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UNIVERSITI SAINS MALAYSIA

Stamford College

First Semester Examination  
2004/2005 Academic Session  
October 2004

**External Degree Programme  
Bachelor of Computer Science (Hons.)**

**CST311 – Distributed Computing & Network**

Duration : 2 hours

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**INSTRUCTIONS TO CANDIDATE:**

- Please ensure that this examination paper contains **SEVEN** questions in **THREE** printed pages before you start the examination.
  - Answer any **FIVE** questions.
  - On each page, write *only your Index Number*.
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## 1. Communication.

- (a) Name the **four (4)** communication models used in a distributed system. Explain each briefly, with importance given to the differences between them.
- (b) Explain why transient communication has inherent scalability problems, and how these could be solved.

(20/100)

## 2. Processes.

- (a) What is the use of threads in distributed systems?
- (b) List and explain the reasons for code migration in distributed system.
- (c) List and explain **two (2)** models of code migration.
- (d) Explain how migration is achieved in heterogeneous systems; give an example in java programming language.

(20/100)

## 3. CORBA.

Sketch a diagram of the general organization of a CORBA system and explain briefly each component.

(20/100)

## 4. Answer the following questions on the Data Link Layer.

- (a) Name **two (2)** protocols of Data Link Layer in the Internet.
- (b) Using a diagram, explain how PPP works.
- (c) If a bit stream *10011101100* arrives in a receiver and we use the standard CRC method with the generator polynomial  $x^3 + 1$ , check whether there is an error in the data.

(20/100)

5. Answer the following questions on the MAC sub-layer.
- (a) Carefully and precisely describe the IEEE 802.3 MAC protocol for shared-medium LANs. Describe all relevant algorithms, parameters (such as minimum and maximum frame sizes), and constraints.
  - (b) For each of the following interconnection devices, list the layer at which it operates, and its pros and cons.
    - (i) Hubs: Layer: ....., Pros: ....., Cons: .....
    - (ii) Bridges: Layer: ....., Pros: ....., Cons: .....
    - (iii) Routers: Layer: ....., Pros: ....., Cons: .....
    - (iv) Ethernet Switches: Layer: ....., Pros: ....., Cons: .....
  - (c) Ethernet has been around for 20 years with no serious competitors. Identify at least **four (4)** main reasons for its longevity.

(20/100)
6. Answer the following questions on the Network and Transport Layer.
- (a) Suppose that you have been assigned IP address 131.111.0.0 and have **twelve (12)** networks in your organization that you wish to remain distinct.
    - (i) What is the subnet mask?
    - (ii) Give the subnet addresses of the **twelve (12)** distinct networks.
  - (b) Sketch the IPv6 segment structure.
  - (c) List **three (3)** features of IPv6 over IPv4.
  - (d) Give **two (2)** scenarios how will the public Internet, which is based on IPv4, be transitioned to IPv6.

(20/100)
7. Consider that you are assigned to design a chat monitoring system. The system should be able to detect a worm, indicate the node affected and create an alert. Describe briefly what procedures you would follow for the packet capturing, filtering and decoding process. On what basis can the chat monitoring engine cause an alert on detecting a worm? You need to give the theoretical explanation only. Do not write any codes or algorithms.

(20/100)