Assignment 4

Time and synchronization

Due : 15 November 2016, 13 :00

Exercise 1

Identify and explain the synchronization requirements of an indexing and search engine for Internet.
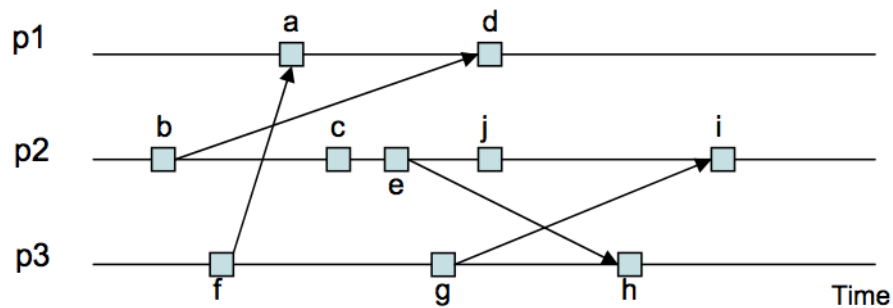
Exercise 2

FIGURE 1

Figure 1 shows the events occurring in the processes $p1$, $p2$ and $p3$. Arrows represent messages sent from one process to another.

1. Compute the timestamps for each of the events **a, ..., j** according to Lamport's logical clocks. Assume that initially all logical clocks are set to zero.

2. Repeat *a)* using vector clocks instead of Lamport's logical clocks. Assume that initially all clocks are set to zero vectors.

3. Relate the following events with either the ***happened-before*** or the ***concurrency*** relations. Explain whether logical or vector clocks enable you to determine the relation that relate these events. Justify your answers.

   (a) **a** and **i**

   (b) **f** and **i**

   (c) **b** and **h**