Chapter 6 Assignment

Q1.

System has four processes and five allocatable resources. The current allocation and maximum needs are as follows:

	Allocated	Maximum	Available
Process A	1 02 1 1	1 12 1 3	00x 1 1
ProcessB	20 1 10	22210	
Process C	110 10	2 13 10	
Process D	11110	11221	

What is the smallest value of x for which this is a safe state?

Q2.

Consider the following state of a system with four processes, P_1, P_2, P_3, and P_4, and five types of resources, RSI, RS2, RS3, RS4 and RS5:

$$C = \begin{array}{|c|c|c|c|c|} \hline 0 & 1 & 1 & 1 & 2 \\ \hline 0 & 1 & 0 & 1 & 0 \\ \hline 0 & 0 & 0 & 0 & 1 \\ \hline 2 & 1 & 0 & 0 & 0 \\ \hline \end{array} \qquad R = \begin{array}{|c|c|c|c|c|} \hline 1 & 1 & 0 & 2 & 1 \\ \hline 0 & 1 & 0 & 2 & 1 \\ \hline 0 & 2 & 0 & 3 & 1 \\ \hline 0 & 2 & 1 & 1 & 0 \\ \hline \end{array}$$

$$E = (24144)$$
$$A = (01021)$$

Show that there is a deadlock in the system, identify the processes that are deadlocked.'

Q3.

A distributed system using mailboxes has two IPC primitives, send and receive. The latter primitive specifies a process to receive from and blocks if no message from that process is available, even though messages may be waiting from other processes. here are no shared resources, but processes need to communicate frequently about other matters. Is deadlock possible? Discuss.