

Assignment 3

EX1.

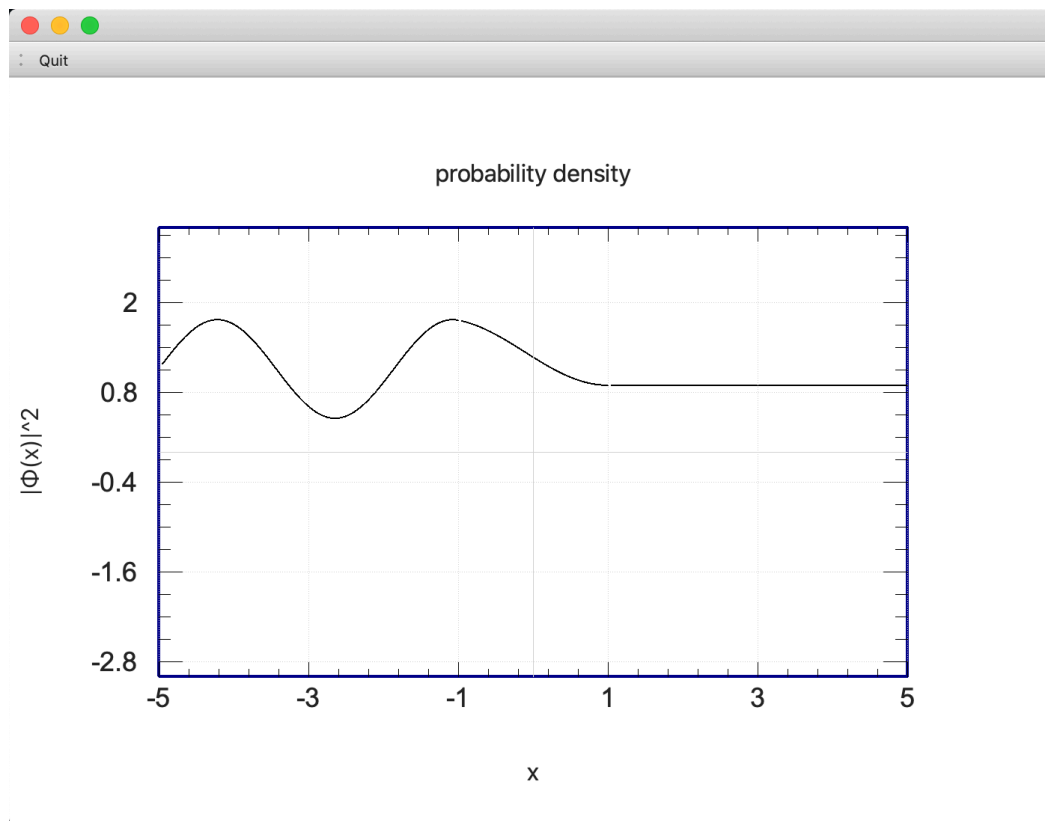
The program *crystal* calculate the volume of a lattice cell in two ways. The first line of output is calculated by the triple product of 3 vectors. The second line of output is calculated by the determinant of matrix formed by the 3 vectors. These two methods give the same result.

EX3.

The program *sevenfunctions* is used to plot seven different functions. Users can choose the function to plot by inputting the index of the function they want.

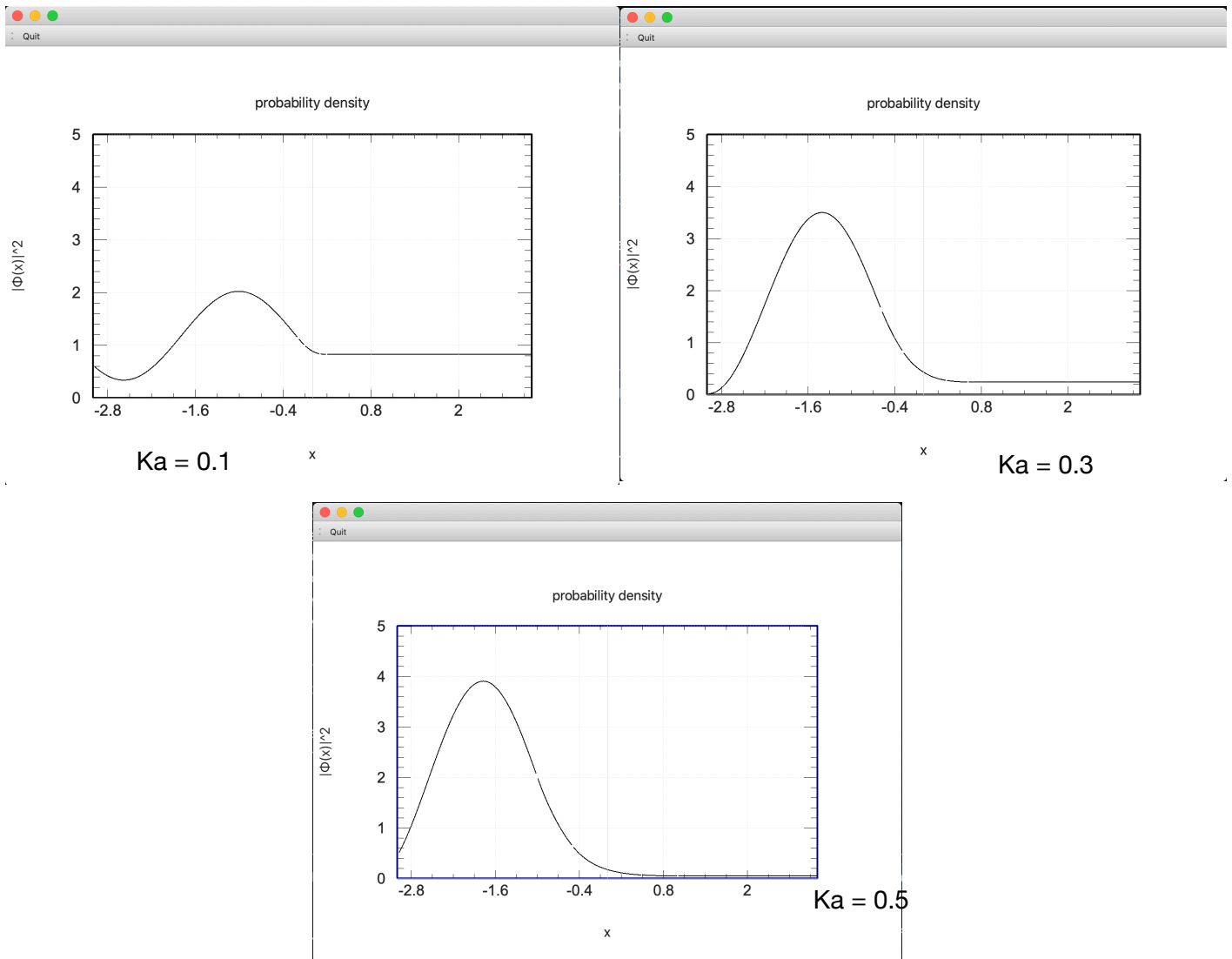
Ex6.

The program *barrier* solve the wave function of a particle in a square barrier potential by solving the matrix equation, and plot the possibility density. The result is showed below.



EX7.

The program *potential* solve the wave function of a particle in a two-step potential barrier. I chose three different values of ka and draw the diagrams. It is clear that the transmission rate decrease with the increase of ka .

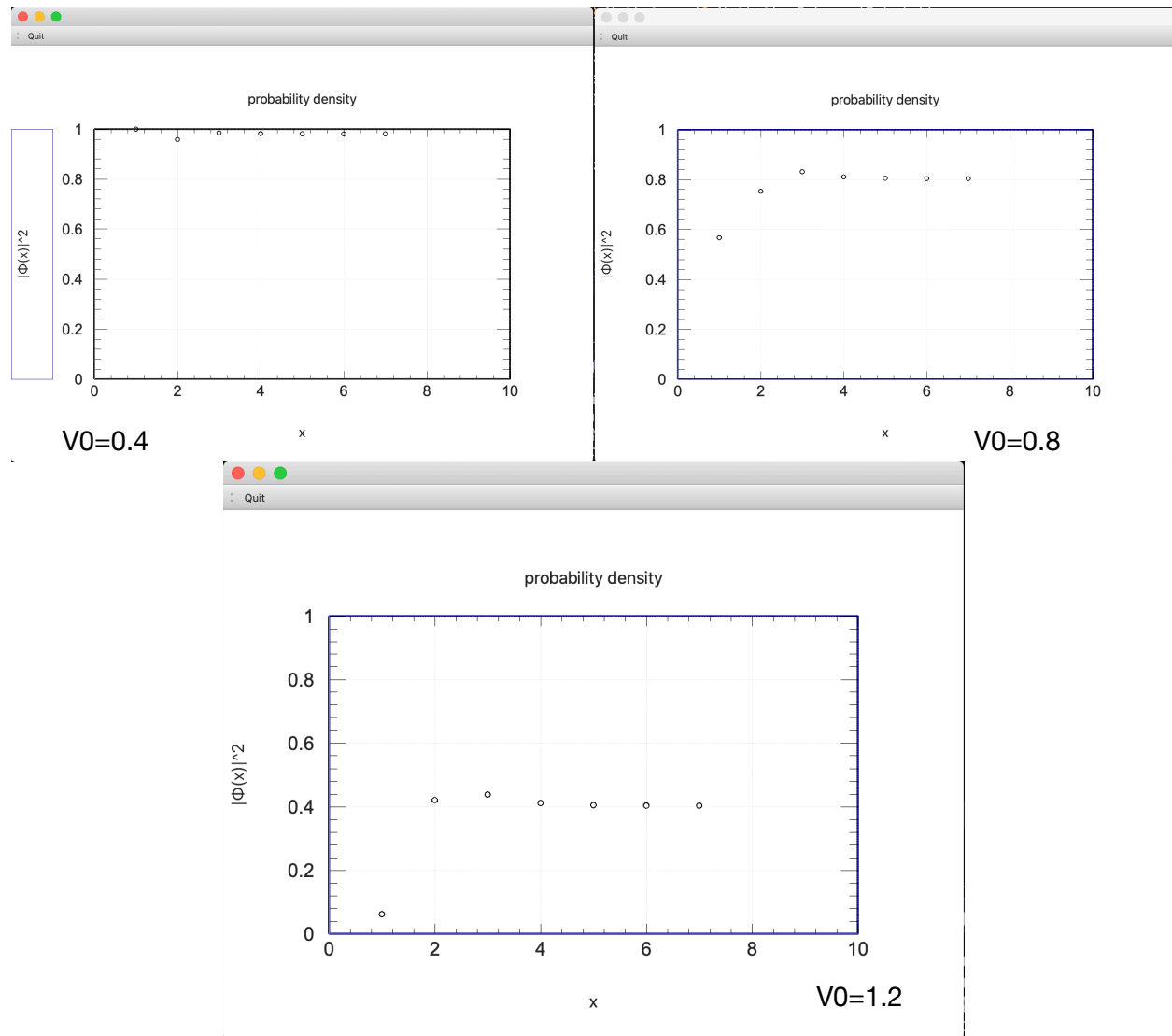


EX8.

This program is based on the program in EX&. Users can input the value of ka , and then the program will plot the diagram of possibility corresponds to the parameter.

EX9.

The program *Gaussian* solve the wave function of a particle in a Gaussian potential barrier. I divided the region into 2^N intervals, where N runs from 1 to 7. And then I chose three different V_0 and plot the diagrams. The transmission rate converges with the increase of N , and it decreases with the increase of potential.



EX14.

This program plot the real part and then imaginary part of wave function from EX7. Users can choose real part or the imaginary part to plot, and the program will generate an animation of wave function evolving over time.