

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. Which of the following is not a benefit of cloud computing? (A) cost efficiency (B) easy backup and recovery (C) quick deployment (D) on-demand provisioning (E) all of them are benefits.
2. In cloud computing, which of the following is used to manage access between the guest operating systems running in virtual machines and the underlying hardware resources on the host computer? (A) Multi-Tenant System (B) Cloud Stack (C) Virtual OS (D) hypervisor (E) none of the above.
3. A software distribution model in which applications are hosted by a vendor or service provider and made available to customers over a network, typically the Internet: (A) Software as a Service (B) Shareware (C) cloud computing (D) Internet Service Provider (E) software virtualization.
4. Amazon's Elastic Compute Cloud (Amazon EC2) is best characterized as (A) Platform as a Service (B) Infrastructure as a Service (C) Web as a Service (D) Storage as a Service (E) none of the above.
5. Which of the following standards/protocols is not for network communications? (A) Ethernet (B) Token Ring (C) SCSI (D) WiMax (E) all of the above are.
6. In the Open Systems Interconnection (OSI) reference model, HTTP belongs to (A) layer 4 (B) layer 5 (C) layer 6 (D) layer 7 (E) none of the above.
7. In the Open Systems Interconnection (OSI) reference model, TCP/UDP belongs to (A) layer 4 (B) layer 5 (C) layer 6 (D) layer 7 (E) none of the above.
8. In the Open Systems Interconnection (OSI) reference model, IEEE 802.11 belongs to (A) layer 4 (B) layer 3 (C) layer 2 (D) layer 1 (E) none of the above.
9. Which of the following networking technologies for local area networks uses the CSMA/CD (carrier sense multiple access with collision detection) access method to handle simultaneous demands. (A) Ethernet (B) Token Ring (C) 802.11 (D) WiMax (E) none of the above.
10. Which of the following is wrong about the relational database model? (A) primary key is used to uniquely identify each row (B) foreign key is used to establish a relationship between rows of two tables (C) a database is a collection of tables (D) each row represents a relation (E) all of the above are correct.
11. Which of the following normal forms adds an additional requirement that every non-prime attribute of the table is dependent on the whole of a candidate key? (A) 1st (B) 2nd (C) 3rd (D) BCNF (E) none of the above.
12. Which of the following operations in relational database returns the Cartesian product of rows from tables? (A) INNER JOIN (B) CROSS JOIN (C) OUTER JOIN (D) FULL OUTER JOIN (E) none of the above.
13. Which of the following is not a format of a memory card? (A) CompactFlash (CF) (B) Secure Digital (SD) (C) microSD (D) Memory Stick (E) all of the above are.
14. Which of the following refers to the interface that allows one program to interact with another? (A) Advanced Programming Interface (B) Application Programming Interface (C) Remote Function Calls (D) Remote Program Calls (E) none of the above.
15. Which of the following refers to a large, expensive, powerful computer that can handle hundreds or thousands of connected users simultaneously? (A) Mainframes (B) super computers (C) embed computers (D) grid (E) parallel computers.
16. In object-oriented programming, _____ refers to the provision of a single interface to entities of different types. (A) encapsulation (B) inheritance (C) polymorphism (D) abstraction (E) none of the above.
17. In object-oriented programming, which of the following is designed for code reuse? (A) encapsulation (B) inheritance (C) polymorphism (D) abstraction (E) type system.
18. _____ is the practice of obtaining needed services, ideas, or content by soliciting contributions from a large group of people, and especially from an online community, rather than from traditional employees or suppliers. (A) Crowdfunding (B) Crowdsourcing (C) folksonomy (D) Web2.0 (E) collaborative filtering.
19. _____ refers to the means of interactions among people in which they create, share, and/or exchange information and ideas in virtual communities and networks. (A) folksonomy (B) social media (C) social context (D) social grooming (E) Wikipedia.
20. Which of the following is not a Web 2.0 concept? (A) Web as a platform (B) Harnessing Collective Intelligence (C) Data is the Next Intel Inside (D) End of the Software Release Cycle (E) all of the above.
21. Which of the following technology currently is the most convenient and popular way to allow a user to use his smartphone to retrieve additional information about a product? (A) NFC (B) RFID (C) QR-code (D) ultra-tag (E) embed chip.

22. Which of the following refers to offering online courses to a virtually unlimited number of participants openly via the web? (A) distant learning (B) e-learning (C) digital learning (D) MOOC (E) none of the above.
23. A program that extends the capability of a Web browser: (A) embedded code (B) plug-in (C) driver (D) gadget (E) widget.
24. A security attack in which one person or program successfully masquerades as another by falsifying data and thereby gaining an illegitimate advantage. (A) spoofing (B) botnet (C) honeypot (D) rootkit (E) none of the above.
25. Which of the following is not a benefit of hard disk "defragmentation"? (A) reduce storage space (B) reduce file access time (C) increase disk life (D) increase disk performance (E) all of the above are benefits.
26. Which of the following technology can be used to enhance data storage reliability? (A) Network Access Server (NAS) (B) RAID (C) parallelism (D) data encryption (E) none of the above.
27. In the public-key infrastructure (PKI), _____ refers to an entity that issues digital certificates. (A) registration authority (B) central authority (C) validation authority (D) certificate authority (E) none of the above.
28. In the public key encryption scheme, suppose A wishes to send a message to B, and the purpose of the encryption is just to let B believe that the message is indeed sent by A, not by any other person pretending to be A. Then, which key(s) should be used to encrypt the message? (A) A's public key (B) A's private key (C) A's public key and B's private key (D) A's private key and B's public key (E) B's public key.
29. Which of the following technology can be used to produce a "signature" of a file for verifying if the file has been altered? (A) encryption (B) striping (C) hashing (D) parity (E) none of the above.
30. Which of the following techniques is used to allow a single-processor computer to perform multi-tasking? (A) multi-processing (B) time-sharing (C) pipelining (D) virtualization (E) parallelization.
31. Which of the following operating systems currently has the largest market share in smartphones? (A) iOS (B) Symbian (C) RIM (D) Android (E) Windows Mobile.
32. Which of the following communication technology is best used for data transmission between personal devices? (A) 802.11 (B) NFC (C) Bluetooth (D) IrDA (E) none of the above.
33. A _____ is a group of compromised computers connected to a network. (A) botnet (B) zombie (C) honey pot (D) DDoS (E) DoS.
34. Which of the following charts are more suitable for scheduling in project management? (A) Heatmap (B) Structure chart (C) Gantt chart (D) Run chart (E) Pi chart.
35. Which of the following refers to the conversion strategy in which the old and the new systems run simultaneously for some period of time after which, if the criteria for the new system are met, the old system is disabled? (A) pilot (B) phased (C) sequential (D) direct (E) none of the above.

二、問答題 2 題，每題 15 分，共 30 分。

注意：請於試卷內之「非選擇題作答區」標明題號依序作答。

1. Design an algorithm that, given an array $A[1..n]$ of distinct numbers (i.e., an array named A with n entries of numbers that are all different), finds the smallest and the largest numbers in the array. The obvious algorithm uses $2n - 3$ ($= n - 1 + n - 2$) comparisons (between two numbers) to complete the task. It is possible to reduce the number of comparisons (with a different algorithm) and your design goal is to achieve that. Please describe your algorithm in suitable pseudocode and determine how many comparisons are needed in the best and the worst cases. The more efficient your algorithm is, the more points you will be credited for this problem.
2. Please explain what the complexity classes P and NP are. What relations are known about the two complexity classes? Describe two problems that are in NP but not known to be in P .