# MA 473 Lab01 Report

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Points to be Noted:

- The directory contains function scripts, and two folders namely 'plots' and 'error_tables'.
- I have created separate function files for FTCS, BTCS, and Crank-Nicolson, for both Dirichlet and Neumann conditions. These functions are called in the question scripts as per requirement.
- The variables considered other than boundary function and initial value function are M (the number of space steps), and lambda.
- For each scheme, there is a line plot, a surface plot, and an error table.
- The line plot is for t = T.
- The surface plot shows the relation between u(x, t) for all (x,t) in the domain.
- The error table is populated using the infinity norm between Un and U2n.

For Example:

In the setup of Q3, using the **Crank Nicolson Scheme** we obtain the following outputs:

Crank-Nicolson Surface Plot for u(x,t)
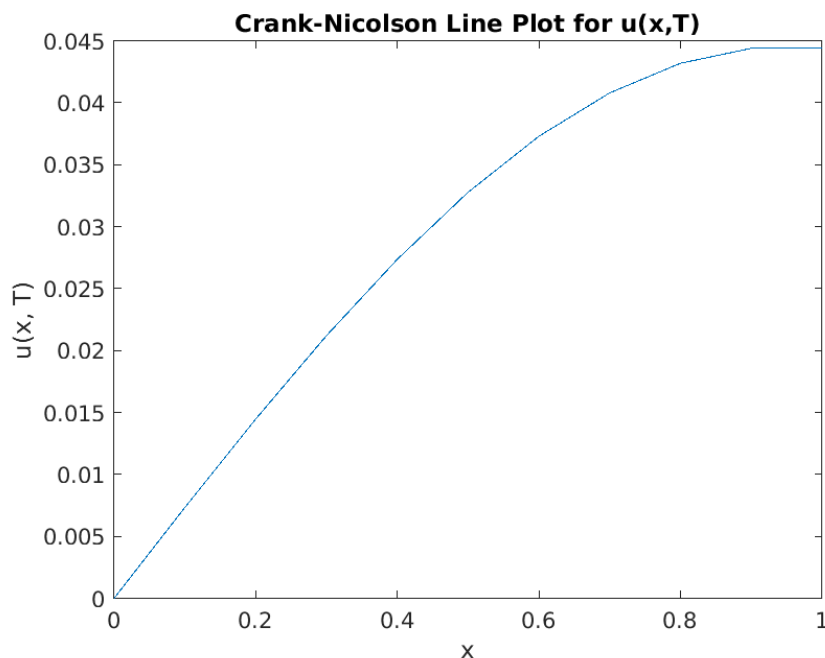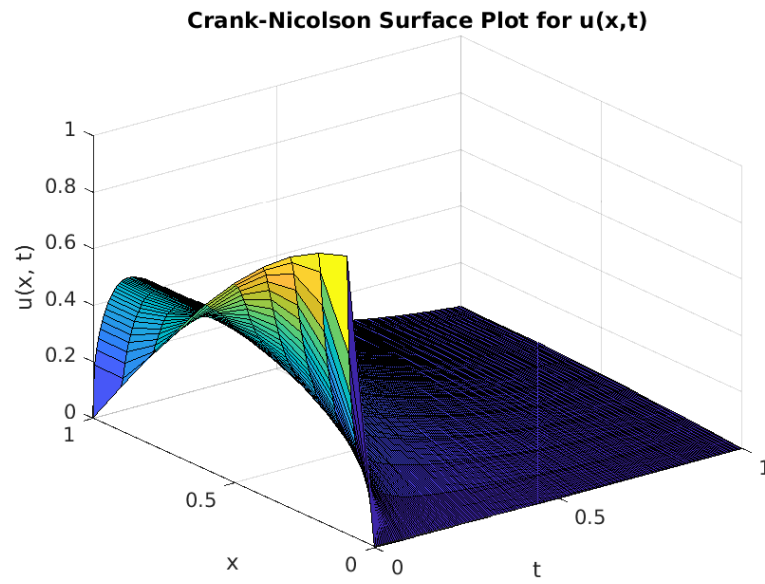
Error Table:

M	Error	Order of Convergence
5	0.8581969122	0.8331717266
10	1.528961778	1.001797277
20	3.061735422	1.02377003
40	6.225197673	1.017234204
80	12.60001768	NaN
160	NaN	NaN

Similarly, the output for all the setups and all the schemes is generated and stored in the respective folders. Kindly view the folder for viewing all the other plots, and error tables.