2007 Paper 9 Question 5

Distributed Systems

(*a*) When distributed systems are designed and engineered, certain fundamental properties have to be taken into account, including:

1. concurrent execution of components
2. independent failure modes
3. communication delay
4. no global time

Give *three* examples of the implications of these properties (separately or in combination) on the engineering of large-scale, widely distributed systems.

[9 marks]

(*b*) (*i*) Define role-based access control (RBAC).

(*ii*) Outline how RBAC could be used for a national healthcare system comprising many administration domains such as primary care practices, hospitals, specialist clinics, etc. Principals may, from time to time, work in domains other than their home domain, and must be authorised to do so.

(*iii*) A national Electronic Health Record (EHR) service must be accessible from all domains. It is required by law that access control policy should be able to capture exclusion of principals and relationships between them. How could this requirement be met in an RBAC design?

[11 marks]