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A.

A-1. Multiple choice questions:

(choose only ONE answer for a question; 3% for each question)

(1) Which of the following techniques is NOT used for the authentication purposes?

   a. Digital watermark.
   b. Digital certificate.
   c. Message digest.
   d. Steganography.
   e. Digital signature.

(2) While it is important to protect all servers, some servers are more important than others. Which of the following criteria is the least important one in terms of determining the level of importance of a particular server?

   a. Invasion of privacy/loss of confidentiality.
   b. Interruption of or loss of support for activity (e.g., manufacturing, online service support, etc.).
   c. Loss of online access.
   d. Compromise of the integrity of customer accounts.
   e. Loss of ability to preventing illegal, malicious network intrusion.

(3) Which of the following statements regarding the use of information technology for facilitating decision making is TRUE?

   a. Dell Computer's online tools that allow users of their Web site to customize and order a new personal computer based on their specific needs are a type of customer decision support system.
   b. A system that uses data mining to guide senior marketing executive's decisions about customer retention can be categorized as an executive support system.
   c. Data visualization technologies help distill large amounts of information into easily read textual lists.
   d. The database of a decision support system is a collection of external data typically mined from the Internet and other third-party sources.
   e. Decision support system primarily addresses structured problems.

(背面仍有題目,請繼續作答)

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(4) A technique known as _____ enables a malicious Web master to displace the pages of an EC Web site in the search engine results pages to redirect customers to another site.

　　a. IP extension

　　b. Web page blocking

　　c. Web page hijacking

　　d. Web page phishing

　　e. Web page spoofing

(5) Which of the following systems should be the least of Jason's concern if he intends to devote his efforts into improving the performance of the logistics department of his company?

　　a. Inventory optimization system.

　　b. Supply chain planning system.

　　c. Supply chain execution system.

　　d. Order tracking system.

　　e. Vender managed inventory system.

(6) Asymmetric Digital Subscriber Line (ADSL) uses _____ to create three separate channels over the one local loop circuit.

　　a. triple DES

　　b. classless inter domain routing

　　c. multipoint circuit

　　d. frequency division multiplexing

　　e. serial-mode configuration

(7) Which of the following tables is in its third normal form?

　　a. Customer (customerID, customerLastname, customerFirstname, balance, creditLimit, salesRepresentativeNumber, salesRepresentativeFirstname, salesRepresentativeLastname).

　　b. Customer (customerID, customerLastname, customerFirstname, balance, creditLimit, address. phoneNumber, salesRepresentativeNumber).

　　c. Customer (customerID, customerLastname, customerFirstname, balance, creditLimit, salesRepresentativeFirstname, salesRepresentativeLastname).

　　d. Order (orderNumber, orderDate, itemNumber, itemDescription, numberOrdered, quotedPrice).

　　e. Order (orderNumber, orderDate, itemNumber, itemDescription, numberOrdered, quotedPrice, customerID).

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(8) ＿＿ cutover involves more risk than other information-system changeover methods.

    a. Parallel

    b. Synchronized

    c. Phased

    d. Direct

    e. Pilot

A-2. Modeling and short-answer questions:

(1) Draw a state transition diagram (i.e., state machine diagram or state chart) to describe the life cycle of the object *production line*" based on the Unified Modeling Language (UML) convention. A list of the potential states of this object may include idle, running, completed, problem interrupted, and maintaining. Make sure that you specify all the events that may trigger a change from one state to another.
(10%)

(2) Based on the Entity Relationship (ER) diagram presented below, construct a SQL query that allow you to view all the information of the members who was *fined* (a type of punishments for violating the library's policies) by the library authority for "*overdue*" (a kind of violation), while the books involved in the violations belong to the category/kind of "*travel guides*." If you think the ER diagram contains error(s) that may make your query unable to retrieve the complete information you intend to view, please specify and correct the error(s).

Note: You do not have to specify and correct all the errors in the ER diagram, just specify and correct the errors that must be corrected in order to make your query work.
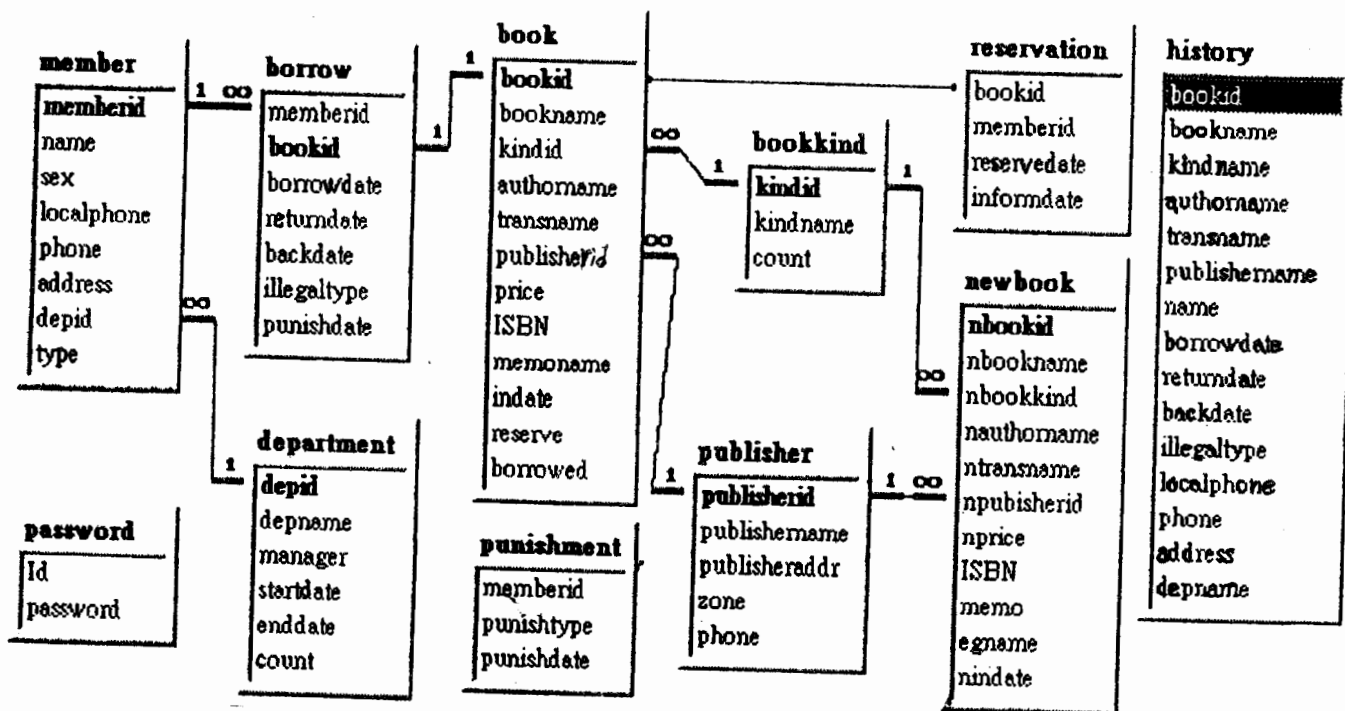(8%)

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(3) Briefly explain the reason for using the subnet masks and how a subnet mask
works in the IPv4 network.

(8%)

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B-1. (24%) Please explain/differentiate the following concepts.
- (a) (4%) Inheritance in object-oriented programming
- (b) (4%) Polymorphism in object-oriented programming
- (c) (8%) "Nonconstant pointer to constant data" versus "constant pointer to nonconstant data"
- (d) (8%) A binary tree (one of the data structures), and "traversing the binary tree in preporder"

B-2. (10%) Consider operator overloading in C++.
- (a) (5%) Please explain the differences between operators that are implemented as member functions and those that are implemented as global functions.
- (b) (5%) What are the operators that must be overloaded as member functions?

B-3. (16%) Suppose in **main()** of a particular C++ program, we have declared two arrays: **ia1** is a one-dimensional array of 10 integers, whereas **ia2** is a 10-by-6 (two-dimensional) array of integers.
- (a) (3%) If we intend to define the function **update** that is able to modify the values of these two arrays in the same C++ program, what are the declarations for the function **update**?
- (b) (3%) If we intend to define the function **computeAverage** that calculates the averaged value for these arrays but is unable to modify the values of these arrays, what are the declarations for the function **computeAverage**?
- (c) (10%) Dynamic memory management is useful when the size of an array is not known in advance. Here, we assume that **ia3** is used to store a two-dimensional array of integers but the size of **ia3** is not known until user input is given. You are asked to write the corresponding C++ code for each of the following instances: (i) Declare **ia3** in the beginning of **main()**. (ii) Allocate storage of the proper size for ia3 when the user input requests that **ia3** should store a 10-by-6 array of integers. (iii) When **ia3** is no longer needed, release the memory allocated for **ia3**.

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