國立成功大學 106 學年度碩士班招生考試試題

系　　所：資訊管理研究所

考試科目：計算機概論

考試日期：0214，節次：2

※ 考生請注意：本試題不可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

A-1 Multiple Choice Questions: (20%, 2% each)

(1) Which of the following protocol is used to translate an IP address to a MAC address? (A) DNS (B) ARP (C) DHCP (D) IP (E) PPP

(2) _____ is a lightweight data-interchange format, which is very popular for building Web APIs (A) XML (B) CSS (C) HTML (D) Javascript (E) JSON

(3) A processor contains small, high-speed storage locations, called _____, whose functions include storing the location from where an instruction was fetched, storing instructions and data, etc. (A) cache (B) virtual memory (C) register (D) RAM (E) flash

(4) Public-key encryption is also known as _____. (A) open-key encryption (B) symmetric key encryption (C) two-key encryption (D) scrambled encryption (E) asymmetric key encryption

(5) What technologies enable the IoT? (A) The Internet (B) Big Data (C) Sensors (D) NFC (E) All of the above

(6) _____ is copyrighted software that is distributed at no cost for a trial period. (A) Freeware (B) Open source software (C) Shareware (D) Custom software (E) Public-domain software

(7) _____ is an Internet standard that enables a local-area network (LAN) to use one set of IP addresses for internal traffic and a second set of addresses for external traffic. (A) IPv6 (B) Firewall (C) Tunneling (D) NAT (E) SSH

(8) When an operating system stores data on a disk, it places that data in the first available _____. (A) buffer (B) cell (C) block (D) array (E) sector

(9) _____ is a region in a program's memory space that stores variables that can be accessed globally. This region does not have size restrictions on variable size. However, it must be used very carefully to prevent memory leaks. (A) Heap (B) Stack (C) Buffer (D) Virtual memory (E) Code page

(10) What is the output of the following C++ code segment?

```
int z[5] = {1, 2, 3, 4, 5};
int* p = z;
int& r = z[2]
cout << *(&r+2) + *++p;
```

(A) 1 (B) 3 (C) 5 (D) 7 (E) 9

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A-2 Short Answer Questions: (30%)

(1) What is a database index? Please give an example. (3%)

(2) The following database table is susceptible to update anomalies. Please provide an example for such anomalies and fix the problem by normalizing the table (be sure to highlight the primary key(s) in your table(s) after normalization). (7%)

Staff ID	Surgeon Name	Patient ID	Patient Name	Appt. Data&Time	Surgery Room No.
S101	Emma Liu	0078583	Yu Na Seo	12-Aug-16 10:00	61113
S203	Aaron Liu	0062571	Min A Kwon	13-Aug-16 12:00	61115
S402	David Wu	0033166	Shin Ji Min	14-Sep-16 16:30	61204
S101	Emma Liu	0166788	Cho A Song	15-Oct-16 18:00	61210

(3) Write a recursive function that searches for a target in a sorted array using binary search, where the array, its size and the target are given as parameters. (5%)

(4) C++ supports multiple inheritance. However, multiple inheritance should be avoided in practice. Why? (5%)

(5) Whenever a user taps a button in an iOS/Android App, the button object notifies the App's view controller, which then performs the task requested by the user. However, the Button class is provided by the iOS/Android framework which completely has no idea what class the App's view controller (normally designed by the App's developer) is. How is this possible? Please explain your answer. (3%)

(6) What is *the principal of substitutability* of objected oriented design? (2%) According to the principal, the following program is badly designed. Why? (2%) How would you fix it? (3%)

```
class Toy {
public:
   virtual void on() = 0;
   virtual void off() = 0;
};

class ToyCar : public Toy {
public:
   void on() {…};
   void off() {…};
   void run() {
      cout << "Running;
   };
};
```

```
class ToyPlane : public Toy {
public:
   void on() {…};
   void off() {…};
   void fly() { cout << "Flying..."; }
};

class Child {
public:
   void play(Toy &toy) {
     if (typeid(toy) == typeid(ToyCar)) {
        dynamic_cast<ToyCar&>(toy).run();
     }
     else if (typeid(toy) == typeid(ToyPlane)) {
        dynamic_cast<ToyPlane&>(toy).fly();
     }
   };
};
```

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B-1. How do RFQs, RFPs, and RFIs differ? (9%)

B-2. What is P2P? How might small business benefit from a P2P network? (11%)

B-3. How does sleep mode differ from hibernate mode? (8%)

B-4. What is BYOD? What's the tradeoffs in this policy? (10%)

B-5. What are some advantages and a disadvantage of OLED technology? (12%)