Part I. 33%

1. Enterprises increasingly provide e-Services via the Internet to generate new revenue or create new efficiencies. A lot of e-Services are provided on the Internet and each e-Service such as Hotel reservation can be offered via several e-Service providers with different criteria (e.g. Five-star Hotel). A database is required to organize the information of e-Services and e-Service providers. Suppose that the data of e-Services is stored as an ordered data file with 50000 records on a disk with block size = 1024 bytes. Each record stores the information of an e-Service. File records are of fixed size with record length = 100 bytes.
   (a) (2 %) What's the number of blocks needed for the data file of e-Services? How many block accesses would be needed to do a binary search on the data file?
   (b) (5 %) Assume that we have constructed a secondary index on a non-ordering key field of the file that is 15 bytes long and a block pointer that is 10 bytes long. What's the total number of index entries for the file? What's the total number of blocks needed for the index entries? How many block accesses would be needed to search for an e-Service using the secondary index?

2. Virtual stores are selling various product categories on the Internet. Suppose that virtual stores have been simplified and organized as a binary tree structure. Each node represents one virtual store. A root node H denotes the headquarters of all virtual stores. Each virtual store may sell more than one product category such as computer, CD-title, book and so on. A XML document is used to record the information of a virtual store, including the store name, product categories and links to other virtual stores (XML documents).
   (a) (4 %) Design your XML document to record the information of virtual store.
   (b) (6 %) Write an algorithm to find those virtual stores selling books, by starting from H. You need to describe how you process the XML documents.

3. Let G represent a process of e-Services executed on the Internet. (i) G is organized by nodes and directed links. Each node represents an e-Service. Each directed link is a dependency. Dependencies are used to describe the execution order and relationship between e-Services within a process. (ii) A dependency \( d = <X, Y> \) connects two e-Services X and Y, in which X is the preceding e-Service and Y is the succeeding e-Service. The dependency d is an outgoing dependency of X and an incoming dependency of Y. An e-Service may have more than one incoming dependency (predecessor) or outgoing dependency (successor). (iii) The length of a path is the number of dependencies on the path. (iv) E-Service X is said to have a higher order than Y if there is a path of length > 0 from X to Y, i.e., X proceeds before Y, and their ordering relation is denoted by X > Y. (v) G has one starting e-Service S, where S > V, for all other e-Service V in G. (vi) A longest path is a path that contains the maximal number of dependencies. (vii) There is no cycle in G.
   (a) (8 %) Use adjacency matrix to represent G, the process of e-Services. Based on the adjacency matrix representation, write an algorithm to generate the ordering relations between all e-Services in G, i.e., ordering[\( X, Y \)]= 1, if \( X > Y \); otherwise, ordering[\( X, Y \)]= 0.
   (b) (8 %) Use adjacency lists to represent G, the process of e-Services. Based on the adjacency list representation, write an algorithm to find the length of the longest path in G.
Part II. 33%

4. To enhance the traditional web, web service applications have mimicked the traditional web activities. Here are four layers of traditional activities and their web services counter parts. Please fill in the following chart.

<table>
<thead>
<tr>
<th>Function</th>
<th>Traditional Web Activities</th>
<th>Web Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Find a web site</td>
<td>Search Engine</td>
<td>(a)</td>
</tr>
<tr>
<td>Site description</td>
<td>Search engine site description</td>
<td>(b)</td>
</tr>
<tr>
<td>Transport protocol</td>
<td>HTTP</td>
<td>(c)</td>
</tr>
<tr>
<td>Data format</td>
<td>HTML</td>
<td>(d)</td>
</tr>
</tbody>
</table>

(2) Please explain in details for the answer (d) from the above table. (3%)

5. Please distinguish the difference between hacking and cracking. (6%)

6. What is cybersquatting? (3%) What is viral marketing? (3%)

7.

Company ABC has just added an employee workstation to its network. The employee is unable to connect to the server at IP address 192.168.10.98/27. Identify the incorrectly configured network parameter. (4%)

8. Which layer in the TCP/IP model corresponds to the OSI network layer? (3%)
   (a) Application
   (b) Transport
   (c) Internet
   (d) Network
   (e) Physical
9. Which Layer 2 component connects the network media to the host? (3%)
   (a) Hub
   (b) Switch
   (c) Bridge
   (d) NIC
   (e) Transceiver

Part III. 34%

10. 7%
何謂藍芽技術？藍芽技術主要的應用範圍為何？藍芽採取何種網路拓樸型態？

11. 7%
路由器(Router)怎麼知道依據訊息地址傳送資料？比較常用的路由協定是什麼？

12. 7%
什麼叫做 RFC？在哪裡可以拿到？為何 TCP 的 RFC 比 UDP 的 RFC 要頁數多而且複雜？

13. 7%
當使用 www 網路突然變得很慢而且不穩定。可能的因數有哪些？

14. 6%
如何避免個人電腦被裝置 spyware?