

System Requirements Specification

Un-Gerrymandered Software

Customer: Shawn Squire



DIAMOND DISTRICTING

Members: Corey Atkins, Matthew Hancher, Nahum Meherete, Joey Napolitano, Nirav Shah, Eric Yoo

Date: October 19, 2017

Table of Contents

1. Introduction

- 1.1 Purpose of This Document**
- 1.2 References**
- 1.3 Purpose of the Product**
- 1.4 Product Scope**

2. Functional Requirements

3. Non-Functional Requirements

4. User Interface

5. Deliverables

6. Open Issues

Appendix A – Agreement Between Customer and Contractor

Appendix B – Team Review Sign-off

Appendix C – Document Contributions

Section 1: Introduction

Section 1.1: Purpose of This Document

The purpose of this document is to specify the functional and nonfunctional requirements for our product, and to identify deliverable items and any open issues. The intended audience of this document includes Prof. Terry Yoo (our instructor), Prof. Shawn Squire (our primary customer), and the users of our product.

Section 1.2: References

Ingraham, Christopher. (2015, March 1). *This is the best explanation of gerrymandering you will ever see*. Retrieved from https://www.washingtonpost.com/news/wonk/wp/2015/03/01/this-is-the-best-explanation-of-gerrymandering-you-will-ever-see/?utm_term=.8c8e3fe95ad1

(2017, August 12). *Redistricting*. Retrieved from <https://en.wikipedia.org/wiki/Redistricting#Gerrymandering>

Section 1.3: Purpose of the Product

The purpose of our product is to provide users with an efficient, equitable, and elegant redistricting system.

Redistricting has always been a controversial issue in the United States. Depending on the state, either the state legislature or an independent body is responsible for redrawing the district lines within the state once every few years or so. These bodies must account for several factors when redistricting like evenly dividing the population of the state into districts and controlling public school attendance.

Unfortunately, state legislatures will often times gerrymander when they perform redistricting. Gerrymandering occurs when district boundaries are drawn in a particular manner to give a certain political party an advantage. In many states, state legislatures are controlled by only one party, so this allows them to gerrymander in such a way as to make sure certain districts encompass certain voter demographics in certain regions.

Moreover, we would like our final product to be immune from these above-mentioned issues.

Section 1.4: Product Scope

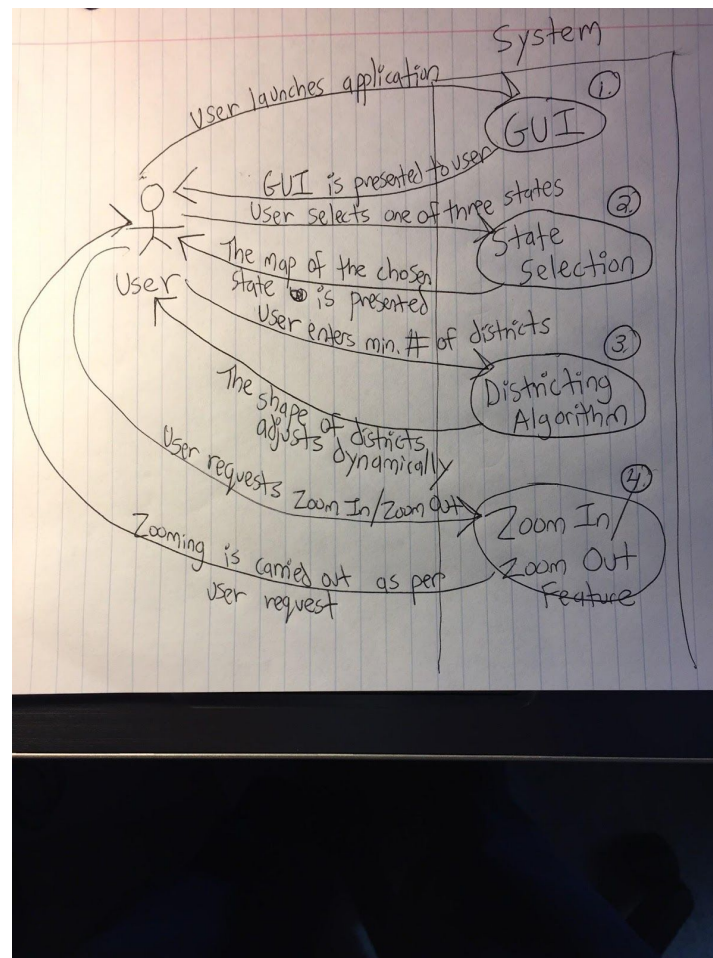


Figure 1

As depicted in the combination top-level use case/context diagram above, there will only be a single person or entity interacting with the system as a user. The diagram shows eight use cases as interactions between the user and the system. Each pair of use cases revolves around one of four different features within the system. These features are ordered chronologically based on the step of the procedure during system usage. The homepage GUI will first be presented to the user. The user will then be required to select one of three states: Maryland, Wyoming, or North Carolina. Upon selection of the state, the map of the state will be presented to the user in a viewable format, with the default districts drawn. Next, the user will be required to select the number of districts to be drawn within the state using a dropdown menu. The system will utilize its algorithm to perform the redistricting, and the map of the state must dynamically change to account for the number of districts. Finally, the user can zoom in or out from the current

view of the map using a slider. The system must adjust the map of the state accordingly.

Section 2: Functional Requirements

Number	1	
Name	Select districts	
Summary	The customer can select the number of districts for each state. The map should display population data for each district.	
Priority	4	
Preconditions	Number of districts by default.	
Postconditions	Number of districts adjusted by customer.	
Primary Actor	Customer	
Secondary Actors	Qt Software	
Trigger	Text Box	
Main Scenario	Step	Action
	1	Customer selects the text box
	2	Customer enters the desired number of districts
	3	Map displays number of districts
Extensions	Step	Branching Action
	1a	None

Open Issues	N/A
--------------------	------------

Number	2	
Name	Select State	
Summary	The customer selects a state; either Maryland, Wyoming or North Carolina. An image of the state will be displayed.	
Priority	3	
Preconditions	Images are loaded on GitHub. Maryland is the default map	
Postconditions	Customer selects state and will display image	
Primary Actor	Customer	
Secondary Actors	Qt Software	
Trigger	Dropdown Menu	
Main Scenario	Step	Action
	1	Customer hit dropdown menu
	2	Customer select state
	3	Image of selected state is displayed
Extensions	Step	Branching Action
	1a	None
Open Issues	Connecting the dropdown menu to displaying the image	

Number	3	
Name	Zoom in and out	
Summary	The customer will be able to zoom in and out of the map.	
Priority	2	
Preconditions	Map size will be set to default	
Postconditions	Map size will be adjusted by customer	
Primary Actor	Customer	
Secondary Actors	Qt Software	
Trigger	Buttons	
Main Scenario	Step	Action
	1	Customer selects a button
	2	Map will increment or decrement in size
	3	
Extensions	Step	Branching Action
	1a	None
Open Issues	N/A	

Number	4	
Name	Launching the application	
Summary	The customer will launch the application to run the program.	
Priority	2	
Preconditions	Open Source Software and files on GitHub	
Postconditions	Able to run files on software	
Primary Actor	Customer	
Secondary Actors	Qt Software	
Trigger	Launching application	
Main Scenario	Step	Action
	1	Customer must download Qt software
	2	Customer must download files from GitHub
	3	Customer can launch application
Extensions	Step	Branching Action
	1a	None
Open Issues	N/A	

Section 3: Non-Functional Requirements

- [NFR.1] The system shall include reliable maps of Maryland, North Carolina, and Wyoming (Priority Level: 5)
 - [NFR.1.1] The system should be geographically correct
 - [NFR.1.1.1] The system should not have districts crossing one another
 - [NFR.1.2] The system shall not be graph based
 - Test Case: We will compare our maps of these states to official maps to make sure that they are geographically accurate
- [NFR.2] The redistricting algorithm shall be based on the state's population (Priority Level: 5)
 - [NFR.2.1] The system's districts should have roughly the same number of people
 - Test Case: The population total of all districts should be equivalent to the actual state population
- [NFR.3] The system's algorithm shall be dynamic (Priority Level: 3)
 - [NFR.3.1] The system shall work for any state, not just Maryland
 - [NFR.3.2] The system shall be in real time
 - Test Case: The algorithm should work properly for Maryland, North Carolina, and Wyoming. The algorithm should not buffer for more than 2 minutes after the number of districts is entered.
- [NFR.4] The system shall show the different districts (Priority Level: 3)
 - [NFR.4.1] The system should show the population for each district
 - [NFR.4.2] The system should show districts before and after non-gerrymandering algorithm
 - Test Case: Each district should be labeled by number and with its population. The total population of the state is labeled. The district boundaries are lucid.
- [NFR.5] The system shall have map features (Priority Level: 3)
 - [NFR.5.1] The system shall have choose number of districts
 - [NFR.5.2] The system should have a default state (e.g. Maryland)
 - [NFR.5.2.1] The system should have a drop down to choose different states
 - [NFR.5.3] The system should have a zoom in/out feature
 - Test Case: The zoom in/zoom out feature allows for at least five different levels of viewing the state. The drop-down menu to choose the number of states works effectively.

Section 4: User Interface

See “User Interface Design Document for Non-Gerrymandering Software.”

Section 5: Deliverables

An electronic file containing the following:

- Systems Requirement Specification
- System Design Document
- User Interface Design Document
- All source code via Git
- Any other software required for installation and execution of the delivered program

Section 6: Open Issues

There are currently no open issues.

Appendix A – Agreement Between Customer and Contractor

Client Agreement

Shawn Squire
1000 Hilltop Circle
Baltimore, MD 21250

The following represents an agreement between **Diamond Districting** (hereinafter referred to as “we”, “us”, or “Diamond Districting”) and **Shawn Squire** (hereinafter referred to as “you” or “Client”). The details of this agreement are as follows:

Professional Services. The Client hereby contracts with Diamond Districting to perform a visualization of non-gerrymandered states.

Description of Services. The following services will be provided:

- Files containing all source code to Un-Gerrymandered Software

Other Terms/Customer Comments

_None_____

Terms and Conditions

Limited Liability. We shall not be liable for any delay due to circumstances beyond our control to provide services, including acts of God, war, government regulations, disaster, or civil disorder.

Amendments. Any changes or modifications must be specifically placed in writing, attached, dated, signed, and approved by both parties.

Cancellation. Cancellation of services should be provided to **Diamond Districting** in writing to amend the current client agreement. In the event that the client cancels the contracted services outlined in this contract, the initial payment will be forfeited.

I have read and understand the terms of the entire agreement. I hereby agree to the terms of this agreement. We both agree to make the attached Terms and Conditions as part of this Agreement.

Client

Shawn Squire: _Shawn Squire_____ **Date** _10/19/17__

Diamond Districting (Team)

Corey Atkins: _____ Corey Atkins_____ **Date** _10/19/17__

Matthew Hancher: ____Matthew Hancher_____ **Date** _10/19/17__

Nahum Meherete: _____ Nahum Meherete_____ **Date** _10/19/2017__

Joey Napolitano: _____ Joey Napolitano_____ **Date** _10/19/17__

Nirav Shah: _Nirav Shah_____ **Date** __10/19/17_____

Eric Yoo: ____Eric Yoo_____ **Date** _10/19/17__

Appendix B – Team Review Sign-off

All members of Diamond Districting have reviewed the document and agree on its content and format.

Corey Atkins: _____ Corey Atkins _____ **Date** __10/19/17__

Matthew Hancher: _____ Matthew Hancher _____ **Date** __10/19/17__

Nahum Meherete: _____ Nahum Meherete _____ **Date** __10/19/2017__

Joey Napolitano: __Joey Napolitano _____ **Date** __10/19/17__

Nirav Shah: _____ Nirav Shah _____ **Date** __10/19/17__

Eric Yoo: __Eric Yoo _____ **Date** __10/19/17__

Comments:

__None _____

Appendix C – Document Contributions

Corey Atkins - Requirements documentation
Hancher, Matthew - Scope
Meherete, Nahum - Traceability Requirements
Napolitano, Joey - Notes
Shah, Nirav - Referenced documents
Yoo, Eric - Qualification Provisions