Pset3, Initial value problem

Problem 1: Heat equation.

Write a code to solve the 1D heat equation. Make a graph to show the solution and discuss your results.

- Use the forward explicit time stepping scheme.
Choose the time step: dt=r*dx^2. Try r=0.5 and r>0.5.
- Use the backward implicit time stepping scheme.
- Use the Crank-Nicolson time stepping scheme.

Problem 2: Quantum mechanics.

As discussed in class, write a code to study the Gauss wave packet using the Schrodinger equation. Make a plot and discuss your results. You may try the following parameter: k=0.5, V=0.2, dx=1, N=240.