

Project 1 Submission

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1. Feature Description or Big-O Analysis

Primary features include

- Config file will read in from the existing file structure provided it exists
- Elsewise uses the natively available windows file explorer to select config file.
- Outputs a “snapshot” of whatever the current simulated city looks like
- Saves all simulation data to a predefined folder in the file structure as excel spreadsheets and plaintext files for later access by user

2. Change Log or Performance Analysis

No changes made at this time [9/7/2025]

3. Citations

N/A

(continued below)

Included Diagram(s):

Explanation:

1) Run the Program

- a. This is the beginning step of the program's execution
- b. The user will begin running the program to simulate the growth of population in a region over a certain period of time

2) Prompt user to select configuration file

- a. The program will prompt the user to select the file for configuration
- b. This file will contain information about the setup of the region space including the initial population zones, power lines, roads, and pollution (none at start)

3) Selecting configuration file

- a. User will input the desired file for configuration

4) Read in Data

- a. Program will read in the desired file name for accessing

5) Locate region file

- a. Program will search the computer for the files location

6) Read in and store data

- a. Program will read in and store the data from the file chosen by the user
- b. This data will be stored in different classes that will have its own unique set of rules and boundaries on growth and distribution of workers and goods

7) Process initial region data

- a. Program will check stored file data for errors or inconsistencies that will not allow the region to be populated correctly

8) Output post-processed initial region data

- a. Program will output the initial region data (time step 0): locations of residential, commercial, and industrial zones; power lines, roads, and pollution (none at start)

9) Display current stats

- a. Program will output the initial stats of the region: current population, pollution, available workers, available goods, etc

10) Compare old vs new region

- a. This will only occur after one time step has occurred
- b. Program will compare the stats and locations of the zones in the region from time step 0 to time step 1

11) Keep going

- a. If program is on time step 0 then jump to step 12
- b. Program will decide whether to continue to run or to stop
- c. This will be decided by the current time step or if there is no difference in the regions between the last time step and the previous one
- d. If program keeps going, move to step 12
- e. If program is stopped move to step 14

12)If program continues

- a. Next time step will occur
- b. Program will run through logic statements of each zone to populate and distribute workers/goods appropriately
- c. Run residential zone logic
 - i. Populate / expand residential zones

13)Run commercial zone logic

- a. Populate / expand commercial zones

14)Run industrial zone logic

- a. Populate / expand industrial zones

15)Process new region data

- a. Repeat steps 8-11

16)If program is stopped

- a. Program will analyze the region data

17)display final stats and zone information**18)Program will save simulation data****19)Return location of save simulation****20)End program****How it Supports the Project Goals:**

We believe that this is a very achievable code structure, each main component can be developed independently at separate times to allow continued development. This fragmented design also allows for testing to occur on regular intervals to hopefully avoid integration issues

Wiki-Level Description

SimCity is a simple program created in C++, the purpose of which is to simulate a miniature city based off of an initial data set and some configurable settings. The program reads in data provided by the user to calibrate and create a city for a simulation that would execute for as long as the user specifies. Upon completion the user is given a simple picture of the post-simulation city, as well as additional stat figures like population, and pollution. All this data and snapshots of the simulation are saved in a file which can be accessed via the file explorer for the user to use.

Approval Requirement

This document details the potential structure for the SimCity Project, if approved we will begin development on the program where development of features will be done in the order they are numbered in our UML Diagram. If there are any issues with the current development plan we hope to hear back as soon as possible to realign the scope with the project expectations