

UNIVERSITY OF MALTA
BOARD OF STUDIES FOR INFORMATION TECHNOLOGY
Department of Computer Science & A.I.
B.Sc. I.T.(Hons.) Year II
June 2005 Assessment Session

CSA2100: Techniques in Operating Systems 17th June 2005

09.00-11.30

*Answer **two** questions out of the **three** provided. Each question carries 25 marks for a total of 50% of this paper.*

Section A

Section B

4. (a) Explain the function of each of the following, making sure you make reference to the OSI Layer they reside in:
- (i) Repeaters;
 - (ii) Switches;
 - (iii) Routers.
- [6 marks]**
- (b) What is the purpose of making use of network layers when describing protocol stacks? Furthermore, explain the layers making up the OSI Model and show how the TCP/IP model corresponds to the OSI model.
- [10 marks]**
- (c) Explain in your own words what the IP protocol offers. **[4 marks]**
- (d) Explain why a company normally resorts to IP subnetting after having purchased a range of IP addresses. **[5 marks]**
5. (a) Until the arrival of IPv6, what is being done to circumvent the IP exhaustion problem? **[5 marks]**
- (b) Explain why the ARP protocol is needed for communicating using IP. Also give the ARP algorithm in detail. **[7 marks]**
- (c) An IP packet is sent from host A1 in Network A to host B1 in Network B. Assuming that there is a single router connecting these two networks, explain in detail how this packet arrives to B1. Make sure you include in your description details of the MAC and IP source and destination addresses stored in the packet. Assume that A1 has both its subnet mask and its default gateway set properly. **[8 marks]**
- (d) Explain the term *Routing Protocol*. In addition, discuss why the use of a routing protocol is a better alternative than relying on static routing. **[5 marks]**
6. (a) Explain the differences between Distance-Vector Routing and Link-State Routing. **[5 marks]**
- (b) Explain a scenario that leads to the Counting to Infinity problem in RIP, and list two solutions to this problem. **[10 marks]**
- (c) Why does the socket interface require the client to use an unused port number to connect to a server, while a server can have multiple connections on the same port? **[5 marks]**
- (d) Explain how a web-proxy works and why is it normally used. **[5 marks]**
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