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Project proposal
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The ideal gas law PV=nRT states that the pressure will increase linearly as the temperature and the number of molecules increase. It also states that the pressure will decrease proportionally to the inverse of volume. We want to create a simulator for the ideal gas law in 2 dimensions in order to verify for ourselves that the pressure in an ideal gas does indeed follow this trend. This would involve us creating a 2-dimensional container containing a monatomic gas. To represent the molecules of the gas, we will use small circles. We will allow the user to change the volume, temperature, and number of gas molecules in the container. Our measurement of the pressure will be based on the number of collisions between the molecules and the wall of the container.

In order to do this, we will have to find a way to model collisions between the different molecules. We will have to model collisions between the molecules and the wall of the container. We will have to show how the movement changes based on the temperature change. We will also have to show a numerical representation of the pressure in the container based on the temperature, volume, and number of molecules. We will also have to make an animation to show the movement of the molecules inside of the container. We will also have to allow the user to interact with the simulation in order to change the volume, temperature, and number of molecules. In order to quantify the pressure in the box, we will count the amount of collisions with the wall of the container.

One of the potential pitfalls that we may run into include lacking sufficient processing power. As we increase the number of molecules in the simulation, the number of computations will increase significantly. Another potential pitfall that we may run into is finding a way to efficiently model and calculate the collisions that will occur in the simulation. Another problem that we may come across is insufficient knowledge in programming. We also have the potential of misrepresenting or oversimplifying what we are trying to find.

We have to find a way to divide the workload in order to allow both of us to get the experience we need. TJ will do the calculations having to do with collisions with the wall. He will also be in charge of the container volume and shape change, molecule movement tracking, and count of the collisions with the wall (which entails the plotting of the pressure in the end). Wesley will be in charge of collisions between molecules, temperature change, and the animation of the molecules in the box.