EASTERN UNIVERSITY, SRI LANKA

THIRD YEAR SECOND SEMESTER EXAMINATION IN SCIENCE - 2005/2006

(March/ April, 2008)

CS 303 – INTERNET AND MULTIMEDIA APPLICATIONS

(Proper & Repeat)

Time allowed: 02 hours

Answer all questions

Q1)

(a) What is an RFC?

(10 marks)

(b) List two ways in which the OSI reference model and the TCP/IP reference model are the same. Also, list two ways in which they differ.

(20 marks)

(c) Why would a software developer use UDP for a transport protocol when TCP offers better quality assurance?

(5 marks)

(d) Compare and contrast the IPv4 and the IPv6 header fields. Do they have any fields in common?

(20 marks)

(e) Expand the following IPv6 address to display all 39 characters (colons count as a character) that are compressed with the double-colon notation:

A013:1234:34::8:411A

(10 marks)

(f) You have a Class C network address. You also have employees at 11 locations, and each location has no more than 13 people. What subnet mask or masks would enable you to install a workstation for each user?

(15 marks)

(g) What is **ARP**, how does it work and why is it necessary?

(20 marks)

Q2)

(a) Describe briefly *non-persistent* and *persistent connections*, which are used to transfer web pages from server to client.

Suppose a user requests a Web page that consists of some text and two images. For this page the client will send one request message and receive three response messages. Is it true or false? Why?

(20 marks)

(b) What is the difference between *persistent HTTP with pipelining* and *persistent HTTP without pipelining*?

(10 marks)

(c) Describe *File Transfer Protocol* (FTP).

Why is it said that FTP sends control information *"out of band"*?

(15 marks)

(d) Can a server be both an FTP server and a Web server? Why?

(5 marks)

(e) Suppose *Tharun* with a Web-based e-mail account sends a message to *Rangan*, who accesses his mail from his mail server using POP3. Discuss how the message gets from *Tharun's* host to *Rangan's* host. Be sure to list the series of application-layer protocols that are used to move the message between the two hosts.

(15 marks)

(f) Why do HTTP, FTP, SMTP, POP3 and IMAP run on top of TCP rather than UDP?

(5 marks)

(g) What is DNS?

DNS queries can be sent from a client (resolver) to a DNS server (a name server), or between two name servers. There are two types of queries that can be made to a DNS server. What type of query does the client send to the DNS server? What type of query does the DNS server send to other name servers?

(15 marks)

(h) Suppose within your web browser you click on a link to obtain a web page. Suppose that the IP address for the associated URL is not cached in your local host, so that a DNS look up is necessary to obtain the IP address. Suppose that n DNS servers are visited before your host receives the IP address from DNS; the successive visits incur a RTT (Round-Trip Time) of $RTT_1, ..., RTT_n$. Further suppose that web page associated with the link contains exactly one object, a small amount of HTML text. Let RTT_0 denote the RTT between the local host and the server containing the object. Assuming zero transmission time of the object, how much time elapses from when the client clicks on the link until the client receives the object.

(15 marks)

Q3)

(a) Define the term *"Interactive multimedia"*.

What is meant by interactivity for *streaming stored audio/video*? What is meant by interactivity for *real-time interactive audio/video*?

(20 marks)

(b) The Lempel-Ziv-Welch (LZW) compression algorithm replaces string of characters as single code. Give the LZW compression algorithm in its simplest form.

Encode the string **/ABC/AB/ABB/ABD/ABE** by tracing the LZW algorithm.

(35 marks)

(c) Describe briefly the image file formats GIF, PNG and JPEG.

(20 marks)

(d) What is the video compression standard intended to use mainly for videoconferencing and video telephony?

What is the video compression standard intended to use mainly for computer applications?

(10 marks)

(e) Video compression is based on two types of redundancies among the video data. What are those redundancies? Describe briefly about those two types of redundancies.

(15 marks)

Q4)

(a) List the differences between static, dynamic and active web pages?

(15 marks)

(b) What are the main differences between HTML and XHTML?

(10 marks)

(c) State the use of each of the following tags in XHTML?
    1. <link>
    2. <script>
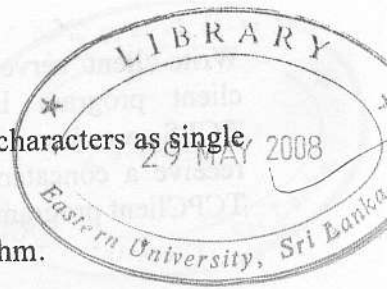   3. <input>

(15 marks)

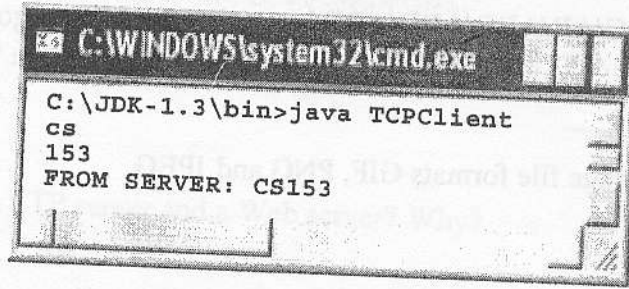(d) What are the advantages of using Cascading Style Sheet (CSS)?

(05 marks)

(e) Consider the following client/ Server application scenario for TCP protocol:

- A client reads a line from its standard input (keyboard) and sends the line out its socket to the server.
- The server reads a line from its connection socket.
- The server converts the line to uppercase.
- The server sends the modified line out its connection socket to the client.
- The client reads the modified line from its socket and prints the line on its standard output (monitor).

Write client/ server Java program pair for a TCP implementation of the above application. Th[e] client program is named as **TCPClient.java** and the server program is named a[s] **TCPServer.java**. The user at the client may then use the application to send two lines and then receive a concatenated capitalized version of the line. The sample inputs and output of the TCPClient program is shown below.

```
C:\WINDOWS\system32\cmd.exe

C:\JDK-1.3\bin>java TCPClient
cs
153
FROM SERVER: CS153
```

(40 marks)

What will happen if you run TCPClient on one host before TCPServer on another host? Give reasons for your answer.

(15 marks)