

Criterion B: Design

This document explains the develop process of the program "Gravity Simulator". It includes design of the program, flow charts and UML diagram to ensure that the program is well planned before programmed, there were adjustments made during programing the program itself.

This program also contains Relevant Criterion section, which explains how success criteria's points can be tested and their result.

Visual Design of the Interface

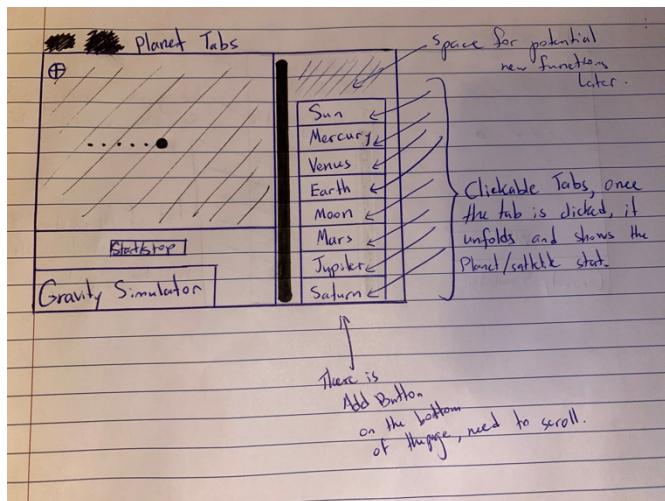


Figure 1

Above picture is the page that the user sees once starting the program. There are clickable planet tabs on the right side (Figure 1), after clicking them the page with that planet/satellite/asteroid/star stats will appear (Figure 2).

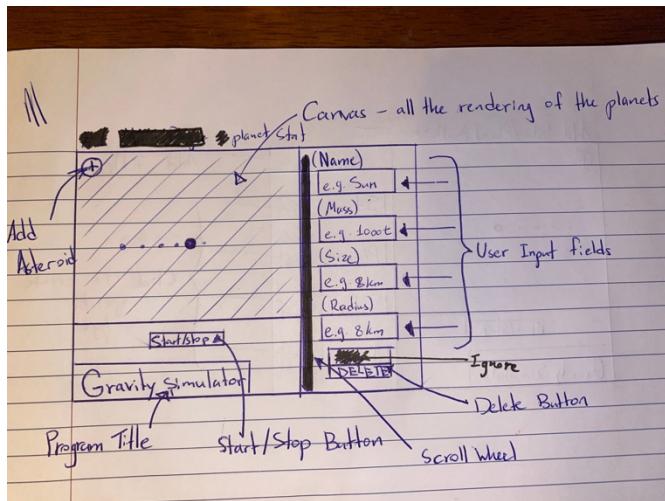


Figure 2

Figure 2. Explains the main features of the program. After the user clicks on the celestial body tab, the page with planet stat will appear with editable user input fields as shown on the right side of Figure 2. There is a delete button below the input fields to delete that specific celestial body.

The program title, "Gravity Simulator" is located on the bottom left corner. Above the button there is a field in which all the celestial bodies will render. There is also a start/stop button below it to start and stop the simulation.

There is a scroll wheel that can be used to scroll up and down between the different input fields. Current input fields are not accurate, they are just examples of what I might put there.

The plus sign at the top-left corner is for creating Asteroid. Once clicked, a menu for creating it on the right side of the screen will appear.

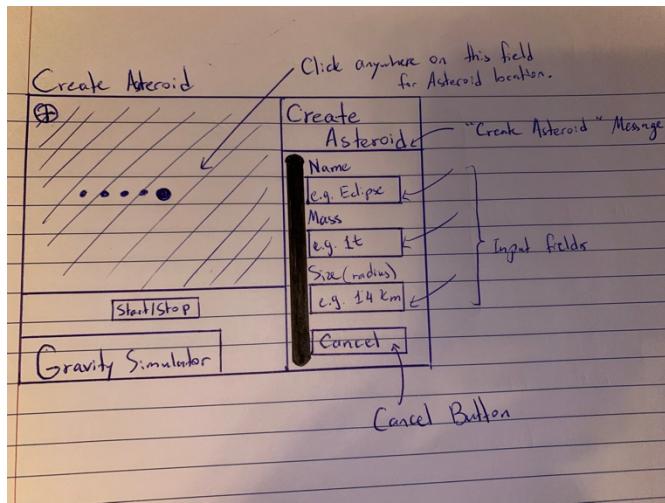


Figure 3

Create asteroid panel appears on the right side of the screen. There are input fields for the user to input asteroid stats. There is a "Cancel" button in case if user would like to not create the asteroid anymore. After inserting the values, the user needs to click anywhere on the render field to create the asteroid at that location.

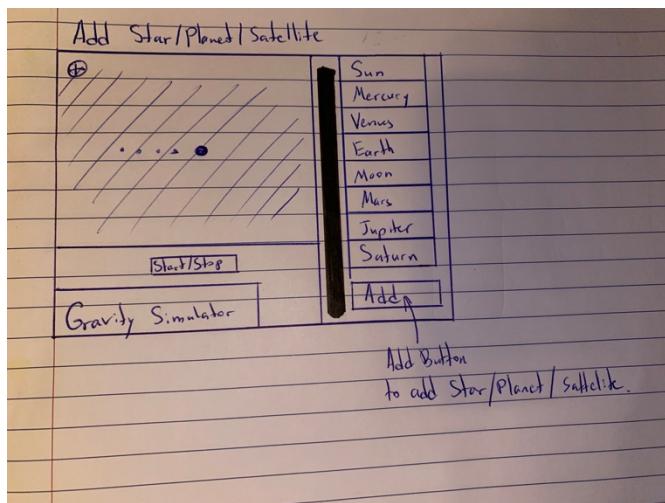


Figure 4

Once the user scrolls to the bottom of the celestial bodies page, there is an add button to add any of the 4 types of celestial bodies in the program (Fig.4.).

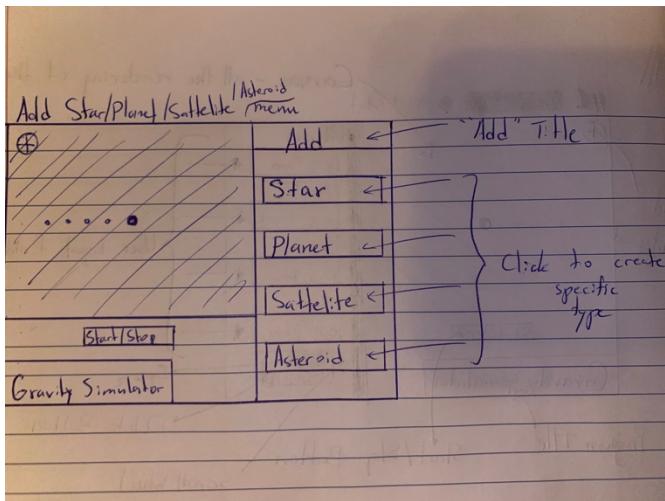


Figure 5

Fig.5. shows the options once the user clicks on the add button from the Fig.4. There are 4 available options: Star, Planet, Satellite, and Asteroid. Once clicked their stat will pop up as shown in Fig.2.. This is also another, less confusing way of creating an asteroid. Once create satellite is clicked, the window in Fig.6. will appear.

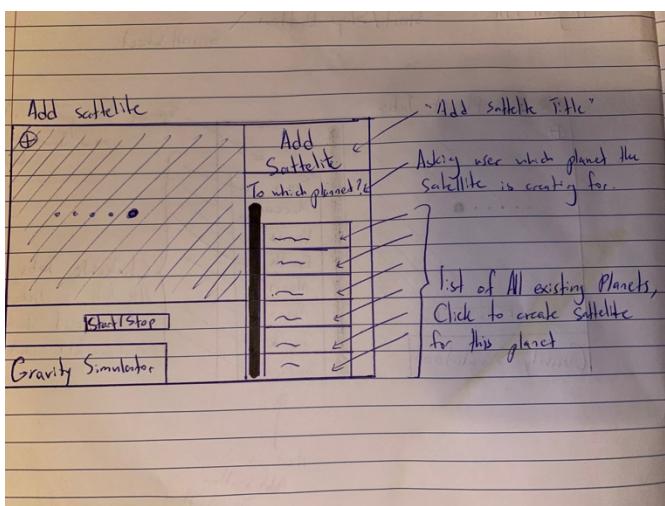


Figure 6

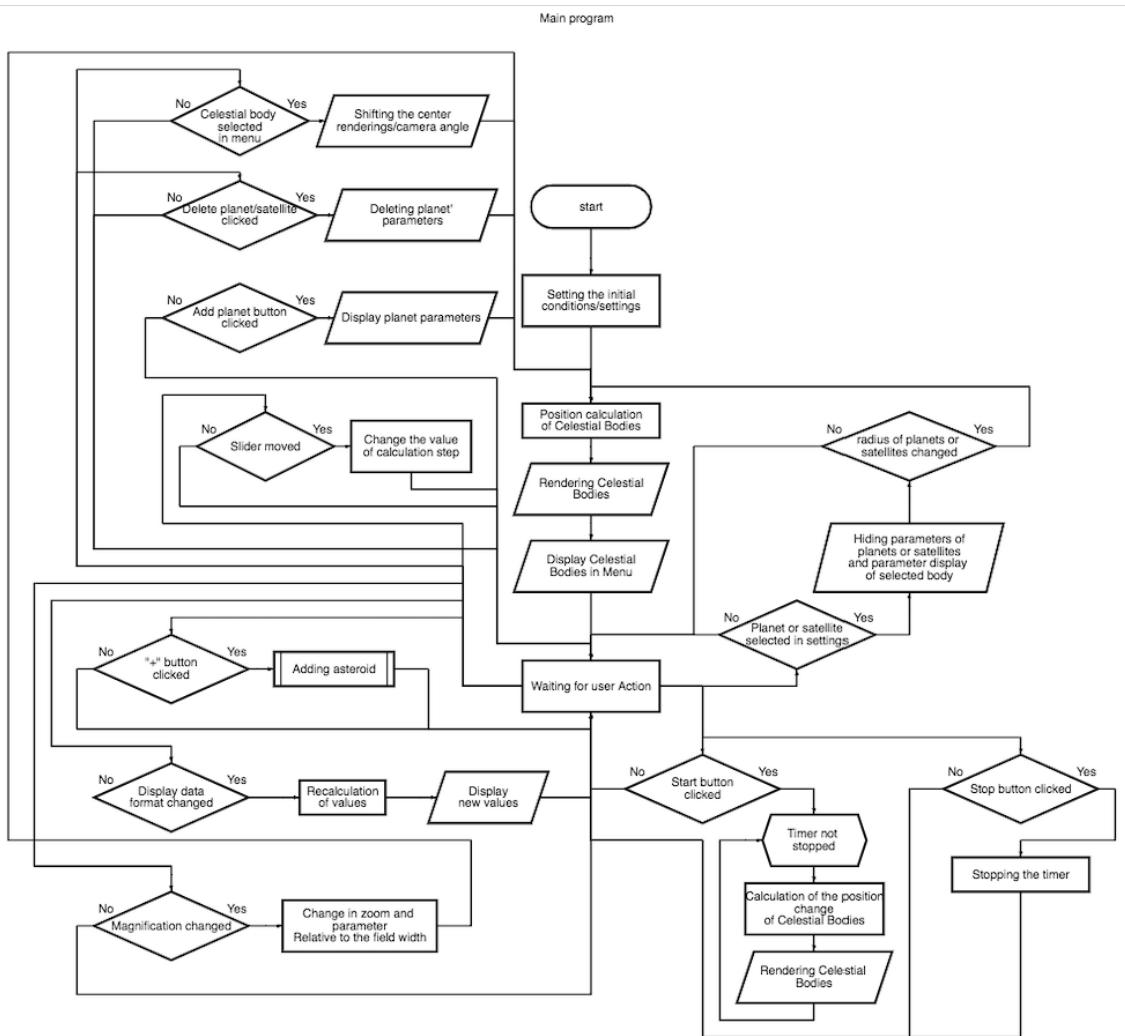
Fig.6. shows the menu that pops up in case of user clicking satellite in Fig.5.. There is a title of "Add satellite" and a message below the title asking the user to state the planet to assign the satellite to. There is no cancel button at this stage, and to delete or cancel satellite, the satellite needs to be created first, and it will be deleted once user clicks on its tab and clicks "delete" button in Fig.2.

Relevant Criterion

Relevant Criterion from	Test	Example
Part A		
1	The buttons and the features should be simple and easy understand for the unexperienced users	Different output depending on the buttons clicked. Example: If user clicks on the celestial body tab, the celestial body stats will appear.
2	Click "Add" on the bottom of the right-side panel and select planet	Adds a new planet with default name, mass, radius, distance from the sun and color.
3	Click "Add" on the bottom of the right-side panel and select satellite.	Adds a new satellite with default name, mass, radius, distance from the selected planet and color
4	Change values/stats of the celestial bodies and see if the trajectory changes.	The trajectory and behavior of celestial bodies change as the user changed values for the stats of them.
5	Click drop down menu on the top-right corner of the screen.	The drop-down menu appears, which allows the user to choose the units the values of Celestial bodies should be in.

6	Click start/stop button	The program will start moving or stop moving depending on the button pressed.
7	Click on the circles with 4 first letter of planet name on the side panel on the left.	The camera perspective changes to the planet icon clicked, placing the planet into the center.
8	Scroll in and out of the solar system using the scroller on the mouse	The size of the solar system, distance between the planets should change.
9	Go through the asteroid creation process discussed in the design section of Fig.3, Fig.4, and Fig.5.	The asteroid should be created, rendered on the canvas.
10	Slide the time comparison slider	The simulation should slow down/speed up and there should be comparison between in simulation time and real life time (years)

Program Flow Charts

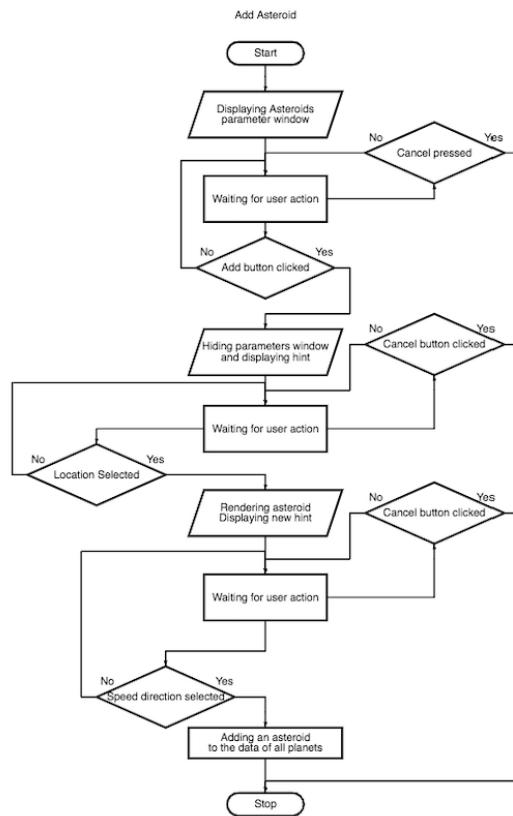


This program will have a specific style, where the different functions of the program are waiting for user action at the same time. The top flow chart is show casing the main program, in which the user can make the following decisions:

- - Start button clicked
- - "+" clicked to add asteroid
- - Slider moved
- - "Add" "Delete" celestial bodies
- - Tabs clicked

All of these are waiting for user action simultaneously, meaning that the user can decide which one to use between them. These actions are then leading to other

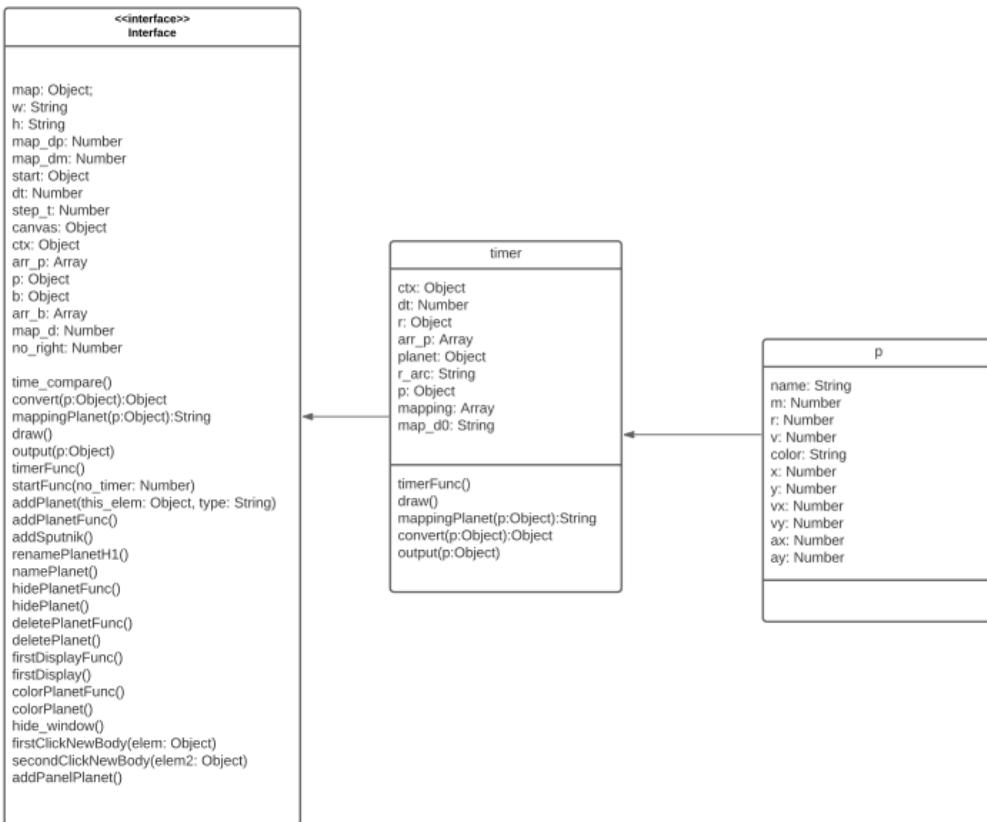
waiting for user actions, specific processes dependent on the function the user used/button the user clicked.



"Add Asteroid" flow chart is the process of creating the asteroids, there are few steps: waiting for user action, user deciding to click add or cancel, rendering the asteroid if add was clicked, not allowing the user to start to create another asteroid while previous one is in process of creating.

Note that both of the flow charts differ from the program sketch as I did them after I finished to visual design the program, therefore I have added functions like changing the planet perspective with a slider.

Program UML



This program doesn't use many classes due to its unique and specific style (simulation). It mainly uses the functions listed on the "interface" block. The block "p" stands for planet, which has values assigned to it. Block "Timer" is for the start/stop action (rendering) of the planets.

Word Count: 721