City of Aaron Game

Requirements Document

You should all use this document as the basis for designing and developing your game program. In my experience, there are always a few students who get in trouble because they forget that they have a set of requirements that their programs have to meet. So, my suggestion is that you print this document out and keep it handy so that you can reference it each week as you work on your assignments.

Game Overview

In this game the player will assume the role of the ruler over the city Of Aaron. The city of Aaron is mentioned briefly in Alma 8:13 in the Book of Mormon.

> *Now when the people had said this, and withstood all his words, and reviled him, and spit upon him, and caused that he should be cast out of their city, he departed thence and took his journey towards the city which was called Aaron.*

The player of the game will assume the role of the leader over the city of Aaron. Wheat is the staff of life, and is used as the main currency in the city. As ruler over the city, the player's task is to manage the village's wheat crops so that the people of the village can be adequately fed, while dealing with rats, and random crop yields. The city is blessed when the people pay their tithes and offerings. After serving for 10 years, the player will be judged by the people. If too many people die during the player's term of office, the player is removed from office and the game ends.

The game is loosely based on the famous RPG text game of Hammurabi. You should try playing the original Hamurabi game to get a feel for how the game works. You can find the game at this website: https://classicreload.com/hamurabi.html. If you Google Hammurabi you can find several other sites that discuss the game and allow you to play it.

Play of the game

1. The player will serve for a term of 10 years.

2. At the beginning of the game a report is displayed showing the following information:

    A. The year number (1)

    B. How many people starved (0)

C. How many people came to the city (5)

D. The current population (100)

E. The number of acres of crop land owned by the city (1000)

F. The number of bushels per acre in this years harvest (3)

G. The total number of bushels of wheat harvested (3000)

H. The number of bushels paid in tithes and offerings (300)

I. The number of bushels of wheat eaten by rats (0)

J. The number of bushels of wheat in store (2700)

3. Each year the player will be offered options to do the following - in this order:

A. Buy some land.

B. Sell some land.

C. Determine how much wheat to set aside to feed the city.

D. Determine how many acres of land are to be planted with wheat.

E. Determine what percentage of the harvest should be paid in tithes and offerings.

4. The game then calculates the following (in this order):

A. The number of bushels of wheat that are harvested.

B. The number of bushels of wheat paid in offerings.

C. The total number of bushels of wheat in store after adding the harvest and subtracting the wheat paid in offerings.

D. The number of bushels of wheat in store eaten by rats. This value is subtracted from the wheat in store.

E. The number of people that starve because they don't have enough wheat.

F. The number of people that move into the city.

5. At the beginning of each subsequent year, a report identical to the report shown at the beginning of the game is displayed.

6. If too many people have starved, the player is removed from office and the game ends.

7. At the end of 10 years, the player's performance is evaluated and displayed.

User Stories

The requirements for your game are presented as a set of user stories. A user story describes something that happens in the game as a result of the user taking some action. You should use these user stores as your guide as you design and develop the code for your game.

Common to every menu

All menu options are presented with either a number or a letter that will be entered by the user to invoke each option. When the user enters an invalid choice, an error message is displayed and the menu is displayed again.

Program Start

When your program starts, it displays a banner page and then displays the [Main Menu](#).

The following text is just an example of a banner page. Be creative and develop your own version.

Welcome to the city of Aaron. You have been summoned here by the High Priest to assume your role as ruler of the city. Your responsibility is to buy and sell land, determine how much wheat to plant each year and how much to set aside to feed your people. In addition, it will be your job to pay an annual tithe on the wheat that is harvested. If you fail to provide enough wheat for the people, people will starve, some people will die, and your workforce will be diminished. Plan carefully. And Oh, there is always a danger of rats eating your wheat.

Main Menu

The options on the main menu are:

- [Start a New Game](#)

- [Load a Saved Game](#)

- [Help](#)

- Quit

The end user (player) enters their selection. The program then takes the appropriate action. If an invalid menu item is entered, the computer displays an error message and redisplays the main menu. The program terminates when Quit is selected.

Start A New Game

The program prompts the user to enter their name. The name entered by the user is stored in the game and all other objects required to start the game are initialized. The program then displays the [Game Menu](#).

Load a Saved Game

The program prompts the user for the name of the file containing the saved game. The program will then attempt to open the file and read the game objects from disk. If successful, the program displays the [Game Menu](#). If the game could not be loaded, the program displays an error message and then returns to the [Main Menu](#).

Help Menu

The options on the help menu are:

- What are the goals of the game?

- Where is the city of Aaron?

- How do I view the map?

- How do I move to another location?

- How do I display a list of animals, provisions and tools in the city storehouse?

- Back to the Main Menu.

The user selects one of the options and the appropriate help message is displayed. Then the Help menu is re-displayed allowing the user to make another choice. When the user selects the option to return to the Main Menu, the [Main Menu](#) is re-displayed.

Game Menu

The game menu controls play of the game. The options on the Game Menu are as follows.

- [View the map](#)

- [Move to a new location](#)

- [Manage the Crops](#)

- [Live the Year](#)

- [Reports Menu](#)

• [Save Game](#)

  • Return to the [Main Menu](#)

Each time the Game Menu is displayed, the program displays the [current annual report](#). In any year, if more than 50% of the population starves, the game is over. Display an appropriate message and terminate the game.

When the final year has been lived, the program calculates and displays the [user's final rating](#) based on the resources accumulated, then the program returns to the [Main Menu](#).

View the Map

The program displays the map and immediately returns to the [Game Menu](#).

The map will contain a 2-dimensional array of locations. Your map should be at least 5 rows by 5 columns, but it may be larger if you want. Each location has a name, a description of what the player can see at this location, a symbol that will be used to represent this location when the map is displayed, and a list of game tips that are displayed to the user when they select the location.

The following list includes some of the things you could choose to include in your map. This is a place where you can use some of your own creativity. In addition to displaying a description of what the user can see at each location, you could provide some hints to win the game.

  • The Ruler's Court

  • The City's Granary and Storehouse

  • Wheat Field

  • Undeveloped Land

  • The village

  • A River

  • The border of the Lamanites land

  • The Temple

As an example, if the player goes to one of the wheat fields, the description you display might be something like this: "*You are standing in one of the city's wheat fields. There is nothing but wheat as far as the eye can see. We hope to have a bountiful harvest this year. It takes 20 bushels of wheat to feed one person.*"

The map can contain multiple locations of the same type. For example, multiple villages (with unique names) can be displayed on the map. Any cell in the map grid that does not have a specific purpose can be labeled as Undeveloped Land.

Reports Menu

The Reports menu consists of the following options.

- View the animals in the storehouse

- View the tools in the storehouse

- View the provisions in the storehouse

- View the authors of this game

These are lists of simple objects. They do not currently contribute to the game, but are intended to meet the course requirements for creating classes, objects, lists, and saving them to a file.

The user chooses the report view and the program displays the selected report. After displaying the report to the screen, the program asks the user if they want to save the report to a file. If the user answers Yes, the program prompts the user for the name of the file to save the report, then saves the report in the file. If the user answers No, the program returns to the Reports Menu.

If the report cannot be saved to the file, the program displays and error message and returns to the Reports Menu.

Move to a new location

The user will be prompted to enter the coordinates of the location on the map that they want to move to. Upon arriving at the new location, the program will display the name of the location and the description of what can be seen at this location. If there are any game tips associated with the location, one of the tips is chosen at random and displayed.

Live the Year

The software performs the following non-interactive calculations to advance the game one year (in the order listed). The game state is updated to reflect the new amounts of land, wheat and people.

1. The number of bushels of wheat that are harvested.

2. The number of bushels of wheat paid in offerings.

3. The total number of bushels of wheat in store after adding the harvest and subtracting the wheat paid in offerings.

4. The number of bushels of wheat in store eaten by rats. This value is subtracted from the wheat in store.

5. The number of people that starve because they don't have enough wheat.

6. The number of people that move into the city.

The program returns to the Game Menu, displaying the annual report containing the results for the year.

Manage the Crops

The Crop Management menu contains the following options.

• Buy Land

• Sell Land

• Feed the People

• Plant Crops

• Pay Tithes and Offerings

• Return to the Game Menu

The program will perform the actions described by each user story that corresponds to the menu options. When the user chooses to return to the Game Menu, the program returns to the Game Menu.

Buy Land

1. Generate a random number between 17 and 27 for the price of an acre of land. Display the price to the user.

2. Ask the user "How many acres of new land do you want buy"?

3. The user enters a value

4. Check to make sure the value is positive. If not, show a message and ask the user to enter the value again.

5. Make sure that the player has enough wheat to make the purchase. If not, show a message and ask the user to enter the value again

6. Make sure that the city has enough people to tend the land. One person can take care of 10 acres. If there are not enough people, show a message and ask the user to enter a different value.

7. Add the number of acres purchased to the acres owned

8. Subtract the wheat used to purchase the land from the wheat in storage

Sell Land

1. Generate a random number between 17 and 27 for the price of an acre of land. Display the price to the user.

2. Ask the user "How many acres of land do you want sell"?

3. User enters a value

4. Make sure the value is positive. If it is not, show a message and ask the user to enter the value again.

5. Make sure that the player has this much land to sell. If not, show a message and ask the player to enter the value again.

6. Subtract the number of acres sold from the acres owned

7. Add the wheat from the sale to the wheat in storage

Feed the People

1. Ask the user "How many bushels of grain do you want to give to the people?"

2. User enters a value.

3. Check to make sure that the value is positive. If it is not, show a message and ask the user to enter the value again.

4. Make sure that the city has this much wheat in storage. If not, show a message and ask the user to enter the value again.

5. Subtract this amount from the wheat in storage. Display the amount of wheat you have left.

6. Update the game state to save how many bushels of wheat you have set aside to feed the people.

Plant the Crops

1. Ask the user "How many acres of land do you want to plant?"

2. User enters a value.

3. Check to make sure that the value is positive. If it is not, show a message and ask the user to enter the value again.

4. Check to make sure the city has this much land. If not, show a message and ask the user to enter a new value.

5. Make sure that the city has enough wheat in storage to plant this many acres (You can plant 2 acres with one bushel of wheat). If not, show a message and ask the user to enter the value again.

6. Calculate the number of bushels required to plant the crops.

7. Subtract this amount from the wheat in storage. Display the amount of wheat you have left.

8. Update game state to save how many acres have been planted.

Pay Tithes and Offerings

1. Ask the user what percentage of their harvest they want to pay in tithes and offerings.

2. Get the user's input.

3. Check to make sure that the value entered by the user is positive. If it is not, show a message and ask the user to enter a new value.

4. Check to make sure that the value entered by the user is not greater than 100. If it is, display a message and ask the user to enter a new value.

5. Save the value entered by the user.

Harvest Crops

1. Calculate the crop yield according to the following table:

Tithes and Offerings	Crop Yield
8-12 % inclusive	A random value between 2 and 4 bushels per acre
Below 8 %	A random value between 1 and 3 bushels per acre
Above 12%	A random value between 2 and 5 bushels per acre

2. Using the crop yield, calculate the number of bushels of wheat harvested.

3. Save the this amount.

Calculate the Amount of Wheat Eaten by Rats

1. Generate a random number between 1 and 100.

2. If the value is less than 30, then some of the wheat in store will be eaten by rats. Calculate the number of bushels of wheat eaten by the rats according to the following table:

Tithes and Offerings	Bushels of Wheat Eaten by Rats
8-12 % inclusive	A random value between 3% and 7% of the wheat in store
Below 8 %	A random value between 6% and 10% of the wheat in store
Above 12%	A random value between 3% and 5% of the wheat in store

3. Subtract the wheat eaten by rats from the amount of wheat in store.

4. Save the updated amount of wheat in store.

Grow the population

1. Determine how much to grow the population (a random number between 1% and 5%).

2. Calculate the number of people who moved into the city.

3. Save this value.

4. Add this number to the current population

5. Save the updated value of the current population.

Population Mortality (How many died?)

1. Calculate how many people were adequately fed during the year. It takes 20 bushels of wheat to feed each person, so the amount of wheat set aside for food divided by 20 will give you the number of people adequately fed.

2. If the number of people who were adequately fed is less than the current population, subtract this number from the population of the city. This is the number of people who died of starvation. Save the number of people who died of starvation.

3. Subtract the number of people who died from the current population. Save this updated value for the current population.

Display the Current Annual Report

The Current annual report provides the following information to the user.

- The year number

- How many people starved

- How many people came to the city

- The current population

- The number of acres of crop land owned by the city

- The number of bushels per acre in this year's harvest

- The number of bushels of wheat paid in offerings

- The number of bushels of wheat eaten by rats

- The number of bushels of wheat in store

Save Game

The program prompts the user for the name of the file where the game should be saved. The game state is saved to the file. The program displays a "Success" message if the game was successfully saved to the file, or an error message if there was an error. The program then returns to the Game Menu.

Calculate the Final User Rating

You may create any rating system you want, based on the data stored in the game.