Assignment 5

Due date: 18 October 2013, 22:59 CET

1. The graph below shows a network of nodes and edges. Assume that the network is used to implement a distributed algorithm. Describe the role that each node must play in order to execute the algorithm correctly.

2. A distributed system consists of a collection of nodes that communicate with each other. In order to ensure that all nodes synchronize, a distributed algorithm must be designed. Describe the steps involved in designing a distributed algorithm.

3. Two types of entities in distributed systems are messages and events. Describe the characteristics of each type of entity and provide an example of how each is used in a distributed system.

4. In many distributed systems, the concept of a message queue is essential. Explain why message queues are important and describe how they are used in distributed systems.

5. The diagram below shows a network of routers communicating with each other. Describe the role that each router must play in order to ensure that data is transmitted correctly.

6. In the context of distributed systems, message passing is often used to coordinate the behavior of different nodes. Explain how message passing is implemented in distributed systems and provide an example of a distributed system that uses message passing.

7. From the given data set, perform a hypothesis test to find the saturation intensity of the system.

8. Perform a hypothesis test to determine if there is a significant difference in the average temperature of the system before and after the intervention.

9. Compare the data from Part A and Part B of the experiment. Describe any differences observed and speculate on the reasons for these differences.

10. What is the role of a controller in a distributed system? Explain how a controller works and provide an example of a distributed system that uses a controller.

11. Explain the significance of the concept of scalability in distributed systems. Describe strategies for achieving scalability in distributed systems and provide an example of a distributed system that demonstrates scalability.

12. What is the role of a dispatcher in a distributed system? Explain how a dispatcher works and provide an example of a distributed system that uses a dispatcher.

13. Describe the role of a scheduler in a distributed system. Explain how a scheduler works and provide an example of a distributed system that uses a scheduler.

14. What is the role of a communication protocol in a distributed system? Explain how a communication protocol is designed and provide an example of a distributed system that uses a communication protocol.

15. Explain the importance of error detection and correction in distributed systems. Describe techniques for detecting and correcting errors in distributed systems and provide an example of a distributed system that demonstrates error detection and correction.

16. What is the role of a distributed database in a distributed system? Explain how a distributed database is designed and provide an example of a distributed system that uses a distributed database.

17. Describe the role of a distributed directory in a distributed system. Explain how a distributed directory is designed and provide an example of a distributed system that uses a distributed directory.

18. What is the role of a distributed file system in a distributed system? Explain how a distributed file system is designed and provide an example of a distributed system that uses a distributed file system.