RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree in Information and Communication Technology
Second Year – Semester II Examination – April / May 2015

ICT 2406 – Internet Programing

Answer **All** Questions   Time allowed: Three hours

1.

   a) Define "**Nuts and Bolts**" view of the Internet.   (4 Marks)

   b) Compare and contrast Packet Switching and Circuit Switching.   (4 Marks)

   c) Name three different access networks that can be used to provide Internet connectivity to a subscriber. Discuss their advantages and disadvantages.

           (3 Marks)

   d) Assume that a full block of IP addresses, (from 192.168.10.0 to 192.168.10.255) is given to a network administrator in a company which has four different departments with different number of hosts. Sales department has 100 computers, Purchase department has 50 computers, Accounts has 25 computers and Management has 5 computers. The network administrator need to subnet the above IP block in to four subnets.

      i. What is/are the subnet mask(s) that can be used by the network administrator? (Hint: Use variable length subnet masking (VLSM)).

           (4 Marks)

      ii. Give the start and the end IP address of each subnet.   (2 Marks)

      iii. Discuss why the administrator cannot fulfill the requirements of the above network using fixed size (length) subnets.

           (3 Marks)

2.

   a) Why do we need routing algorithms? Name two routing algorithms.

           (4 Marks)

   b) Suppose there are three routers between a source host and a destination host. Ignoring fragmentation, an IP datagram sent from the source host to the destination host will travel over how many interfaces? How many forwarding tables will be indexed to move the datagram from the source to the destination? Explain your answer.   (4 Marks)

c) What is the role of the Internet Control Message Protocol (ICMP)? Give an example where ICMP is used. (4 Marks)

d) Compare and contrast IPv4 and IPv6 (8 Marks)

3.

a) In data transmission, what is meant by round-trip time (RTT) of a message? Calculate the RTT when loading a web page which consists of base HTML file and five JPEG images. Consider a persistent HTTP connection. (4 Marks)

b) DHCP, NAT and CIDR help to extend lifetime of IPv4 and they are possible solutions for IPv4 address depletion. Explain. (6 Marks)

c) Suppose a peer with username Arnold discovers through querying that a peer with username Bernard has a file it wants to download. Also suppose that Bernard is behind a NAT. Explain how Arnold establishes a TCP connection with Bernard. (6 Marks)

d) When creating network applications, Application developer has to select most appropriate transport layer protocol for his application. When is it appropriate to use UDP instead of TCP? Explain using examples. (4 Marks)

4.

a) Suppose a client opens a web browser and enters the URL http:// www.rjt.ac.lk. List and describe all the protocol interactions (step by step) between client's web browser and the web server. (6 Marks)

b) Describe how Web caching can reduce the delay in receiving a requested object. Does Web caching reduce the delay for all objects requested by a user or for only some of the objects? Why? (4 Marks)

c) Suppose Alice, with a Web-based e-mail account (such as Hotmail or gmail), sends a message to Bob, who accesses his mail from his mail server using POP3. Discuss how the message gets from Alice's host to Bob's host. Be sure to list the series of application-layer protocols that are used to move the message.

(6 Marks)

d) Header lines of an HTTP request message is given below. Describe each field of the HTTP header message. (4 Marks)

```
GET /somedir/page.html HTTP/1.1
Host: www.someschool.edu
User-agent: Mozilla/4.0
Connection: close
Accept-language:fr
```

(extra carriage return, line feed)

5.

a) Consider an e-commerce site that wants to keep a purchase record for each of its customers. Describe how this can be done with cookies. (6 Marks)

b) Why is it said that FTP is an "out-of-band" protocol? (3 Marks)

c) State three advantages of distributed computing comparing to centralized computing. (3 Marks)

d) List and describe in brief all the protocol interactions between a client's computer and the network when the client clicks on a hyperlink for an audio/video file which lies on a web server. (4 Marks)

e) Define RTSP protocol. How is RTSP similar to HTTP? (4 Marks)

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