Question 1. Solve the problem using separation of variables:

\[
\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = 0, \quad 0 < x < 1, \quad 0 < y < 1,
\]

\[
u(0, y) = 0, \quad u(1, y) = 0, \quad 0 < y < 1,
\]

\[
u(x, 0) = 0, \quad u(x, 1) = 2, \quad 0 < x < 1.
\]