1. Given the system with state equations below with unit step input $u(t)$ and initial condition $x_1(0) = 2, x_2(0) = 3$:

$$\dot{x}_1 = -2x_1 + u$$
$$\dot{x}_2 = x_1 - x_2.$$

   a. Find the state space of the system.
   b. Find the time domain solution.
   c. Try to sketch your solution by hand.
   d. Verify your result in part b and c using Matlab(lsim).

2. Given the system with transfer function below with unit step input $u(t)$ and zero initial conditions.

$$G(s) = \frac{3s + 2}{s(s^2 + 3s + 2)}$$

   a. Apply partial fraction decomposition to $G(s)$.
   b. Draw a block diagram of the system.
   c. Find a state space of the system.
   d. Find the time domain solution.
   e. Verify your result using Matlab(lsim).