

Multiple Choice Questions : 3 points for each question *except 4 points for Question 1*

- 1) Which of the following is not a cause of inadequate alignment between IT and business?
A) A lack of communication B) Different objectives C) Not understanding each group's expertise
D) Lack of IT knowledge on the part of the business executives E) Lack of funds
- 2) Re-designing and automating business processes can be seen as a double-edged sword because:
A) increases in efficiency may be accompanied by job and morale losses.
B) increases in efficiency may be accompanied by poor data quality.
C) support for middle-management decision making may be offset by poor data quality.
D) reliance on technology results in the loss of hands-on knowledge.
- 3) Which of the following statements is correct?
A) An individual's right to privacy is absolute.
B) Determining and enforcing privacy regulations can be difficult.
C) An individual's right to privacy supersedes the needs of society.
D) Advances in information technologies have not affected individual privacy.
E) The Internet has increased individuals' privacy.
- 4) Which of the following best illustrates the sales revenue model?
A) eBay receives a small fee from a seller if a seller is successful in selling an item.
B) Epinions receives a fee after steering a customer to a participating Web site where he or she makes a purchase.
C) Flickr provides basic services for free, but charges a premium for advanced services.
D) Apple accepts micropayments for single music track downloads.
- 5) Data dictionaries perform all of the following functions except:
A) Providing information on each record.
B) Providing information on why attributes are needed in the database.
C) Defining the format necessary to enter data into the database.
D) Providing information on the name of each attribute.
E) Providing information on how often attributes should be updated.
- 6) Digital subscriber lines:
A) operate over existing telephone lines to carry voice, data, and video.
B) operate over coaxial lines to deliver Internet access.
C) are very-high-speed data lines typically leased from long-distance telephone companies.
D) have up to twenty-four 64-Kbps channels.

- 7) Organizations implement intranets to support _____ electronic commerce.
A) business-to-business B) business-to-consumer C) business-to-government
D) business-to-employee E) consumer-to-business
- 8) Which of the following is not a challenge for achieving net neutrality?
A) The amount of video traffic on the Internet is increasing.
B) Under current models, the investment required to meet future demand exceeds projected revenue growth.
C) Net neutrality might hinder U.S. competitiveness.
D) Network providers could censor certain content by slowing down or blocking access.
E) Telecommunications and cable companies are in favor of net neutrality.
- 9) _____ development focuses on rapid delivery of working software by breaking a large project into a series of small sub-projects that are completed in short periods of time using iteration and continuous feedback.
A) Agile B) Rapid application C) Joint application D) Object-oriented
- 10) Internet advertising improves on traditional advertising in all of the following ways except:
A) Internet ads can be updated at any time at minimal cost.
B) Internet ads can reach large numbers of potential buyers all over the world.
C) Internet ads are always more effective than other types of advertising.
D) Internet ads can make effective use of multimedia.
E) Internet ads are current.
- 11) An industry-wide effort to develop systems that can configure, optimize, tune, and heal themselves when broken, and protect themselves from outside intruders and self-destruction is called
A) grid computing. B) utility computing. C) virtualization. D) autonomic computing.
- 12) With regard to mobile computing, _____ means that it is easy and fast to access the Web and other mobile devices.
A) Ubiquity B) Convenience C) Instant connectivity D) B and C E) A, B, and C
- 13) Which of the following is not one of the principal management challenges in developing global systems?
A) encouraging local users to support global systems B) coordinating applications development
C) defining an acceptable test plan D) agreeing on common user requirements
- 14) Building relationships, anticipating needs, and providing special deals for the community's members is a function of which category of Web 2.0 applications?
A) Social networking B) Aggregators C) Blogs D) Crowdsourcing E) Social commerce

- 15) Data mining is a tool for allowing users to:
A) quickly compare transaction data gathered over many years.
B) find hidden relationships in data.
C) obtain online answers to ad hoc questions in a rapid amount of time.
D) summarize massive amounts of data into much smaller, traditional reports.
- 16) _____ integrate the planning, management, and use of all of an organization's resources, and are designed to tightly integrate the functional areas of the organization.
A) Transaction processing systems B) Supply chain management systems
C) Functional area information systems D) Enterprise resource planning systems
E) Corporate extranets
- 17) Which of the following best explains improved morale of sales personnel due to sales force management systems?
A) Customer contact information being recorded using e-forms that provide known customer data.
B) Common systems ensuring that sales personnel follow common processes and procedures.
C) Improved training and less "busywork" allowing a greater focus on selling and revenue generation.
D) Sharing of all sales-related information facilitating successful team selling.
E) E-forms ensuring that customer data is automatically entered.
- 18) Which of the following is not a responsibility of effective change management?
A) integrating legacy systems B) dealing with fear and anxiety about new systems
C) training users of the new system D) enforcing user participation at all stages of system development
- 19) When Wal-Mart sells a package of diapers, the company captures data on that sale at its point-of-sale terminal and transmits that data to the company that makes the diapers. When it is necessary, the diaper company restocks the diapers in that Wal-Mart store. This process is called:
A) supply chain management B) demand chain management C) vendor-managed inventory
D) enterprise resource planning inventory E) just-in-time inventory
- 20) Which of the following is an important capability for sales processes that is found in most major CRM software products?
A) returns management B) lead management C) channel promotions management
D) events management
- 21) Which of the following is not a reason why managers need IT support?
A) The number of alternatives is decreasing. B) Decisions must typically be made under time pressure.
C) Decisions are becoming more complex. D) There is a growing need to access remote information sources.
E) Decision makers are often based in different locations.

- 22) In service-oriented architecture, _____.
A) business processes are broken down into individual components or services
B) business processes of an organization are standardized
C) business processes of an organization are integrated from individual components
D) business processes are shared with channel partners
E) business processes are modified to prevent illegal activities within the process
- 23) Which of the following systems is not used to capture tacit knowledge?
A) expert system B) case-based reasoning C) fuzzy logic D) neural network
- 24) Which of the following statements is false?
A) Companies that use Software-as-a-Service are running applications on the vendor's hardware.
B) Application service providers are similar to Software-as-a-Service providers.
C) Companies that purchase open-source software cannot modify it.
D) Outsourcing refers to acquiring IT applications from outside contractors.
E) Insourcing refers to building IT applications in-house.
- 25) A cold backup site is a(n) _____.
A) empty warehouse with all necessary connections for power and communication
B) warehouse that contains non-critical information
C) warehouse that contains information on metadata rather than operational data
D) database that contains historical information and data
E) database that is used less frequently than other databases
- 26) Enabling management to make better decisions regarding organizing and scheduling sourcing, production, and distribution is a central feature of:
A) SCMs B) TPSs C) KMSs D) ERPs
- 27) Which of the following is a reason for the development of semantic Web?
A) Web pages can be understood by people but not by computers.
B) Users should be able to use any device in any network for any service.
C) Users give a lot of unnecessary personal information to social networking sites.
D) Widgets cannot be integrated into Web pages.
E) Users are skeptical while making purchases online due to the fear of getting cheated.
- 28) The leading methodology for understanding the really important information needed by a firm's executives is called the _____ method.
A) digital dashboard B) balanced scorecard C) KPI D) data visualization

- 29) While pursuing a global business strategy, the _____ prohibit(s) the implementation of local strategies, and thus a global company cannot quickly react to local challenges and opportunities.
A) increased bargaining power of customers B) threat of new entrants into the market
C) increased bargaining power of suppliers D) need to achieve economies of scale
E) threat of substitute products from other industries
- 30) When a firm provides a specialized product or service for a narrow target market better than competitors, they are using a _____ strategy.
A) product differentiation B) market niche C) mass customization D) process efficiency
- 31) Which of the following statements is true about exception reports?
A) They help analyze why a key indicator is not at an appropriate level or why an exception occurred.
B) They are produced at predefined intervals to support routine decisions.
C) They answer unplanned information requests to support a nonroutine decision.
D) They provide a summary of critical information on a recurring schedule.
E) They highlight situations that are out of the normal range.
- 32) How are information systems used at the industry level to achieve strategic advantage?
A) by building industry-wide, IT-supported consortia and symposia
B) by raising the bargaining power of suppliers
C) by encouraging the entry of new competitors
D) by enforcing standards that reduce the differences between competitors
- 33) Preventive maintenance of a system involves _____.
A) making changes to an information system to repair flaws in the design
B) making enhancements to improve processing performance or interface usability
C) making changes to a system to reduce the chance of future system failure
D) adding desired but not necessarily required system features
E) making changes to an information system to accommodate changing business needs

I. Choice problem, each question has only one answer. 3% for each.

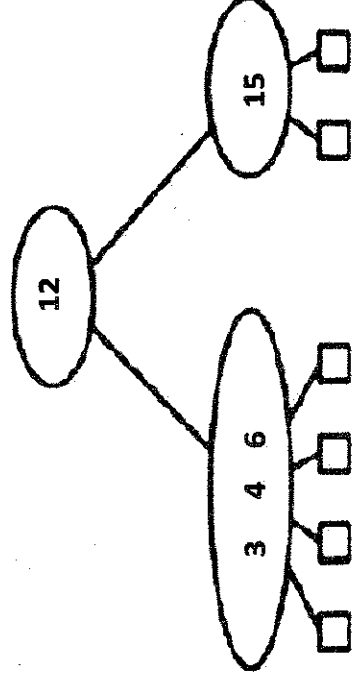
- 1 What philosophy is adopted by quick sorting? (a) dynamic programming; (b) divide and conquer; (c) greedy; (d) prune and search; (e) backtracking; (f) randomized.
- 2 What philosophy is adopted by binary search? (a) dynamic programming; (b) divide and conquer; (c) greedy; (d) prune and search; (e) backtracking; (f) randomized.
- 3 What philosophy is adopted by depth first search? (a) dynamic programming; (b) divide and conquer; (c) greedy; (d) prune and search; (e) backtracking; (f) randomized.
- 4 What philosophy is adopted by skip list? (a) dynamic programming; (b) divide and conquer; (c) greedy; (d) prune and search; (e) backtracking; (f) randomized.
- 5 What philosophy is adopted by shortest spanning tree? (a) dynamic programming; (b) divide and conquer; (c) greedy; (d) prune and search; (e) backtracking; (f) randomized.
6. What statement is false for the recursion? (a) it needs to call itself while execution; (b) it has the corresponding mathematical expression; (c) a tree can be defined in a recursive way; (d) we need to define the base condition where no more recursive call is needed; (e) generally, the performance is better than the iterative version for the same problem; (f) generally, we can write the recurrence relation for the recursive program.
7. What is false for the hashing? (a) hashing can run in a constant time to find the desired location if no collision; (b) In the worst time that each key is hashed to the same location, the searching will degenerate to a linear search; (c) if the key is a string, a hashing function can fold or extend the binary representation of the string as the bucket size; (d) for a hashing function use the function, like $\text{key mod } j$, j should be selected as a prime number; (e) in an open hashing, auxiliary structure is employed; (f) in separate chaining hashing, it needs additional memory.
8. What statement is false? (a) circular queue should reserve one empty space to distinguish the empty and full conditions; (b) double linked list causes more time than single linked list when insertion and deletion; (c) single linked list can back traverse a node if needed; (d) two $n \times n$ adjacent matrixes for two undirected graph, both of which has n nodes, can occupy a $n \times n$ array to store the node and link information; (e) adjacent list can easily find the edges connecting a node, but it is hard to find the nodes an edge is connected; (f) queue structure is commonly used in scheduling.

II. Briefly answer the following question: 12% for questions 1-5, and 16% for question 6.

1. Assume the five keys, mar, may, nov, aug, and apr, come to the system in the

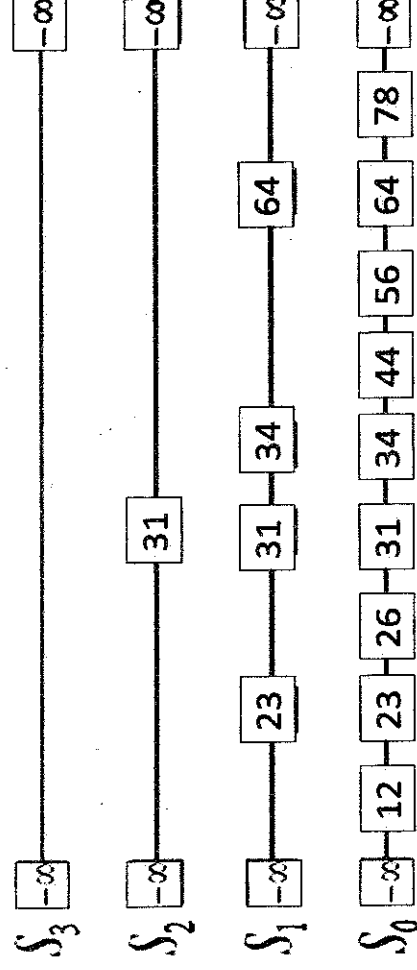
order and one by one. Please draw AVL tree, from empty AVL tree and one step by one step, to append the input and rotate the tree to host the five keys.

2. The following is a 2-4 tree. Assume the three keys, 5, 10, and 8 come to the tree. Please draw the 2-4 tree one step by one step to append the input and split the tree to host the three inputs.

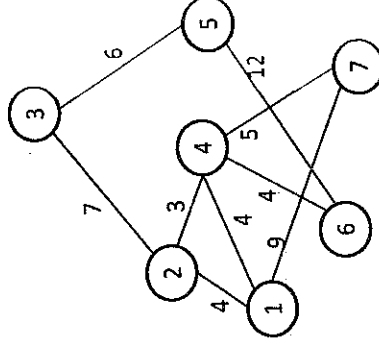


3. Assume the four keys, 4, 7, 12, and 15 come to the system in the order and one by one. Please draw a red-black tree, from empty red-black tree and one step by one step, to append the input and rotate the tree to host the four keys. Please indicate which node is black and which node is red.
4. Please draw the expression (binary) tree for the following expression,

$$a * (b + c / d) * e + f - g * h / (i - j).$$
 Then write the post-order algorithm for the post-order traversing.
5. For the following skip list, please redraw the skip list again in your answer sheet and mark the traversing path to find the key 56 and then write down the searching algorithm.



6. For the following graph, please draw its minimal spanning tree and shortest path from node 6 to node 3 (6%). Please write down the algorithm to find the minimal spanning tree in the graph (10%).



One teacher of ABC school would like to know the different impacts on students' learning between face-to-face and online teaching methods using multiple regression, randomized block design, time series, and factorial experiment analyses.

- 1 Please suggest two dependent variables and describe the data types of the variables (10 points)
- 2 Please suggest five independent variables related to the dependent variables of answer 1 and describe the data types of each variable. (10 points)
- 3 How to obtain a random sample? Please provide detail description of the sampling steps (10 points)
- 4 How many samples are needed (5 points)
- 5 Please provide detail description of data collection from the subjects chosen in answer 3(10 points)
- 6 Please use the variables of answers 1 and 2 and apply multiple regression, randomized block design, time series, and factorial experiment analyses (please provide needed null/alternative hypotheses).(40 points)
- 7 How to determine the appropriateness of the above analyses?(10 points)
- 8 Can the results of the above analyses apply to students in other schools? Why?(5 points)

一共五大題，每大題各 20 分。

1. Please describe the constraints that may be placed on participating entities in a relationship. Describe the purpose of integrity constraints and identify the main types of integrity constraint. (20%)
2. Please describe the main objective of conceptual database design. Identify the main tasks associated with conceptual database design. Identify and describe the purpose of documentation gathered during conceptual database design. (20%)
3. Please describe the advantages and disadvantages of creating data marts. Contrast the following terms: independent data mart, dependent data mart, and logical data mart. Explain the pros and cons of each of these three types of data mart. (20%)
4. Please give examples to explain how E-R entities are transformed into relations. (20%)
5. Please contrast the following terms: (20%)
 - a. optimistic concurrency control; pessimistic concurrency control
 - b. authorization; authentication
 - c. push replication; pull replication
 - d. dynamic view; materialized view

簡答題

1. What is System Development Life Cycle (SDLC) methodology (also list steps of SDLC)? Please identify its weaknesses and how these can be overcome? (20%)
2. What are Malware, Adware, and Spyware? From both technological and process perspectives, please discuss how we can avoid them? (20%)
3. What are logic ports? Please discuss how these ports are related to hacking and how the hacking can be prevented? (20%)
4. Please explain the meaning of Hyperthreading? Please use diagrams to illustrate how one, two, and four cores of processor are working based on Hyperthreading? (20%)
5. What is normalization of data? Please give example(s) to illustrate it. (20%)

