

User Guide

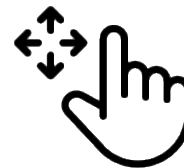
TO RUN PROGRAM:

1. Download the entire “Science” folder
2. Open the file “Science.html” with a browser

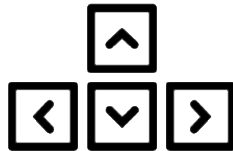
I chose to explore scenes and figures found in science. The first scene created is a growing plant with five branches in a pot. The second is a solar system with Saturn, Neptune, and a rock orbiting a Sun. Both models incorporate many objects, colors, and movements to produce vivid images. To navigate the webpage:



Click on the screen to make the planetary connectors disappear/reappear



Drag on the screen to orient the plant in 360°



Use the keyboard arrows to orient the orbital rotation of the solar system



Press the spacebar to pause/resume the solar system orbit

Results

In addition to these mouse and keyboard commands, there are buttons on-screen to interact with the plant, which include slowing/speeding/pausing/playing the growth and setting the plant to full growth. So in order to view the permanently full-size plant, first pause the growth by pressing “Play/Pause Growth” then press “See full”. After completing the models, I am very pleased with the results. The plant grows at a constant pace, and retracts back to a seed once it reaches full size. Each of the branches are composed of five cones stacked on top of one another, becoming increasingly smaller. Four of the branches have curvature, and each of the cones executes this curvature to create a “sagging” effect. The pot is comprised of two altered cones to give it a geometric shape. Rotation with the mouse is anchored at the pot. With extra time, I would’ve added artifacts to the branches to give them a more detailed, leafy texture.

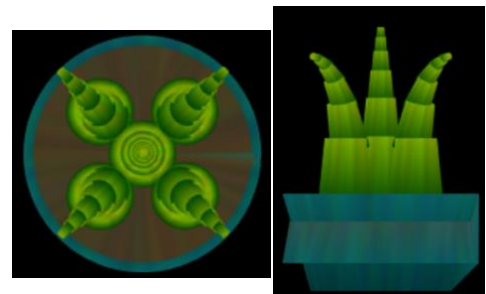


Figure 1. (left) The full-grown plant as viewed from above, (right) the full-grown plant from straight-forward

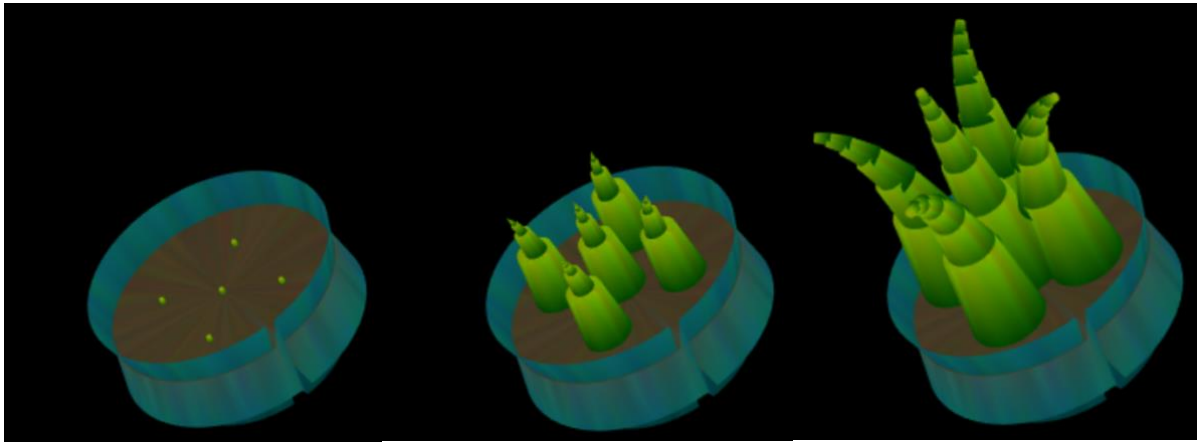
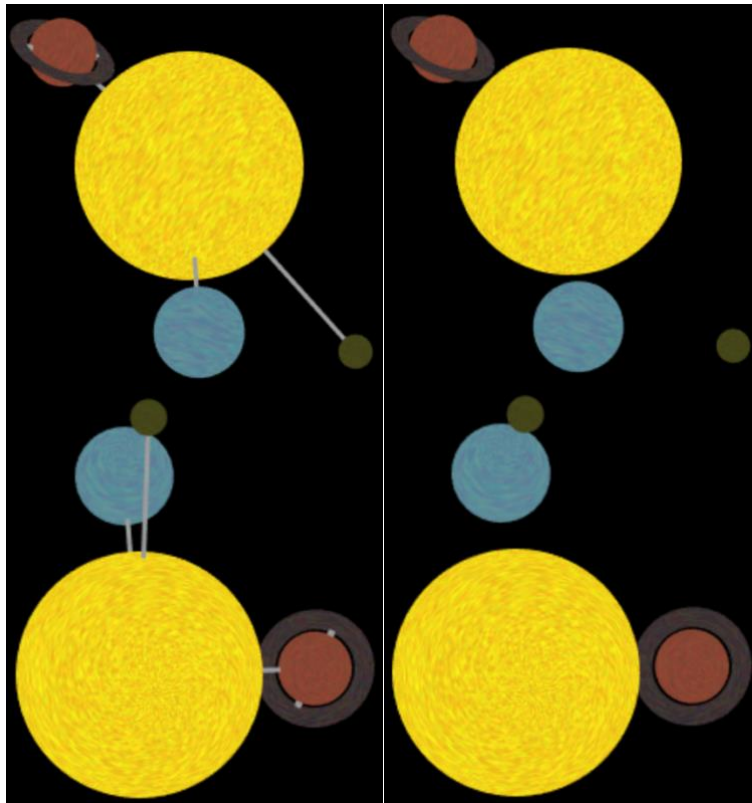


Figure 2. A growing plant from buds (left), to sprouts (center), to full-grown(right)

The solar system turned out much better than expected. The Sun is made up of 100 slices, each with 100 vertices to grant it a grainy texture. To color each object, I explicitly gave a vertex a color assignment, with a specified amount of random variance. For example, the Sun is grounded at yellow (255, 255, 25.5) with a 25% range of random reduction to green to give the Sun more

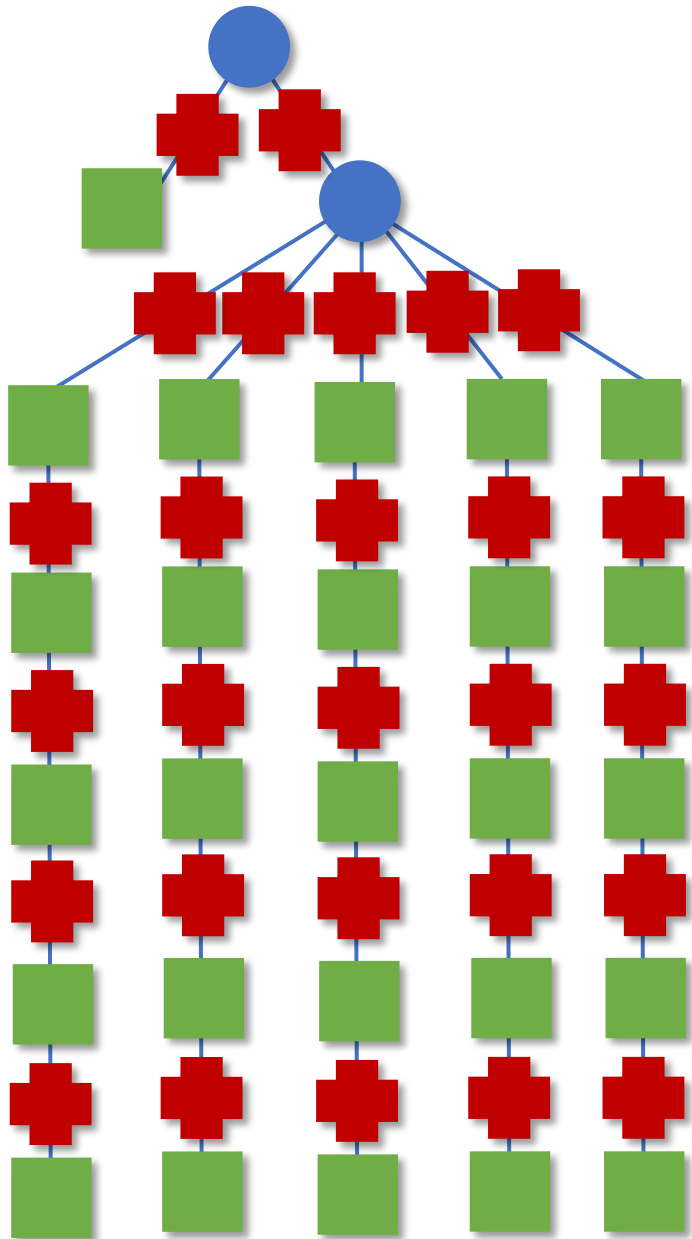
reddish spots. A similar algorithm is applied to the orbiting objects and the plant. The planets use fewer vertices because of their smaller size, however you can see their color variance upon close inspection.



The default viewing experience provides poles to see the connections between the Sun and the planets, as well as the ring to Saturn. By clicking within the Canvas, the user can remove the visual aid to see a pure orbit. If I were able to add another element to this program, I would have the surrounding planets grow and shrink as they orbited the Sun to give them realistic depth.

Figure 3. (left side) Scenes of the solar system model with the connecting poles shown, (right side) their counterparts without poles

Growing Plant



Solar System

