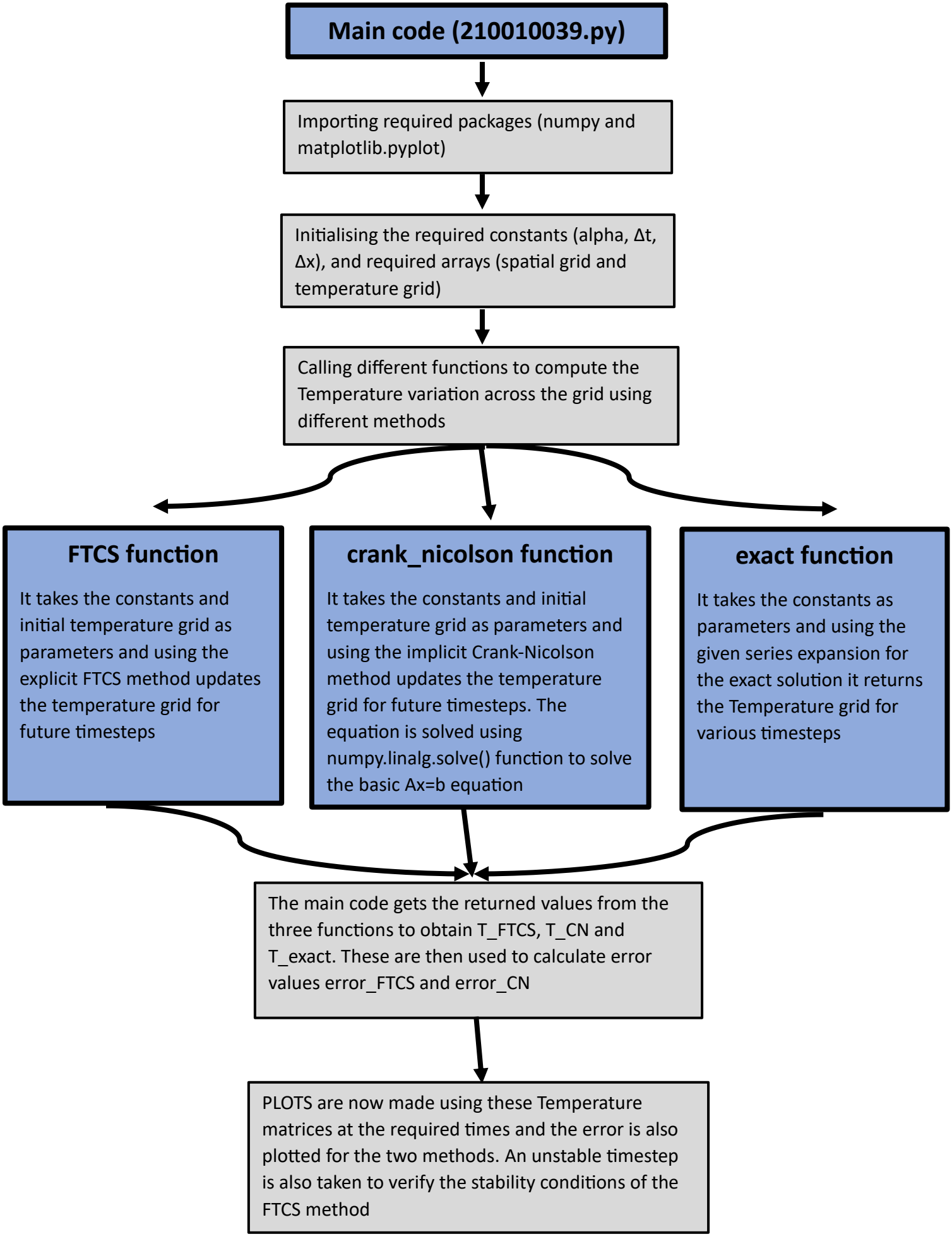
Main code (210010039.py)
Importing required packages (numpy and matplotlib.pyplot)
Initialising the required constants (alpha, Δt, Δx), and required arrays (spatial grid and temperature grid)
Calling different functions to compute the Temperature variation across the grid using different methods
FTCS function
It takes the constants and initial temperature grid as parameters and using the explicit FTCS method updates the temperature grid for future timesteps
crank_nicolson function
It takes the constants and initial temperature grid as parameters and using the implicit Crank-Nicolson method updates the temperature grid for future timesteps. The equation is solved using numpy.linalg.solve() function to solve the basic Ax=b equation
exact function
It takes the constants as parameters and using the given series expansion for the exact solution it returns the Temperature grid for various timesteps
The main code gets the returned values from the three functions to obtain T_FTCS, T_CN and T_exact. These are then used to calculate error values error_FTCS and error_CN
PLOTS are now made using these Temperature matrices at the required times and the error is also plotted for the two methods. An unstable timestep is also taken to verify the stability conditions of the FTCS method