題號： 392
國立臺灣大學 104 學年度碩士班招生考試試題
科目：計算機概論(C)
題號： 392
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一、選擇題（單選）35 題，每題 2 分，共 70 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）

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. According to cloud computing's service models (that is, 'X as a Service (XaaS), where 'X' can be data, software, platform, or infrastructure), Amazon's Amazon Web Services (AWS) belongs to (A) DaaS (B) SaaS (C) PaaS (D) IaaS (E) none of the above.

2. Continuing with the previous question, Gmail belongs to (A) DaaS (B) SaaS (C) PaaS (D) IaaS (E) none of the above.

3. Continuing with the previous question, Mac OS X Yosemite belongs to (A) DaaS (B) SaaS (C) PaaS (D) IaaS (E) none of the above.

Building a POS system usually requires building a database containing tables of records for products, customers, and transactions. Answer the following questions related to this.

4. Which of the following fields can be used as the primary key in a table of products for inventory? (A) Product Barcode (B) Item Name (C) Manufacture Date (D) Manufacture ID (E) all of the above.

5. Which of the following fields is more likely to be a foreign key in a table of products for inventory? (A) Product ID (B) Transaction ID (C) Manufacture ID (D) Buyer ID (E) Item Name.

6. Which of the following fields is not needed when building a table for transaction records? (A) Buyer ID (B) Transaction ID (C) Transaction Amount (D) Item Expiration Date (E) all of the above are useful in such a table.

7. Which of the following fields is likely to appear in both the table for product information and the table for customer information? (A) Product Barcode (B) Transaction ID (C) Customer ID (D) Transaction Date (E) none of the above.

8. Which of the following fields is likely to appear in both the transaction table and customer table? (A) Item Name (B) Product ID (C) Number of Items in Stock (D) Buyer Membership Expiration Date (E) none of the above.

9. Kickstarter is an example of (A) Crowdfunding (B) Crowdsourcing (C) folksonomy (D) Web2.0 (E) peer-to-peer lending.

10. Which of the followings best describes "O2O"? (A) acquiring customers from online to offline (B) acquiring customers from offline to online (C) serving customers offline and maintaining customer-relationship online (D) serving customers online and maintaining customer-relationship offline (E) selling products both online and offline.

11. A law says that the number of components on an integrated circuit will double every 1-2 years: (A) von Neumann bottleneck (B) Moore's law (C) Morris' law (D) Watson's law (E) none of the above.

12. A test of a machine's ability to exhibit intelligent behavior equivalent to, or indistinguishable from, that of a human: (A) Turing Test (B) Machine Learning (C) CAPTCHA (D) Chinese Room Argument (E) none of the above.

13. Which of the following technologies are used in both Apple Pay and Google Wallet? (A) Touch ID (B) Bluetooth (C) NFC (D) Beacon (E) None of the above.

14. Which of the following is not a top-level domain name? (A) .com (B) .info (C) .tw (D) .net (E) all of the above are top-level domain name.

15. A technology designed to prevent illegal distribution of movies, music, and other digital content: (A) encryption (B) decryption (C) digital right management (D) copy right management (E) digital certificate.

16. Which of the following concepts allows multiple programs within a computer to communicate with outside? (A) PORT (B) VPN (C) Tunneling (D) Time Division (E) Multiplexing.

17. The concept of cache relies on the following: (A) recently used content is unlikely to be used again (B) recently used content is likely to be used again (C) recently unused content is likely to be used soon (D) content is likely to be used in FIFO order (E) least used content is likely to be used soon.

見背面

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18. Which of the following is not a practice of the cache concept? (A) web proxy (B) memory in a disk drive (C) fast memory in a CPU (D) virtual memory (E) all of the above are.

19. 1 Peta Byte: (A) 10^{10} (B) 10^{20} (C) 2^{40} (D) 2^{50} (E) 2^{60}

20. Which of the following systems is responsible for translating host name to IP address? (A) Domain Name System (B) IPv4 (C) Directory Service (D) Discovery Service (E) none of the above.

21. Which of the following protocols is an Internet standard for email transmission? (A) POP (B) SIP (C) NTP (D) SNMP (E) none of the above.

22. Which of the following addresses is used for most IEEE 802 network technologies, including Ethernet and WiFi? (A) MAC (B) IPv4 (C) IPv6 (D) URI (E) none of the above.

23. In the Open Systems Interconnection (OSI) reference model, FTP belongs to (A) layer 4 (B) layer 5 (C) layer 6 (D) layer 7 (E) none of the above.

24. Which of the following is wrong? (A) UDP is connectionless (B) UDP does not guarantee no duplication of packets (C) UDP does not guarantee delivery of packets (D) UDP does not guarantee packets to be delivered in the order sent (E) all of the above are correct (choose this one if none of the above can be chosen.)

25. Which of the following protocols is not used in a client-server architecture? (A) HTTP (B) FTP (C) POP (D) LDAP (E) all of the above belong to client-server architecture (choose this one if none of the above can be chosen.)

26. The main purpose of database normalization is to reduce (A) error (B) redundancy (C) number of fields (D) number of rows (E) none of the above.

27. In short, a(n) _____ contains a database's metadata. (A) data scheme (B) data dictionary (C) data reference (D) documentation (E) none of the above.

28. _____ refers to a set of routines, protocols, and tools for building software applications such as to connect to an existing system or extend its functionality. (A) Web services (B) Representational State Transfer (REST) (C) Application Programming Interface (D) Procedure Calls (E) none of the above.

29. _____ refers to a measure of how well computer hardware, software, or an information system can grow to meet increasing performance demands. (A) fault tolerance (B) load balance (C) extensibility (D) parallel computing (E) scalability.

30. Which of the following is an ISO standard for information security? (A) ISO 9000 (B) ISO 27001 (C) ISO 19033 (D) ISO 7799 (E) ISO 23007.

31. Which of the following technologies is used to provide remote offices or individual users with secure access to their organization's network over a public telecommunication infrastructure such as the Internet? (A) Point-to-Point Protocol over Ethernet (PPPoE) (B) Point-to-Point Protocol (PPP) (C) ISDN (D) Telnet (E) none of the above.

32. Which of the following is a common language for business analysts, software architects and developers to describe, specify, design, and document existing or new business processes, structure and behavior of artifacts of software systems? (A) XML (B) object-oriented programming language (C) unified modeling language (D) COBOL (E) none of the above.

33. Which of the following is often used to define the conceptual view of database by working around real world entity and association among them? (A) object-oriented modeling (B) entity–relationship modeling (C) hierarchical modeling (D) multi-dimensional modeling (E) none of the above.

34. In object-oriented design, _____ refers to the ability for a class to extend or override functionality of another class. (A) polymorphism (B) information hiding (C) encapsulation (D) interface (E) none of the above.

35. In object-oriented design, _____ allows one to define the functions or methods signatures without implementing them. (A) inheritance (B) subclass (C) abstraction (D) interface (E) none of the above.

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二、問答題 2 題，每題 15 分，共 30 分。
請於試卷內之「非選擇題作答區」標明題號依序作答。

1. The heapsort algorithm starts with a procedure typically called heapify that turns the input array into a heap. Suppose that, for an array with n elements, the elements are indexed from 1 through n. Please describe an adequate heapify procedure in suitable pseudocode, assuming that we want a max heap. How many comparisons between elements may be performed in the worst case for an array of n elements? Please show your calculation. Finally, apply the procedure to an array containing 10 numbers: 0, 3, 4, 6, 7, 1, 2, 5, 8, and 9 (in this order). What will be the resulting array?

2. Design an algorithm that determines whether two sets of numbers, represented as arrays, are disjoint (i.e., not having a common element). The two input arrays may be of very different sizes. Suppose again that, for an array with n elements, the elements are indexed from 1 through n. Please present your algorithm in suitable pseudocode and make additional assumptions wherever necessary. What is the time complexity of your algorithm in terms of the sizes m and n of the two given arrays? Please show your calculation. The more efficient your algorithm is, the more points you will be credited for this problem. Be sure to consider the case where m is substantially smaller than n.

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