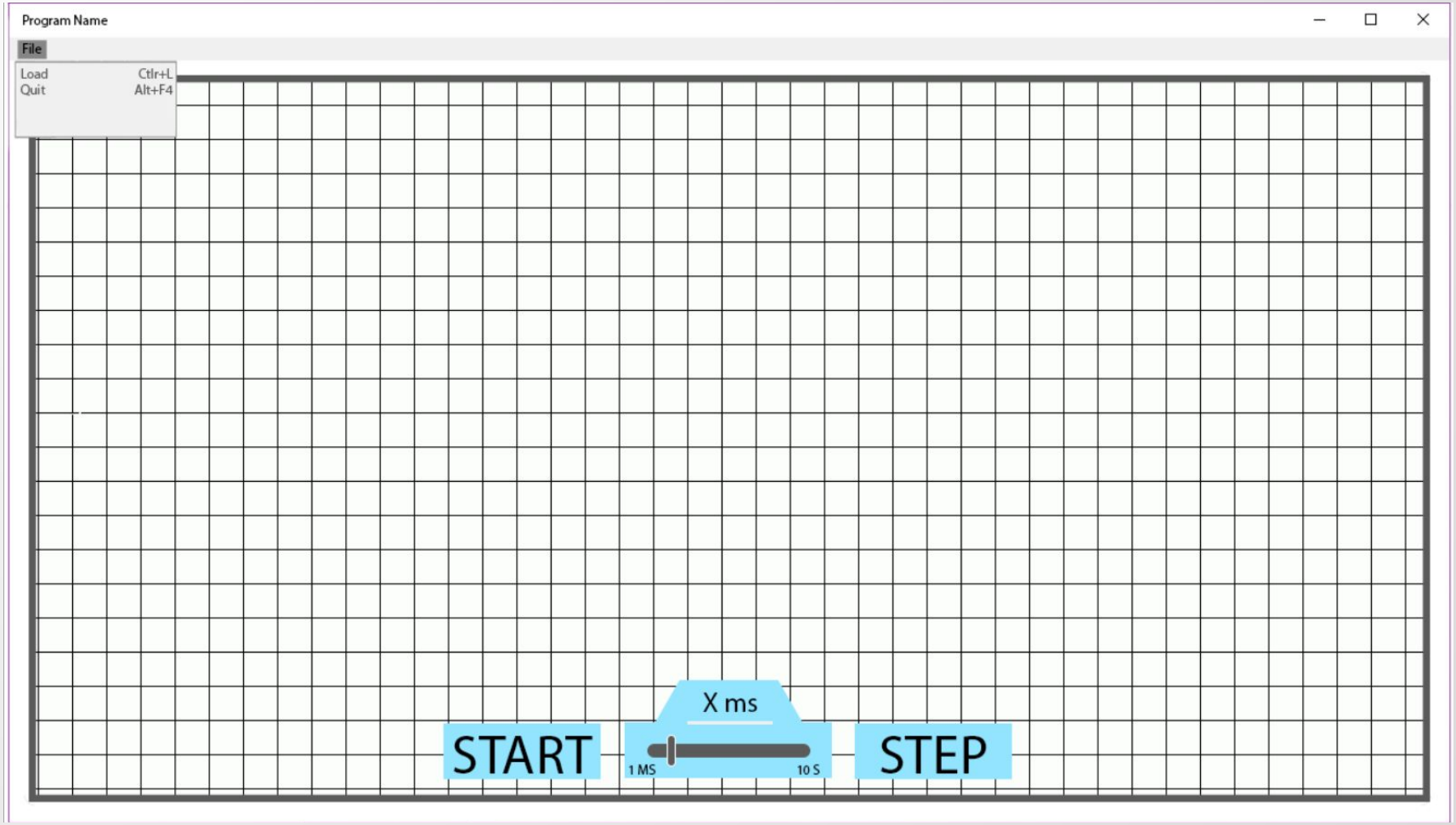
Python

- *lots of options on which libraries and packages to download*
- *Tkinter*
  - *de-facto standard GUI*
  - *has same features as Windows Media*
- *most of us have little experience implementing a GUI in python*

AoA for Deciding Language

			Yes	Yes	Yes	Yes	Yes	Yes	Yes	10	5	5	5	5	5	5	
Language	**Current stable version**	**Release date**	**Library for GUI**	**Built in Library**	**Right Click**	**Left Click**	**Adjustable window**	**Load from file on desktop**	**Slider Feature**	**Library for GUI**	**Built in Library**	**Right Click**	**Left Click**	**Adjustable window**	**Load from file on desktop**	**Slider Feature**	**Sum**
C#	7.3	2018	Yes	Yes	Yes	Yes	Yes	Yes	Yes	1	1	1	1	1	1	1	30
Python	3.7.2	2018	Yes	No	Yes	Yes	Yes	Yes	Yes	1	0	1	1	1	1	1	25

Original High Level Design



REVIEWS

- *System Requirements Review (SRR)*
  - *Attendees: All*
  - *Issues: Unsure what language to use*
  - *3/9/2019*
- *Software Specification Review (SSR)*
  - *Attendees: All*
  - *Issues: None*
  - *4/19/2019*
- *System Design Review (SDR)*
  - *Attendees: All*
  - *Issues: None*
  - *4/19/2019*

REVIEWS

- *Preliminary Design Review (PDR)*
  - *Attendees: Mohammed, Eoin, Alex, Evan, Gabriel*
  - *Issues: Asked about the possibility of mobile development*
  - *4/23/2019*

- *Critical Design Review (CDR)*
  - *Attendees: All*
  - *Issues: Asked about the possibility of reversing the game to any previous state*
  - *4/30/2019*

- *Test Readiness Review (TRR)*
  - *Attendees: Eoin, Alex, Evan, Gabriel, Hannah*
  - *Issues: None*
  - *5/7/2019*

SW Summary

SLOC(MainWindow.xaml.cs) : 702 lines

SLOC(MainWindow.xaml) : 90 lines

Language Used: C#

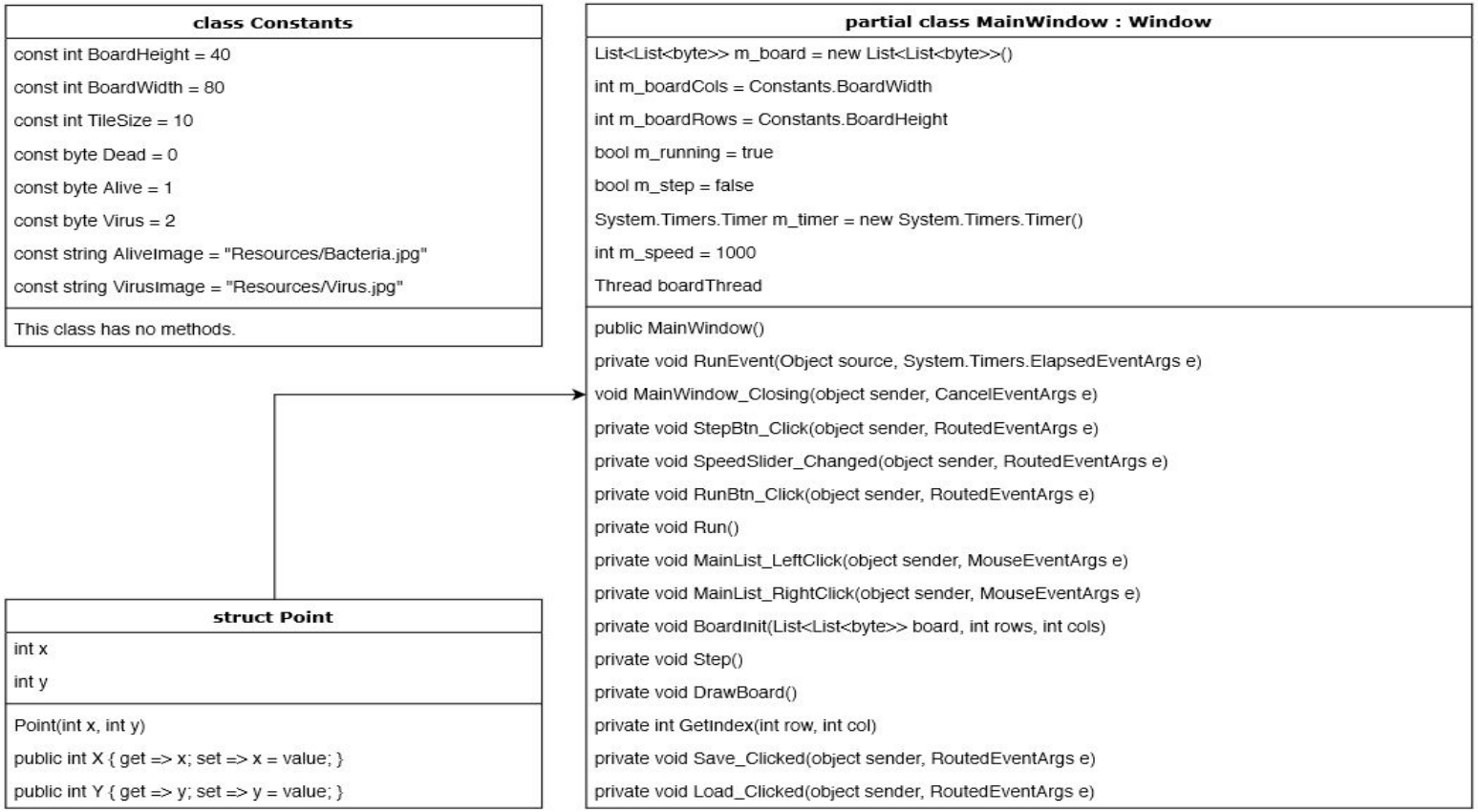
Windows Libraries used:

- *using System.Collections.Generic;*
- *using System.ComponentModel;*
- *using System.IO;*
- *using System.Linq;*
- *using System.Text;*
- *using System.Text.RegularExpressions;*
- *using System.Threading;*
- *using System.Threading.Tasks;*
- *using System.Windows;*
- *using System.Windows.Controls;*
- *using System.Windows.Data;*
- *using System.Windows.Documents;*
- *using System.Windows.Input;*
- *using System.Windows.Media;*
- *using System.Windows.Media.Imaging;*
- *using System.Windows.Navigation;*
- *using System.Windows.Shapes;*
- *using Microsoft.Win32;*

Software Diagram

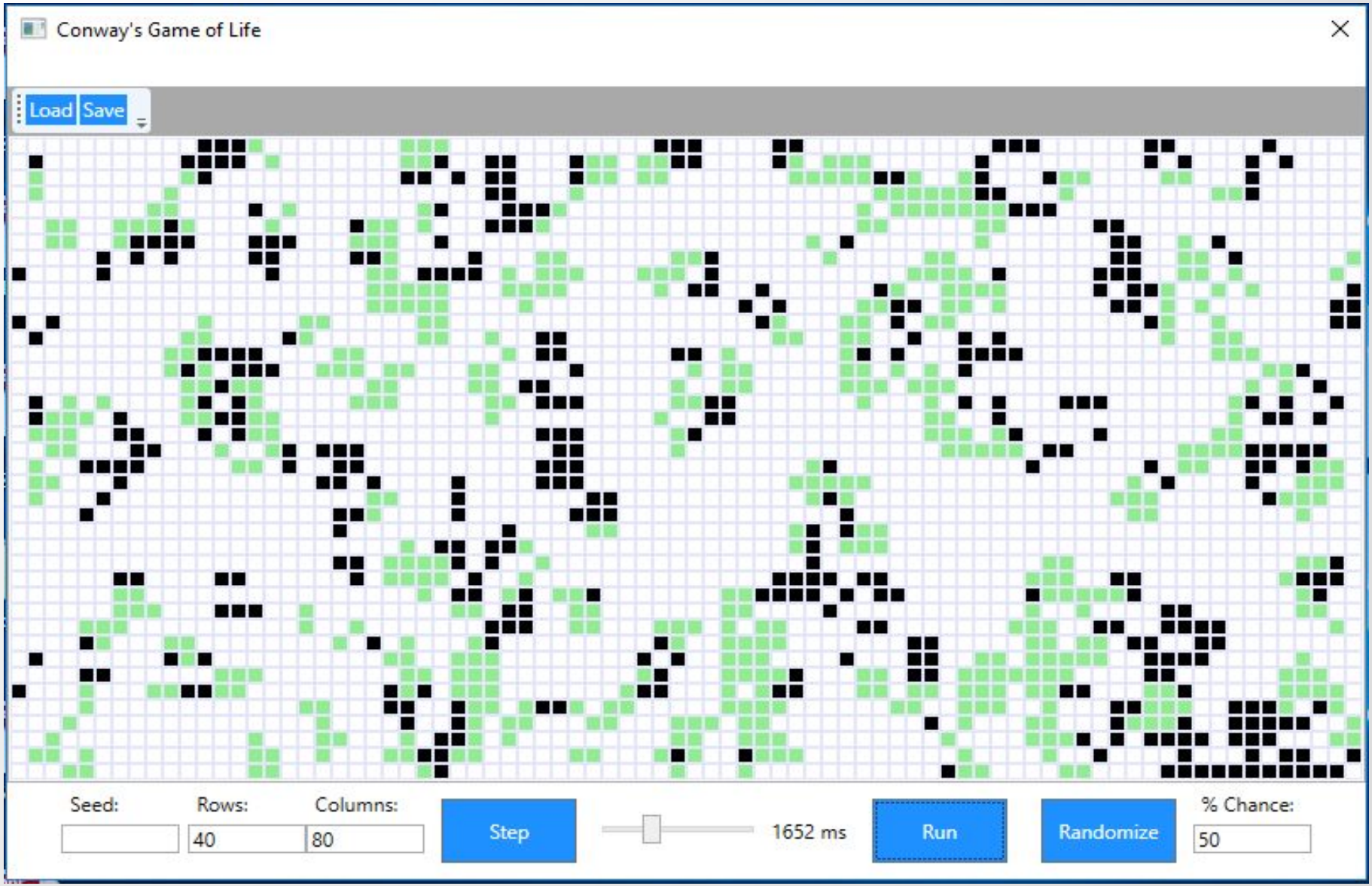
Named space: ConwayGameOfLife

The name space provides the scope boundaries for the implementation of Conway's Game of Life.

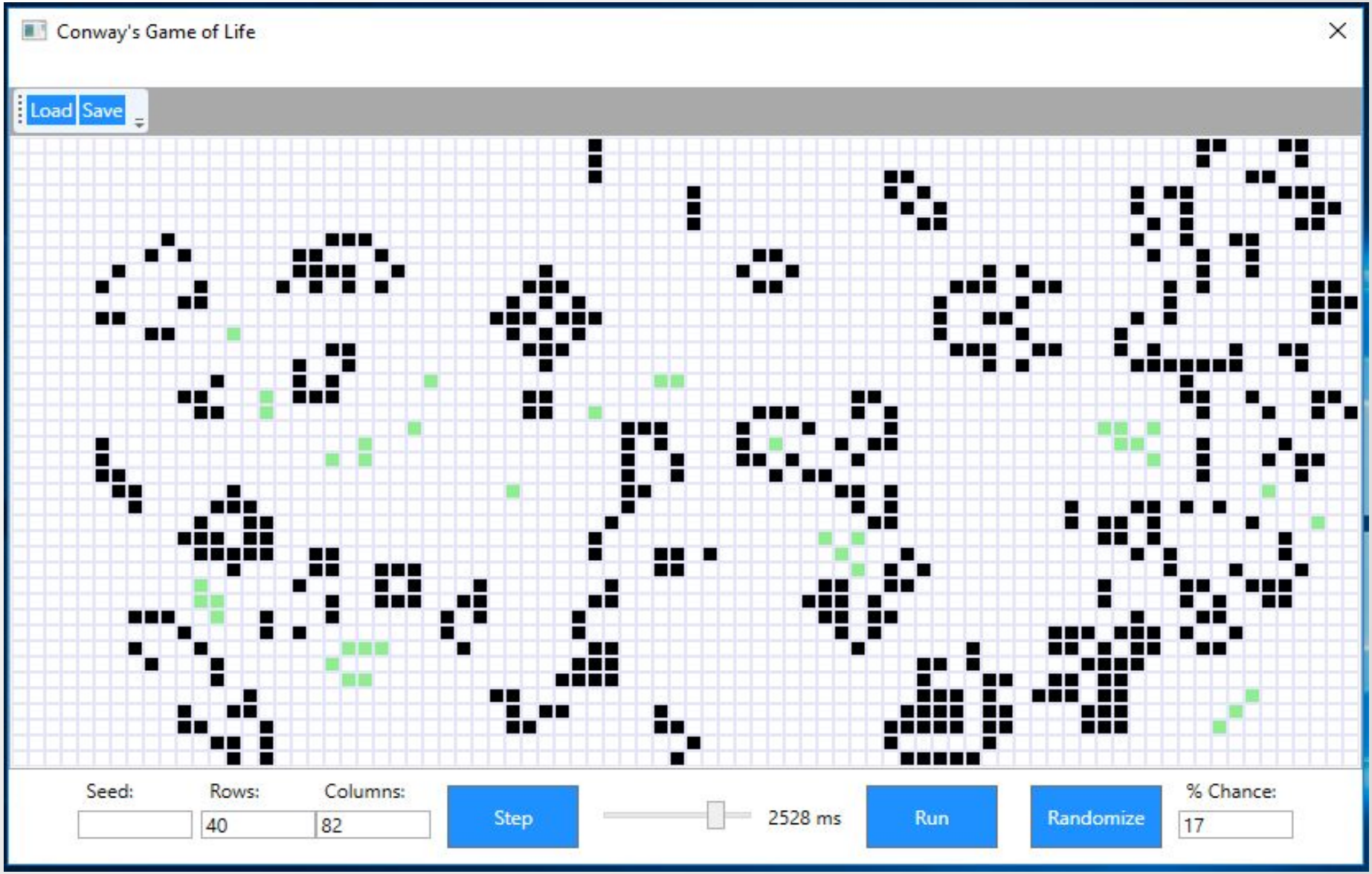


Game Screenshot 1

Game Screenshot 2



Game Screenshot 3



DEMO!!

Conclusion

Improvements:

- *Make the .exe capable of running on more operating systems than just Windows*

- *Improve speed by multithreading*

- *Adding the reversibility feature*

Questions