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國立臺灣大學 109 學年度碩士班招生考試試題

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一、選擇題（單選）20 題，每題 2.5 分，共 50 分，請在每題的選項內選擇最適當的答案。

注意： **答錯倒扣 1 分，扣至零分為止。**（不答不倒扣）

※ 注意：請用 2B 鉛筆作答於答案卡，並先詳閱答案卡上之「畫記說明」。

1. _____ In object-oriented programming, the concept of hiding internal state and requiring all interaction to be performed through an object's methods is known as (A) Abstraction (B) Encapsulation (C) Inheritance (D) Polymorphism (E) Enveloping.

2. _____ Which of the following access modifiers in object-oriented programming specifies that only the current class and subclasses (and sometimes also same-package classes) of this class will have access to the field or method been defined? (A) internal (B) private (C) protected (D) class public (E) none of the above.

3. _____ Which of the following about Python programming language is wrong? (A) it supports functional programming style coding (B) it supports object-oriented programming (C) it supports procedural style coding (D) it supports imperative programming style coding (E) all of the above are correct (choose this one only if none of the above can be chosen).

4. _____ Which of the following about Python programming language is wrong? (A) it is a general-purpose programming language (B) it is statically-typed (C) it procedural can be executed by an interpreter (D) it uses whitespace indentation to delimit blocks (E) all of the above are correct (choose this one only if none of the above can be chosen).

5. _____ Which of the following best describes a software delivery model that is deployed and managed on a vendor's cloud computing infrastructure and accessed by users over the Internet as and when required? (A) On-demand software (B) pay-as- you-go (C) open source (D) mobile software (E) code-on-demand.

6. _____ Google App Engine is best characterized as an example of (A) Infrastructure-as-a-service (B) Software-as-a-service (C) App-as-a-service (D) Platform-as-a-service (E) Network-as-a-service.

7. _____ Which of the following is generally not characterized as a mobile payment service? (A) LINE Pay (B) Pi 錢包 (C) 街口 (D) 台灣 Pay (E) 噴噴.

8. _____ Which of the following best describes 5G's speed? (A) 10-100Mbps (B) 100-500Mbps (C) 300Mbps-1Gbps (D) 1-10Gbps (E) 10-100Gbps

9. _____ In computer networks, which of the following refers to a server that acts as an intermediary for requests from clients seeking resources (such as a file or web page) from servers that provide those resources. (A) cache (B) proxy (C) load balancing (D) firewall (E) none of the above.

10. _____ In computer networks, which of the following servers is responsible for resolving a name like www.im.ntu.edu.tw to its IP address? (A) URL server (B) web server (C) HTTP servers (D) exchange server (E) none of the above.

11. _____ Which of the following is wrong? (A) IPv4 uses a 32-bit address space (B) IPv6 uses a 120-bit address space (C) IPv6 is intended to replace IPv4 (D) IPv6 is the most recent version of the Internet Protocol (IP) (E) all of the above are correct (choose this one only if none of the above can be chosen).

12. _____ Which of the following network technology is most widely used in local area networks? (A) Ethernet (B) Token Ring (C) FDDI (D) ARCNET (E) none of the above.

13. _____ A _____ bit is a check bit that is added to a block of data to ensure that the total number of 1-bits in the string is even or odd. (A) spin (B) recovery (C) parity (D) detection (E) singularity.

見背面

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14. [_____] Bluetooth is popularly used in the following applications as a wireless communication technology except (A) between a mobile phone and a VR headset (B) between a mobile phone and a car stereo system (C) between a wearable device and a mobile phone (D) between a mouse and a laptop (E) all of the above are common applications of Bluetooth.

15. [_____] Which if the following is not a non-volatile memory/storage? (A) Solid-state drive (SSD) (B) DDR4 (C) read-only memory (ROM) (D) Flash memory (E) all of the above are non-volatile.

16. [_____] Which of the following standards is a specification for an information security management system (ISMS) intended to provide a framework of policies and procedures that includes all legal, physical and technical controls involved in an organization's information risk management processes. (A) ISO 9001 (B) ISO 7700 (C) ISO 14000 (D) ISO 27001 (E) none of the above.

17. [_____] In the CIA triad, a model designed to guide policies for information security within an organization, the letters 'CIA' refers to (A) Confidentiality, Integrity and Availability (B) Content, Information and Access (C) Central Intelligence Agency (D) Centralized, Independent, and Assurance (E) none of the above.

18. [_____] Which of the following SQL Commands creates a table "Customers" with two columns "CustomerID" and "CustomerName":

(A) CREATE TABLE Customers (CustomerID int, CustomerName varchar(255));

(B) CREATE DATABASE Customers (CustomerID int, CustomerName varchar(255));

(C) BUILD TABLE Customers (CustomerID int, CustomerName varchar(255));

(D) BUILD DATABASE Customers (CustomerID int, CustomerName varchar(255));

(E) none of the above.

19. [_____] Which of the following is a community-developed relational database management system intended to maintain high compatibility with MySQL and remain free and open-source due to the concerns over Oracle Corporation's acquisition of MySQL in 2009? (A) MonetDB (B) SAP R3 (C) Sybase (D) MariaDB (E) Firebird.

20. [_____] In the age of Internet of Things (IoT), the number of connected devices has grown rapidly in the past 10 years. Which of the following best describes the estimated number of connected devices worldwide in 2020? (A) 10-100 million (B) 100-500 million (C) 1-5 billion (D) 10-50 billion (E) 100-500 billion.

二、問答題 2 題，共 50 分。

※ 本大題請於試卷內之【非選擇題作答區】標明題號依序作答。

21. An ADT LIST contains items of the same type. The following C++ code fragment shows the class definition of an array-based implementation of ADT LIST that contains a list of integers.

(a) (15 points) Write the List::remove(int value, bool& success) function that removes value from the list. Note that the integers in the array are **sorted in ascending order and the list has NO duplicate items**.

(b) (15 points) If the array pointed by p_items is full, the list must resize it in order to add integers to the list. Write the function List::doubleArraySize() that doubles the size of the integer array.

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```
class List
{
public:
    . . .
// value: the integer to remove
// success: whether the removal is successful or not
    void remove(int value, bool& success);
private:
    . . .
    // double the size of the array pointed by p_items
    void doubleArraySize();

    // pointing to an integer array that stores integers
    // initialized as p_items = new int[arraySize];
    int    *p_items;

    // size of item array
    int     arraySize;  // default 20

    // number of list items
    int     itemCount; //default 0

};
```

22. HEAP is a complete binary tree that provides an efficient implementation of priority queues. Suppose we use a heap to manage a list of positive integers that large values mean high priority. The following C++ code fragment shows the class definition of the heap.

```
class HEAP
{
public:
    ...
    // boost items[i]'s priority
    void boostPriority(int i,int newPriorityValue)

private:
    ...
    int itemCount;    // number of heap items
    int items[100];  // array of heap items
};
```

(a) (20 points) Complete the following C++ function that boosts the priority value of element HEAP::items[i].

```
// assume 0 <= i < itemCount,
// and newPriorityValue > items[i]
void Heap::boostPriority(int i,int newPriorityValue)
{

}
```

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