

# Term Project

## Project Description:

Name: Water Simulation

Description: A simulation with adjustable terrain to simulate how streams and lakes form according to the built terrain.

## Competitive Analysis:

Similar Project: Sandbox Map Creator (15-112 S21 Term Project) by Emily Guo

The term project of Water Simulation is inspired by the similar project as how it builds up the terrain. Compared to the Sandbox Map Creator, the term project is more of a terrain builder, the terrain is only a factor for the water formation. Apart from the terrain adjustable feature, the user can set the water source point and then the streams and lakes will form according to the terrain, which is a very useful analytic tool for geology or ecology analysis.

## Structural Plan:

def appStarted  
makeAxonBoard  
findStreamPath  
formLake

## Algorithmic Plan:

2dList  
1dList  
Dictionary  
Set  
Recursion

## Timeline Plan:

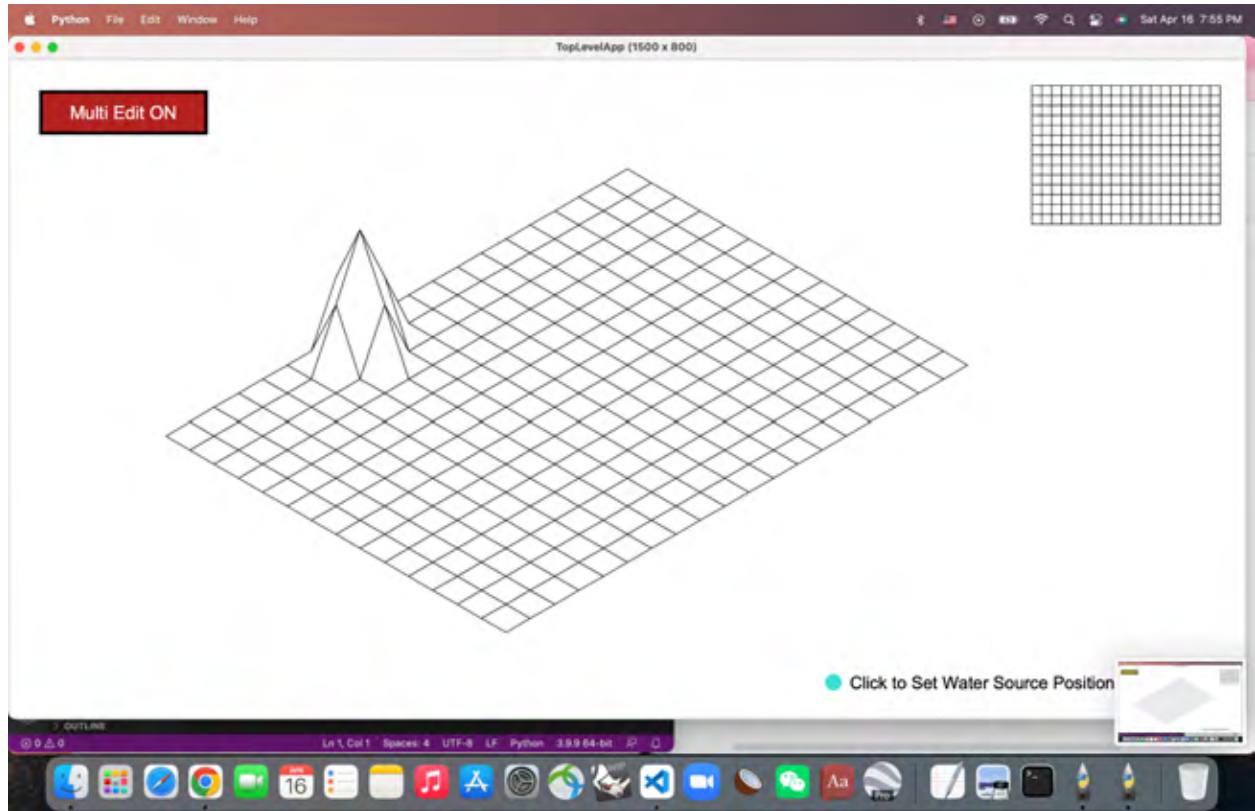
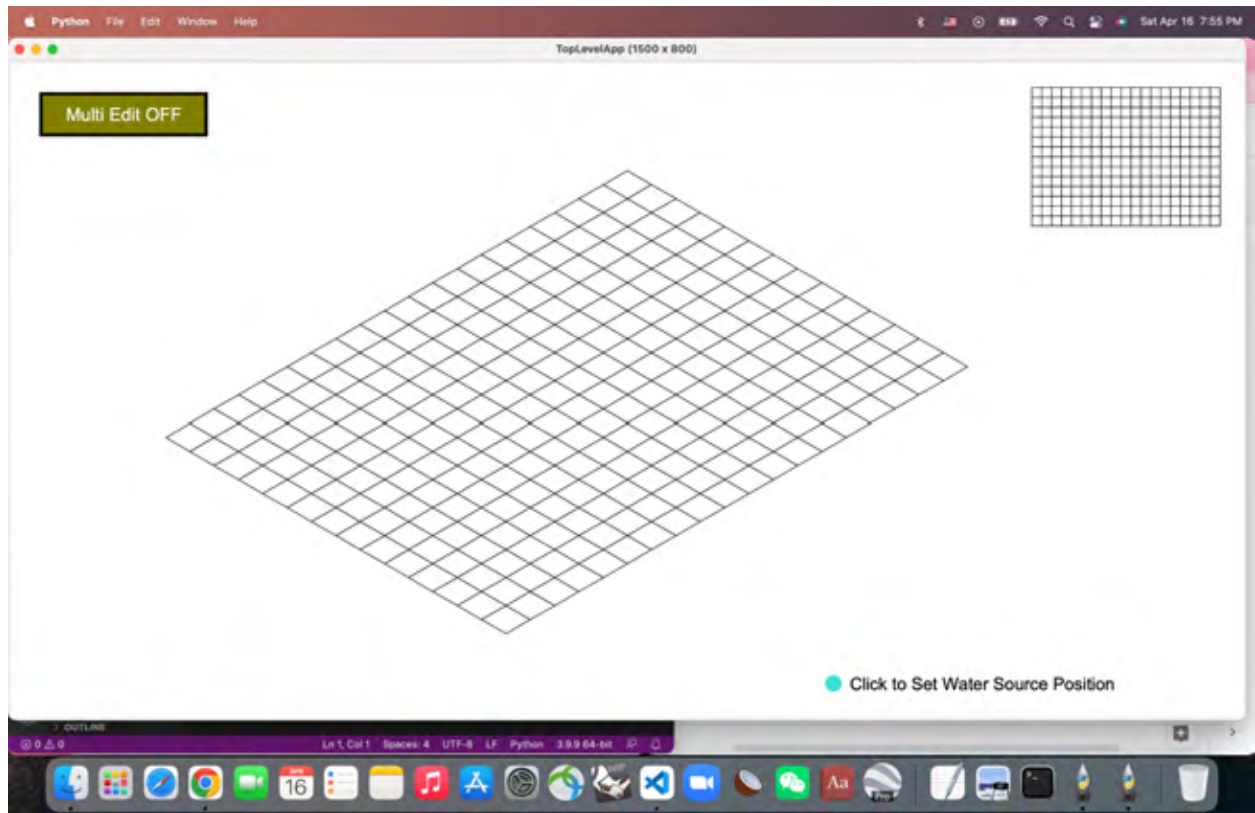
4.20 finish the basic coding  
4.25 MVP

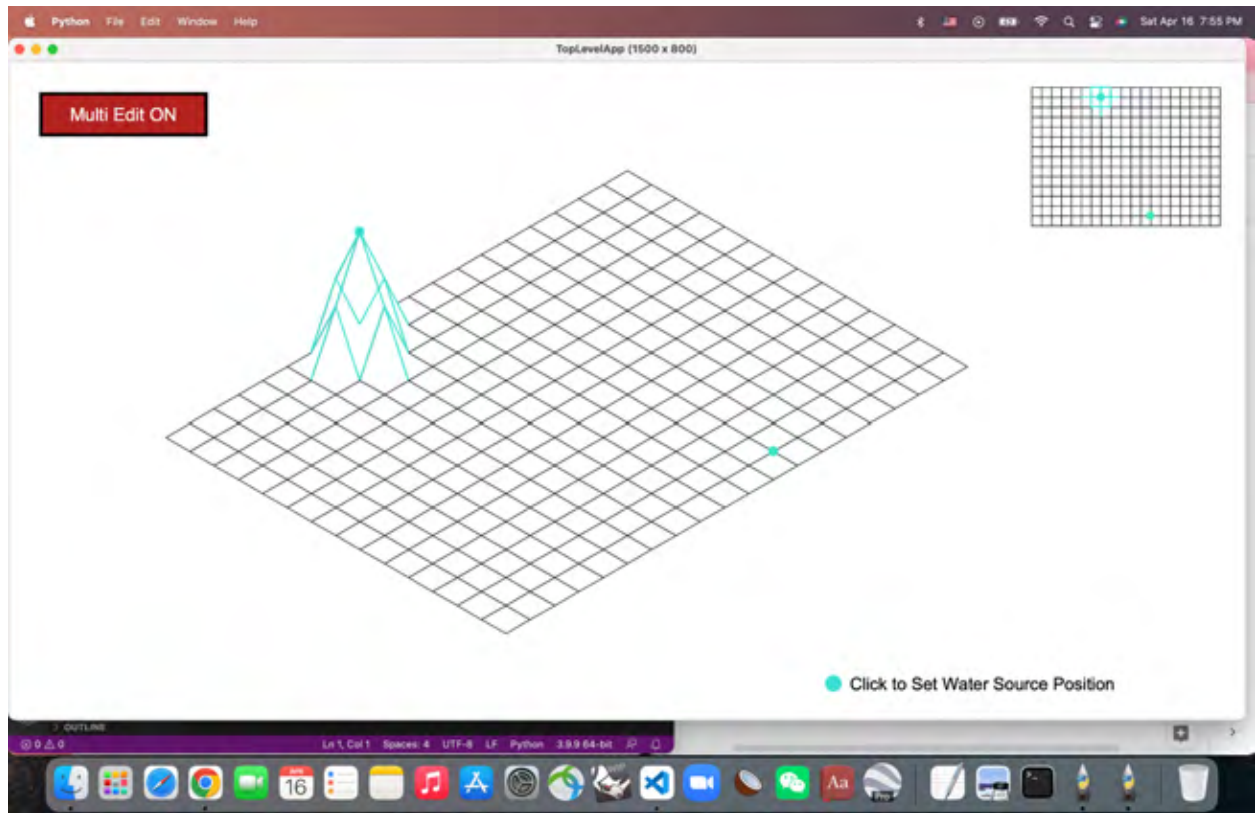
## Version Control Plan:

ctrl+s

## Module List : None

## Storyboard:





## TP2 Updates

### Project Description:

Name: Water Simulation

Description: A simulation with adjustable terrain to simulate how streams and lakes form according to the built terrain and rain intensity.

### Structural Plan:

1. Rotatable isometric view and referred top view of terrain
2. Set random terrain by Perlin Noise
3. Draggable terrain edit
4. Classify the geology of terrain by elevation
5. Set water source and form stream path
6. Stream animation by flowing water particles - changeable by rain intensity
7. Lake fill - changeable by water source and rain intensity
8. Set rain intensity

### Algorithmic Plan:

1dList

2dList

Tuple

Dictionary

Set

Recursion

Tkinter Graphics and Animation

DFS lakeFill

### Timeline Plan:

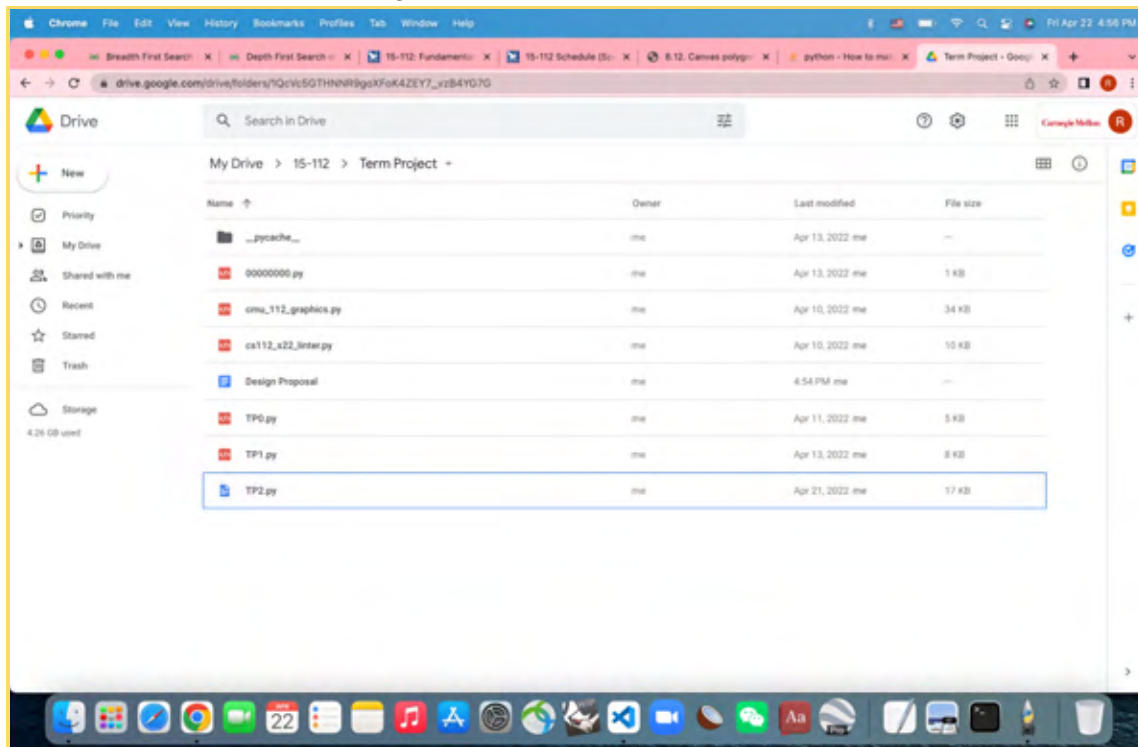
4.25 Basic Coding

4.26 Demo Recording

4.27 TP3 Submission

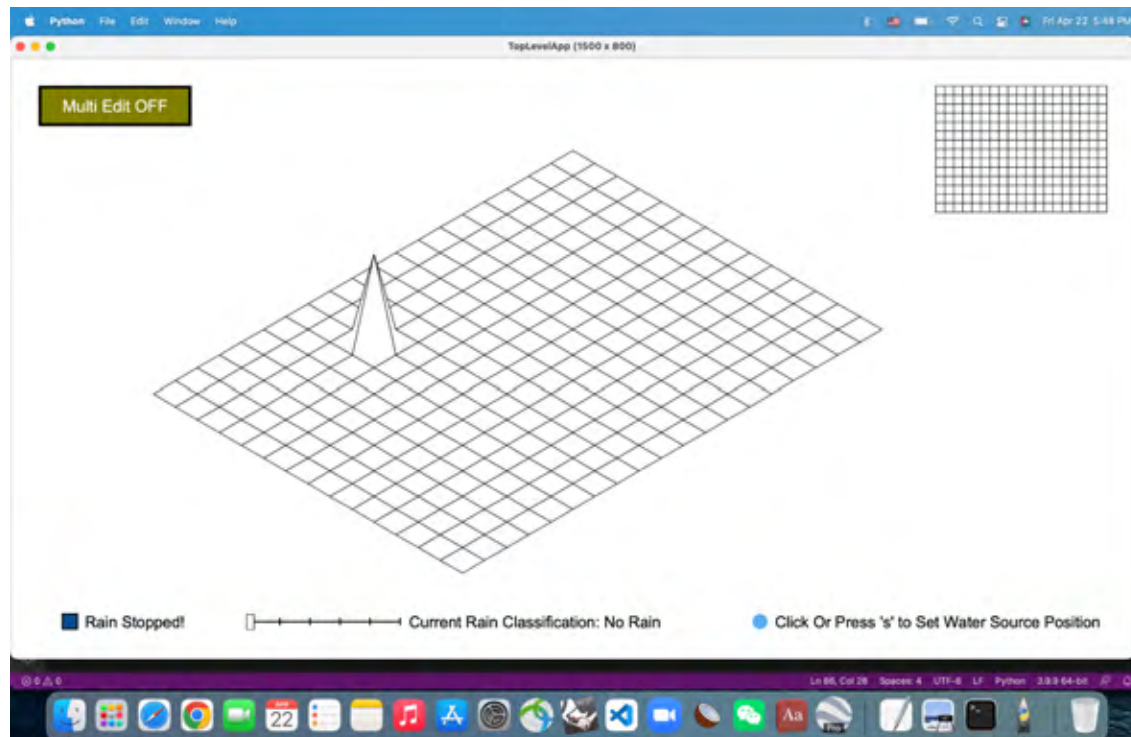
## Version Control Plan:

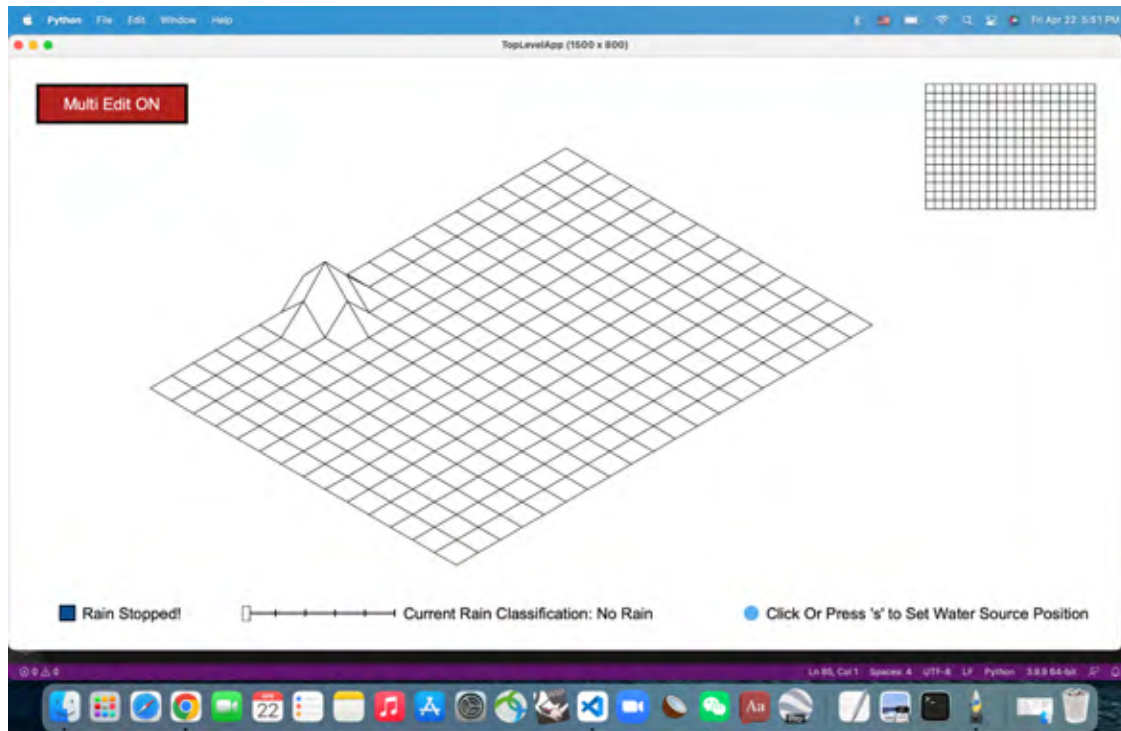
Save and Updated in the Google Drive



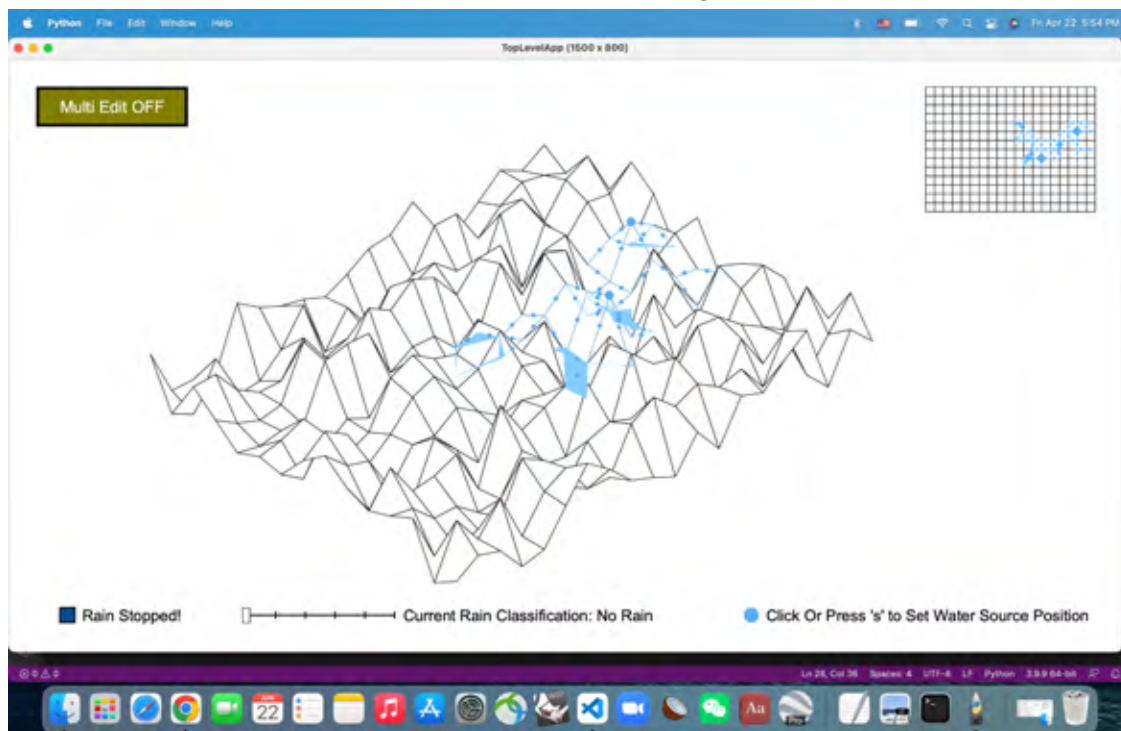
## Storyboard:

1. Terrain Edit - Multi Edit / Single Edit



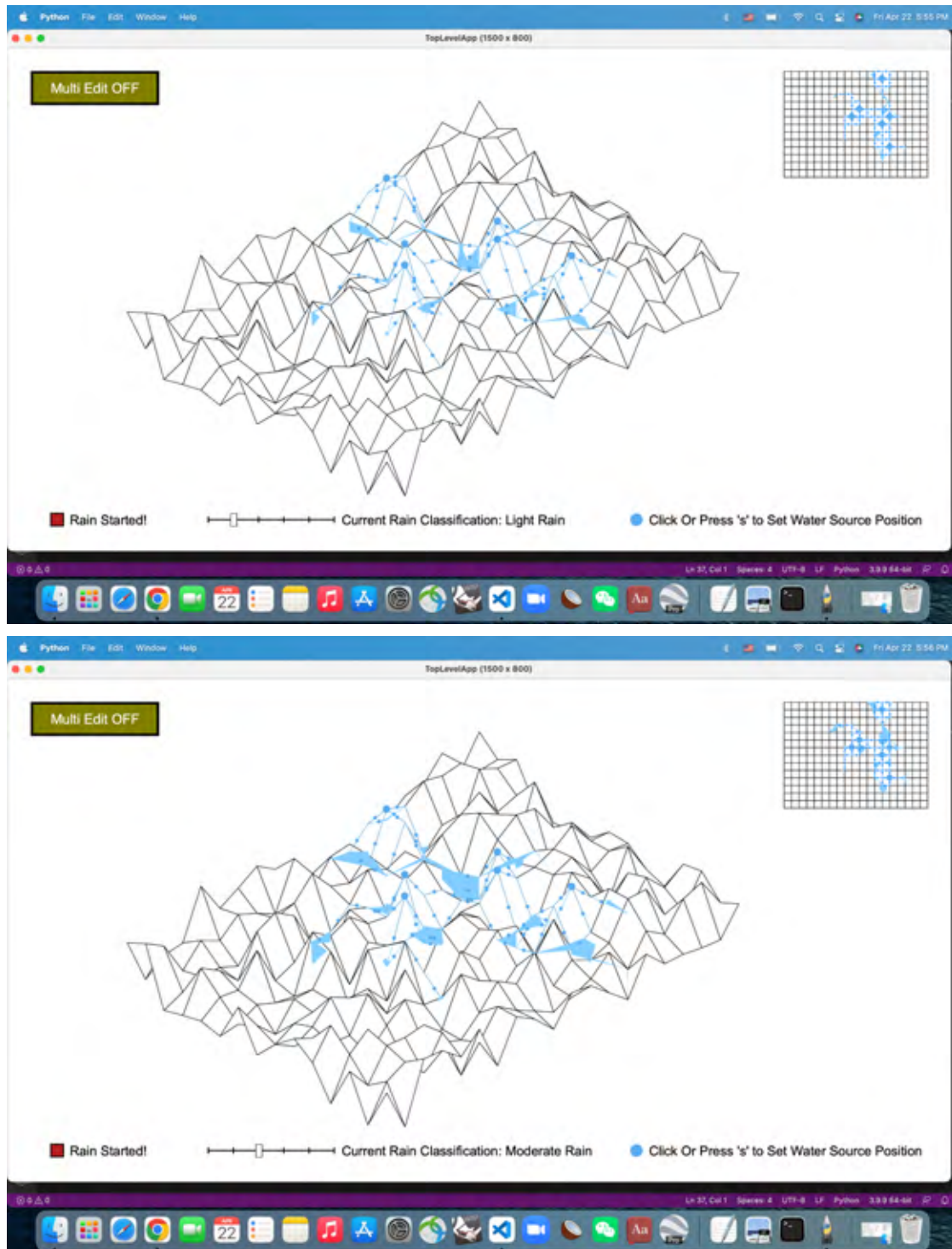


2. Set Water Source → Form the Stream, Flowing Water Particle and Lake





3. Switch to Rain and Set Rain Intensity → Change the Water Particle Flowing Velocity and the existent Lake Scale



## TP3 Updates

### Project Description:

Name: Water Simulation with Customized Terrain

Description: A water feature simulation with customized terrain to simulate how streams, lakes and floodings form according to the built terrain and adjustable rain incidents.

### Structural Plan:

1. Rotatable isometric view and referred top view of terrain
2. Set random terrain by Perlin Noise
3. Draggable terrain edit
4. Classify the terrain by elevations
5. Set water source and form stream path
6. Stream animation by flowing water particles - changeable by rain intensity
7. Lake fill - changeable by water source and rain intensity
8. Set rain intensity
9. Calculate the interval for different rain level and flooded area ratio
10. Add icons for a better interface
11. Add instructions

### Algorithmic Plan:

Loop

1dList

2dList

Tuple

Dictionary

Set

Recursion

Tkinter Graphics and Animation

DFS lakeFill

OOP

Perlin Noise

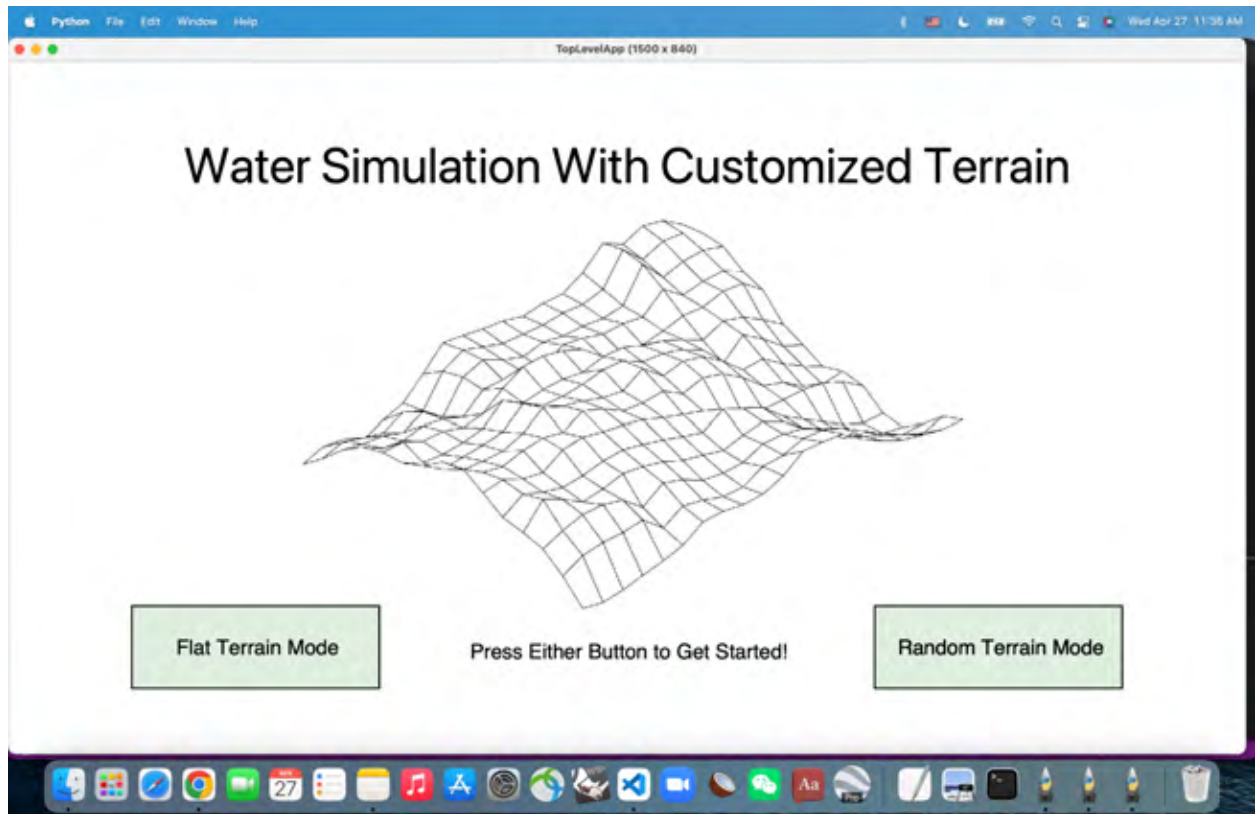
### 04.26 User-Study-a-Thon Feedback:

1. Add instructions for people to know how to operate it
2. Add terrain classification to distinguish the different elevations
3. Enrich the interface

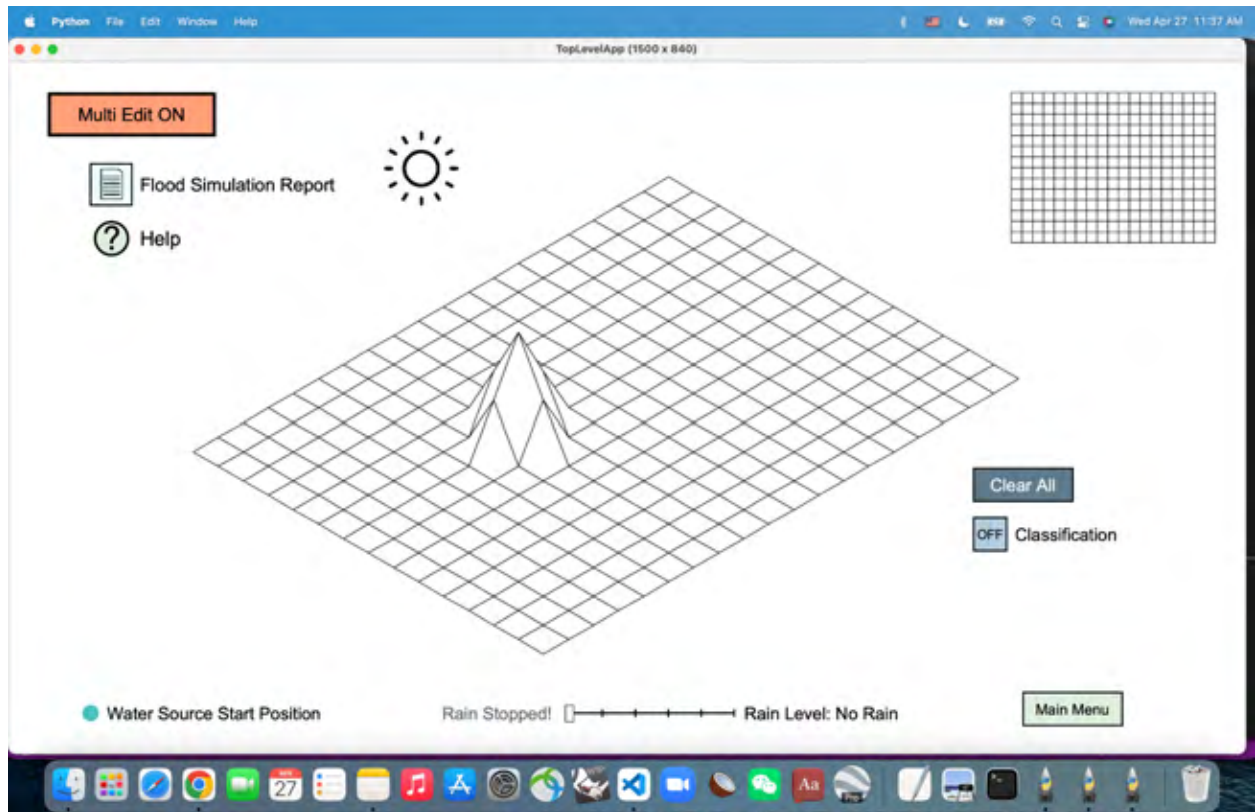
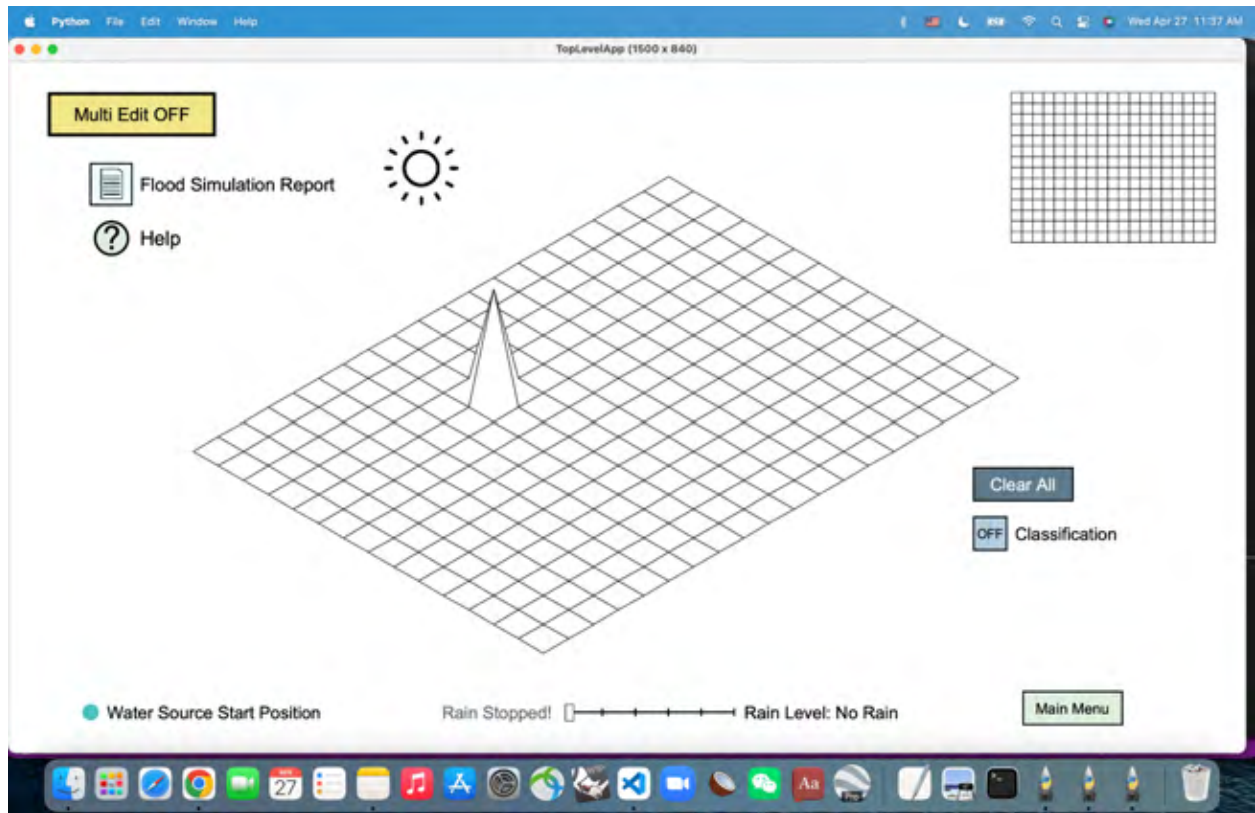


## Storyboard:

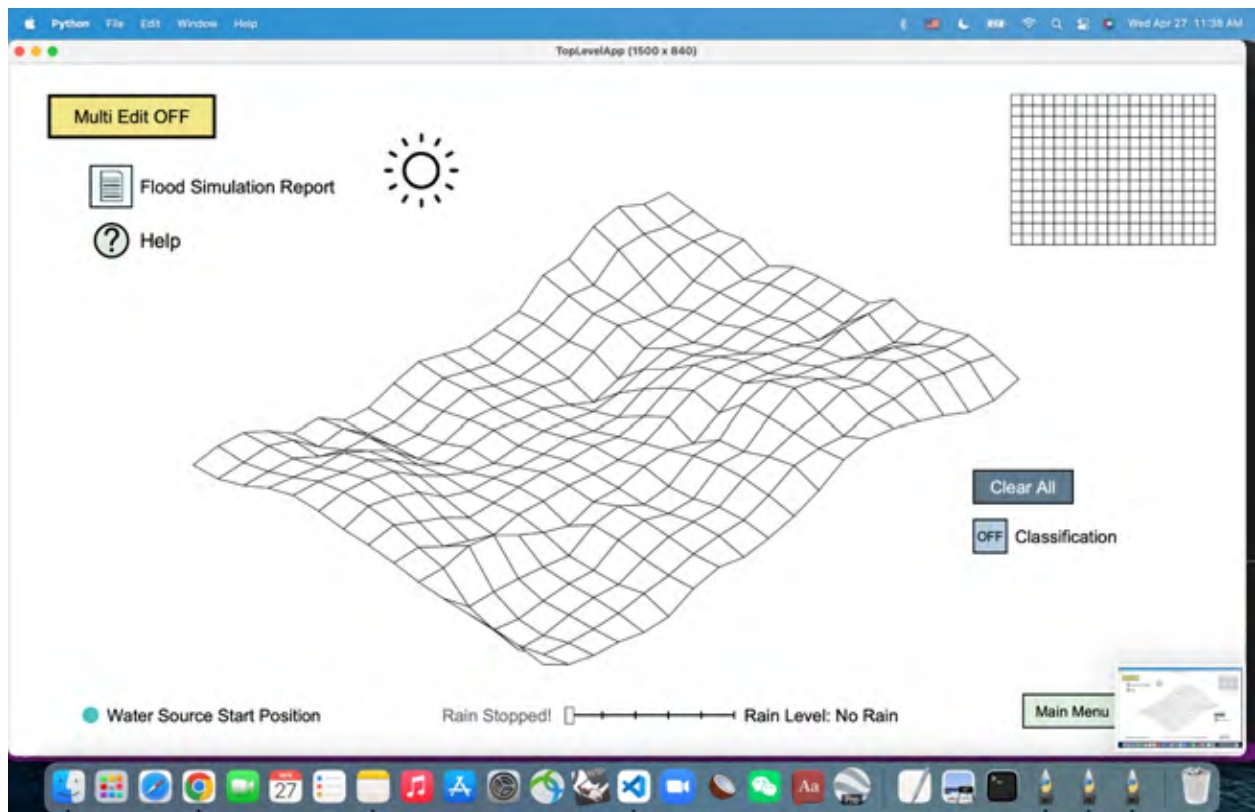
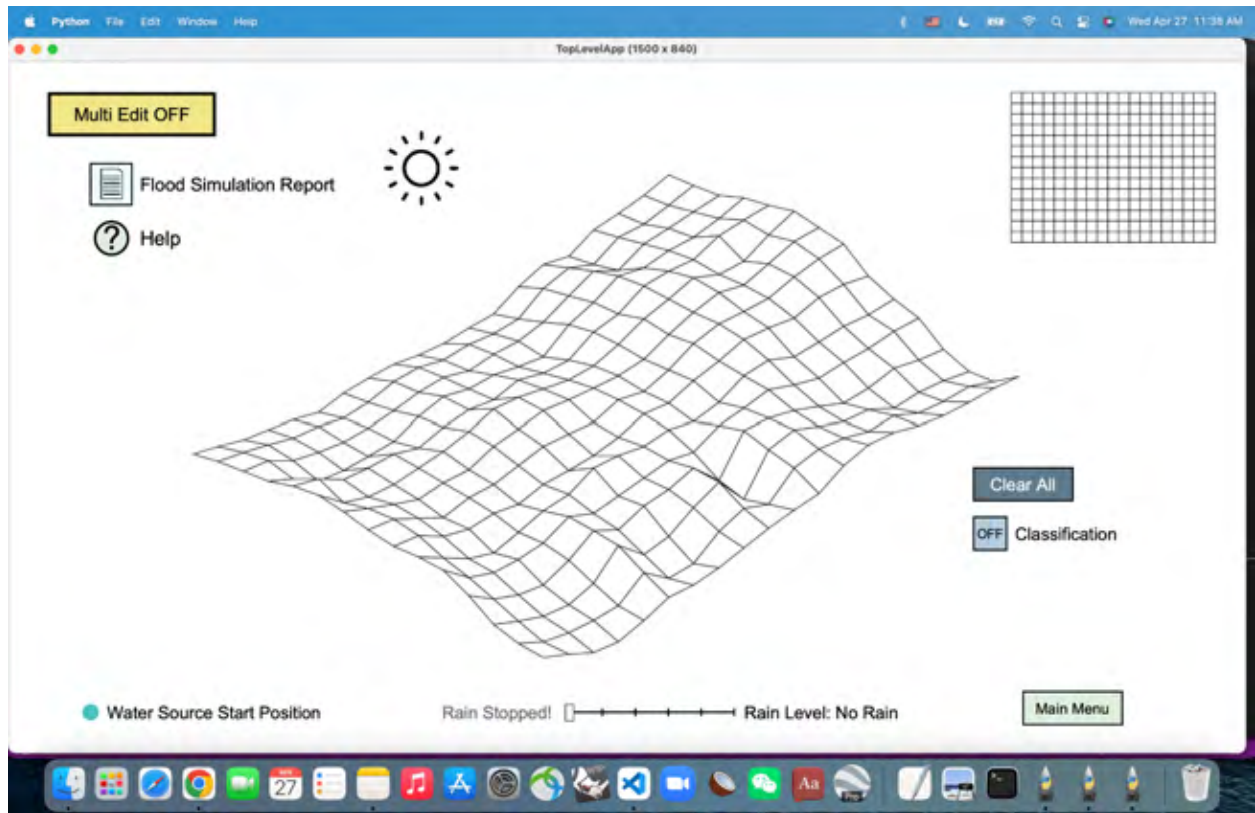
1. Choose Flat Map Mode or Random Map Mode



2. Terrain Edit - Multi Edit / Single Edit

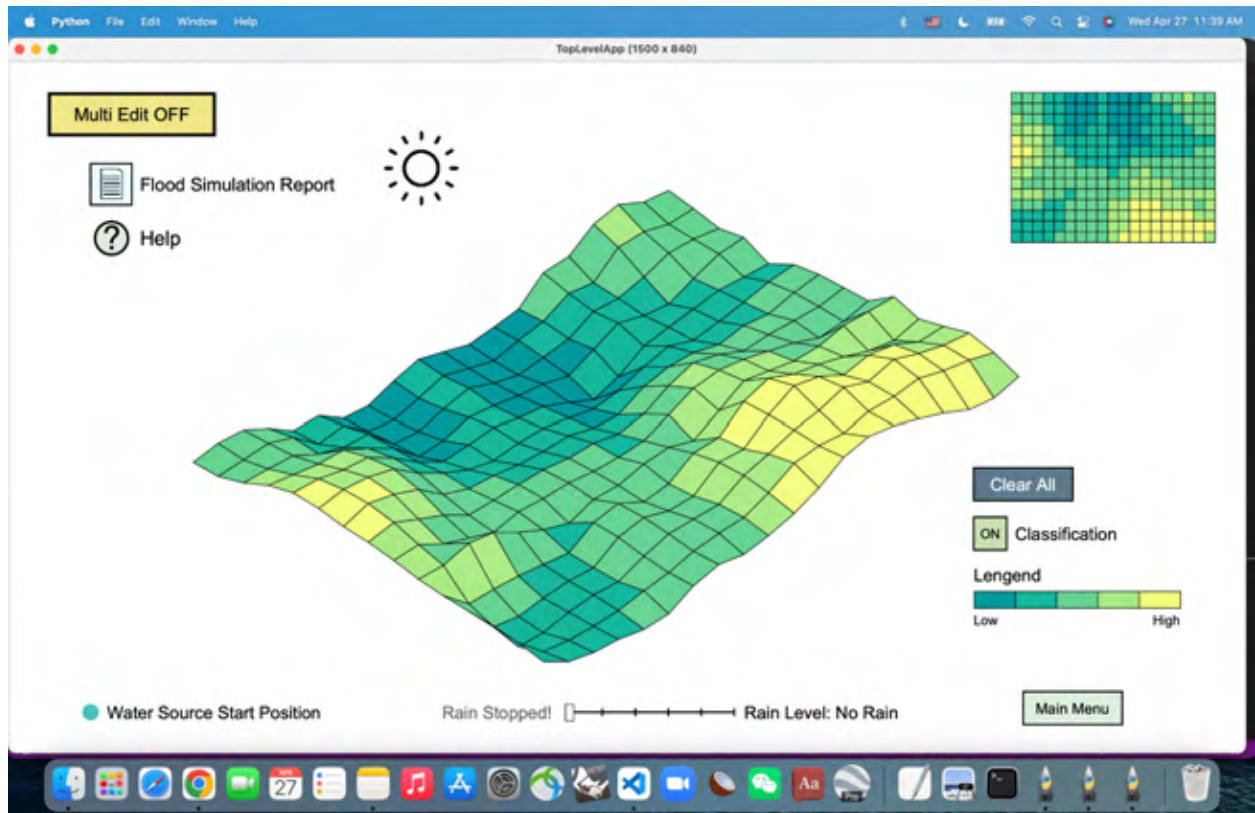


3. Randomly generate organic terrain

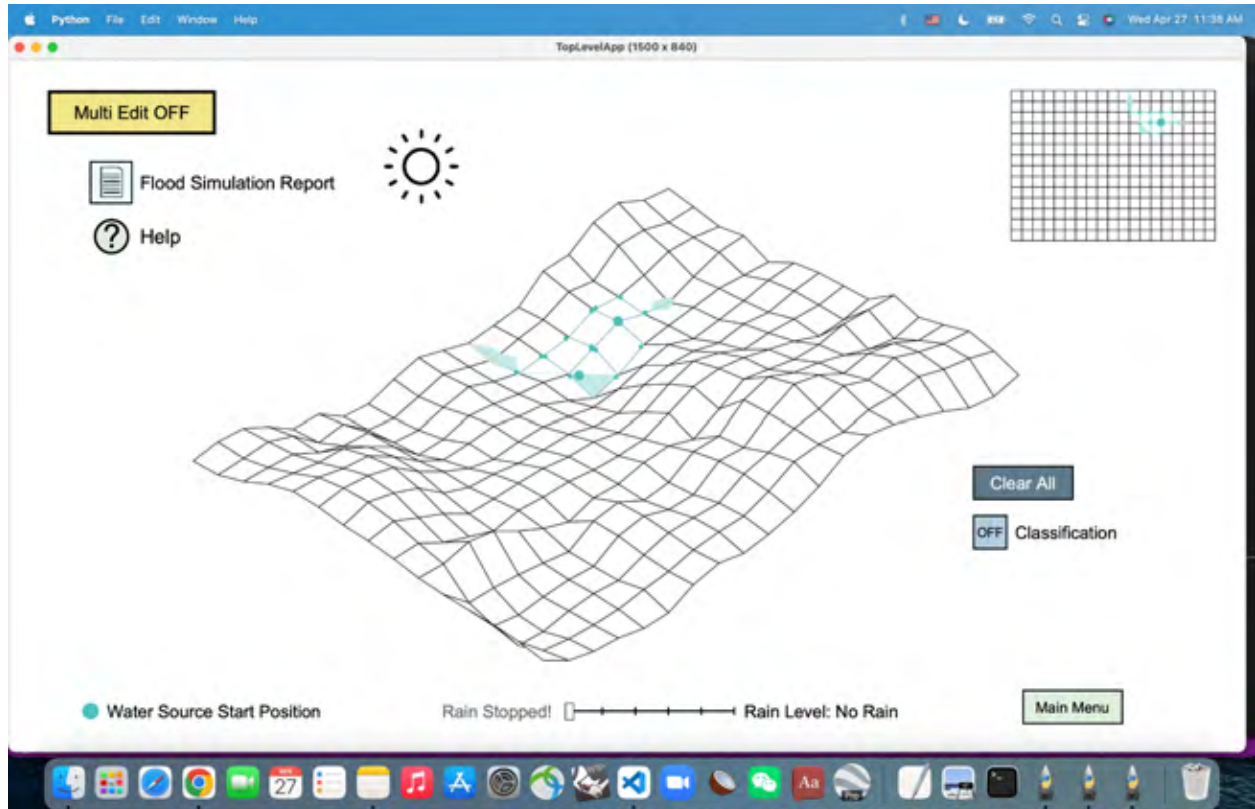


4. Classify the terrain by elevations

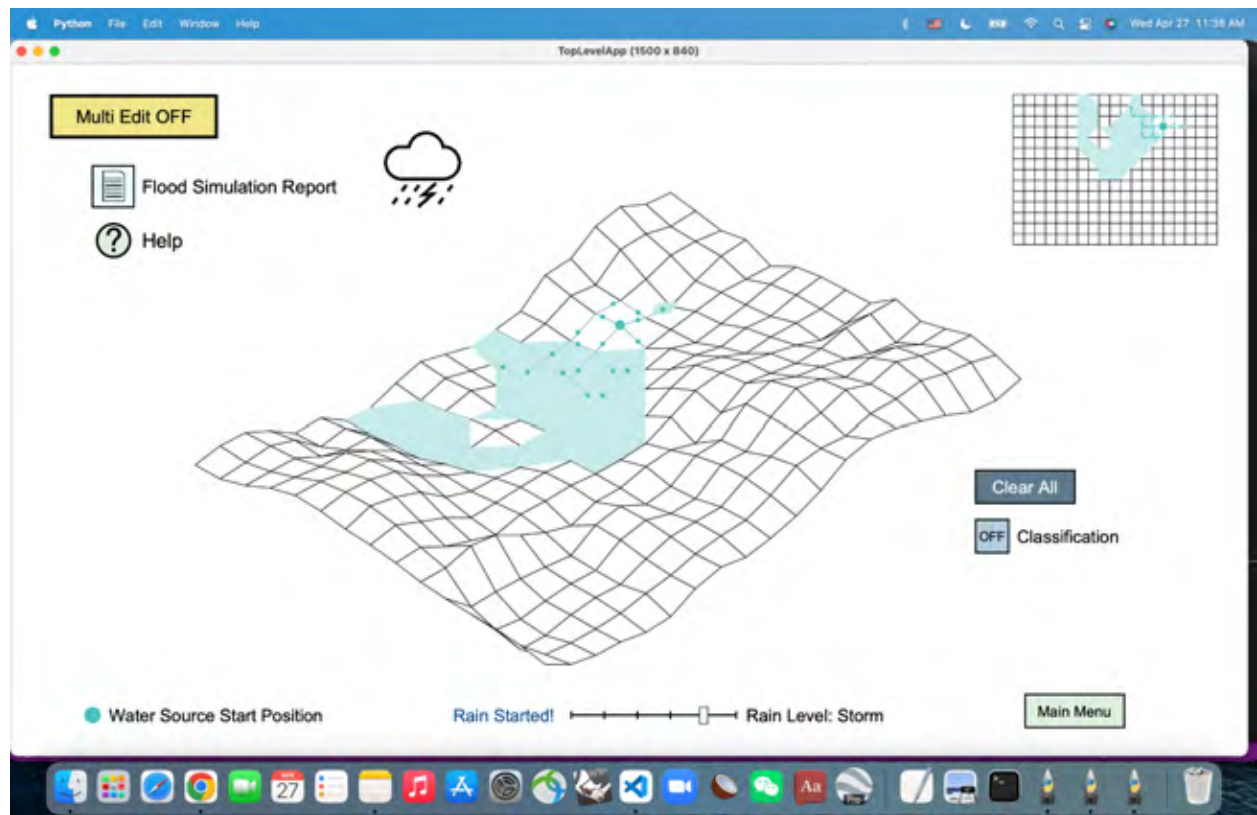




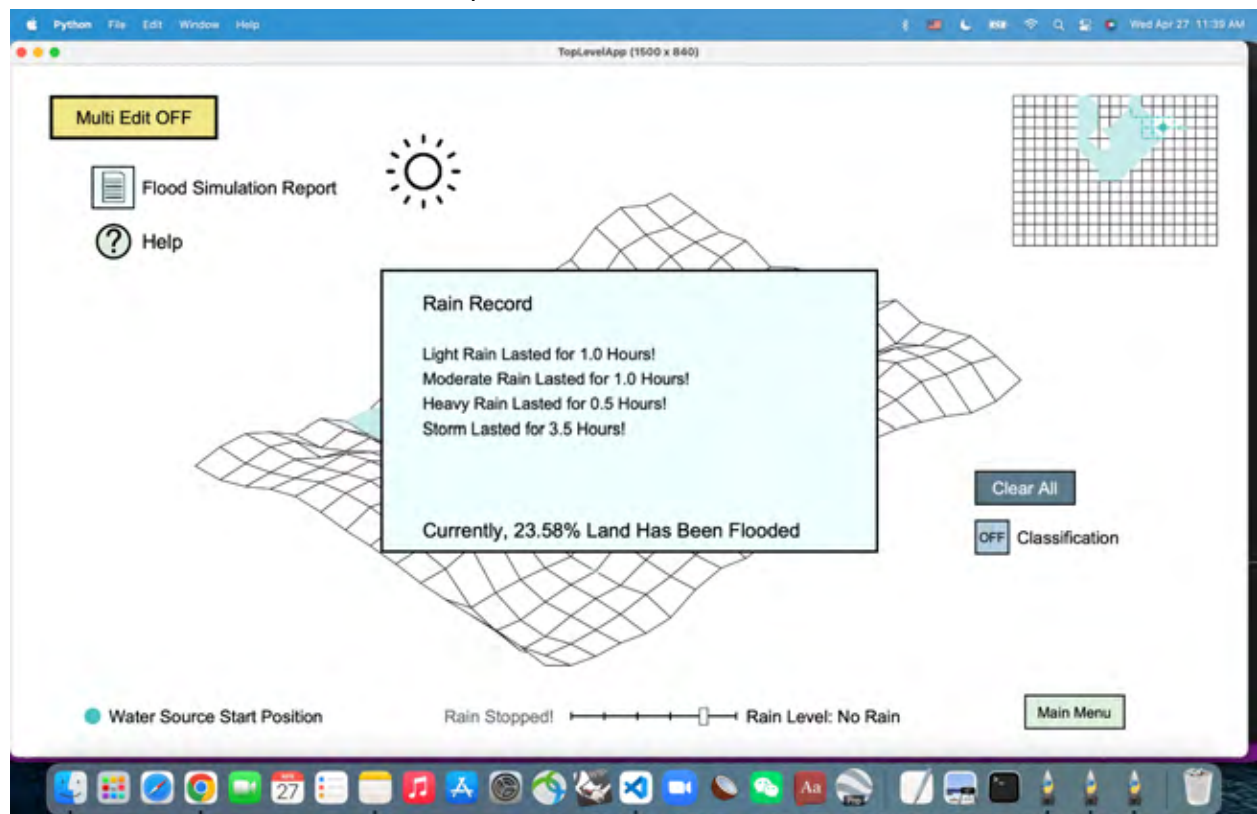
5. Set Water Source → Form the Stream, Flowing Water Particle and Lake



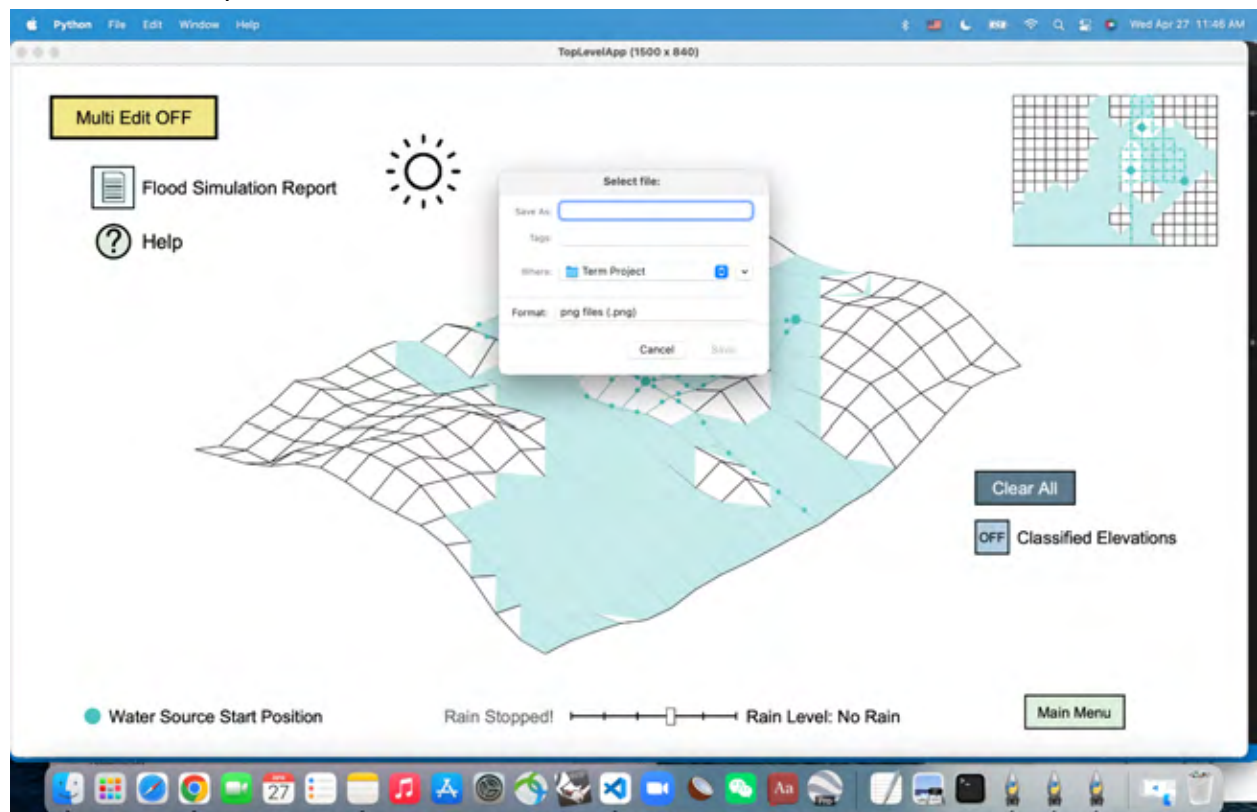
6. Switch to Rain and Set Rain Intensity → Change the Water Particle Flowing Velocity and the existent Lake Scale



## 7. Generate flood simulation report



## 8. Save snapshot





9. Clear all the current water features and related simulations

