1. DESIGN OF VECTOR CLOCKS FOR AD-HOC DISTRIBUTED SYSTEMS

Consider a modern ad-hoc distributed system like vehicular or mobile networks. As the characteristics of ad-hoc systems varies from the conventional distributed systems, the design challenges of ad-hoc systems should be studied for renovating the insight towards key technological shift.

a. Adapt the conventional representation of vector clocks to suit the ad-hoc distributed system. (10 Marks)

b. Formulate the implementation rules for the adapted design of vector clock synchronization concerning the design challenges of the ad-hoc distributed system. (20 Marks)

c. Elaborate the working of the adapted design through a relevant example. (30 Marks)

Discuss the answers in detail.

i. Highlight the abstract difference between a conventional distributed system and an ad-hoc distributed system. [5]
ii. Explain the reason that the vector clocks for conventional distributed systems are not suitable for ad-hoc distributed systems [5]
iii. Discuss the new design idea for vector clocks concerning the reasons mentioned for *ii* [10]
iv. Adapt the implementation rules for the new design discussed for *iii* [10]

Simulate the working of the newly designed vector clock through relevant and detailed examples for various cases depicting different degrees of ad-hocness [30]