Report 2

This week I picked off from where I finished at last week, looking at the code I had compiled trying to think what might still be useful. I ended up scrapping the code all together because I had thought I could at least keep the portion for the potential barrier but that did not work out. After watching a tutorial video, I used the finite difference method for solving the Schrodinger equation which turned into an eigenvalue problem for solving for the unknowns in the equations from this method. Also this is still for the time-independent equation, since that is the portion of that is being solved for. This week a better simulation of quantum tunneling was created. Which was the biggest achievement from this week's work. The finite difference led to a much clearer still view of the quantum tunneling in the graph with the wave being very visible past the potential barrier. Along with the animation that gives a cool visual of the wave going through the barrier and how it looks like after its crossed as well. That was one of the biggest goals I had wanted to accomplish for this project so for that to be working is great news. As for results, I should have had code for printing out the probability density of the wave so I could have an actual result other than just the plot of the probability density of the wave. But this will be something that I intend to add on for next week not that I have the visual. By far the biggest challenge was understanding how to solve the wave equation in python, reading up and looking through different videos had helped with that. Looking through examples and employing the best one I had understood for the most part but there still some points in the method that I'm not 100% clear on so I will need to revisit so that I can be confident when I present. Another issue I had ran into was trying to animate the function since the first attempt printed only a still image, so had to check with chatgpt with other methods to animate and landed with the method that is in the code now. Had to make some very small changed but the code generated worked well on first run. For the future, now I want to print out the probability density of the function so I can have results to anaylaze along with see if it is possible to hard code to find the eigenvalues. Trying to hard code might be odd since they are already found using the linear algebra already in python but I want to try to learn further about python so hard coding could help with that. However if that does not work out then I'd like to work the implications when it is an infinite square well since that should complicate things further and

I’m not quite sure how the result will be different from the 1-D barrier yet. If I do this route then I also want to print out the probability density results and compare them to the 1-D barrier results to see what difference there is, if any. Sources used for this week were chatgpt and https://www.youtube.com/watch?app=desktop&v=j8cjzZG1qa8