1. Find the lattice of closed partitions and input and output consistent partitions for the machine shown below.

   Input
   PS  x=0  x=1
   A   D,0  C,0
   B   C,0  D,1
   C   E,0  F,0
   D   F,0  E,1
   E   G,0  H,0
   F   H,0  G,1
   G   B,0  A,0
   H   A,0  B,1

2. A machine whose next state is independent of the circuit inputs is called autonomous or a counter. Show that if a machine M has an input consistent non-trivial closed partition it can be decomposed into two machines, one of which is autonomous.

3. For the machine shown below find appropriate partitions for a state assignment that will give next state and output equations of the form shown below. Give the Boolean equations of the next state and output for the chosen state assignment. Note that yi and Yi, for i = 1, 2, 3, are the present state and the next state variables, respectively and Z is the output.

   \[
   Y_1 = F_1(y_1)
   \]
   \[
   Y_2 = F_2(x, y_2, y_3)
   \]
   \[
   Y_3 = F_3(x, y_2, y_3)
   \]
   \[
   Z = F_0(y_1, y_2)
   \]

   Input
   PS  x=0  x=1
   A   F,0  D,0
   B   D,0  E,0
   C   E,0  F,0
   D   A,0  B,0
   E   B,0  C,0
   F   C,0  A,1