

Session I. Multiple Choice (3 points for each question)

Choose one answer only for each question

1. An aspect of cloud computing that allows developers to create, test, and run their solutions on a cloud platform without having to purchase or configure the underlying hardware and software is known as _____.
a. DaaS
b. IaaS
c. SaaS
d. PaaS
2. A(n) _____ is written for mobile devices running a particular mobile phone operating system.
a. native app
b. hybrid app
c. DSS
d. expert system
3. A(n) _____ can connect up to 127 different peripheral devices together with a single connector.
a. SLR device
b. USB port
c. port replicator
d. docking station
4. _____ uses short-range radio signals to enable computers and devices to communicate with each other.
a. Cellular radio
b. Bluetooth
c. Wi-Fi
d. A hot spot
5. A(n) _____ backup method is the only real-time backup, providing very fast recovery of data.
a. selective
b. full
c. incremental
d. continuous data protection
6. A _____ defines how users view the organization of data in a database.
a. data dictionary
b. data mart
c. data model
d. report writer
7. You register a domain name through _____, which is an organization that sells and manages domain names.
a. a cybersquatter
b. a registrar
c. ICANN
d. an ISP
8. Mobile payment apps use a payment system on phones equipped with a(n) _____, which stores data that is transmitted to a contactless terminal and verified as a legitimate sale.
a. QR chip
b. EULA
c. NFC chip
d. trojan horse
9. A _____ is a special series of bits that functions like a ticket.
a. packet
b. Bluebug
c. token
d. host

10. A(n)_____ check tests data in two or more associated fields to ensure that the relationship is logical and their data is in the correct format.
- completeness
 - consistency
 - range
 - alphabetic
11. What is the difference between the client-server architecture and the three-tier architecture?
- In the three-tier architecture, each tier is a database server.
 - In the client-server architecture, each client program has a presentation layer.
 - The three-tier application must be distributed over all desktops, but client-server does not.
 - The client-server application must reside on a server, but three-tier does not.
12. The *Process* stands for the activity of executing a program, which one is NOT *Process* state:
- program counter
 - general purpose registers
 - boot loader
 - associated memory cells
13. The *Process table* is NOT indicating following state:
- waiting time
 - ready/waiting
 - priority
 - memory area assigned to the process
14. When converting an XML document to Java classes, how should you think about XML elements?
- Elements are equivalent to classes.
 - Elements are like instance variables.
 - Elements are similar to superclasses.
 - Elements can be instance variables, classes, or methods.
15. What is wrong with the following statement?
- boolean result = statement.execute("SELECT * from emp WHERE empNum = '?'");*
- boolean should be ResultSet
 - execute should be executeQuery
 - execute should be prepareStatement
 - ? should be an integer

Session II. Problems and Calculations

1. (a) List all elements (in both binary and decimal) of 3 bits of two's complement (e.g. $000_{(b)} = 0_{(d)}$), (b) what is the value (in both binary and decimal) of the summation of the greatest element and the smallest element? (20 points, 16 points/4 points respectively)
2. A Machine cycle includes fetch, decode, and execute; how many machine cycles will be conduct per second for a 3GHz CPU? (5 points)

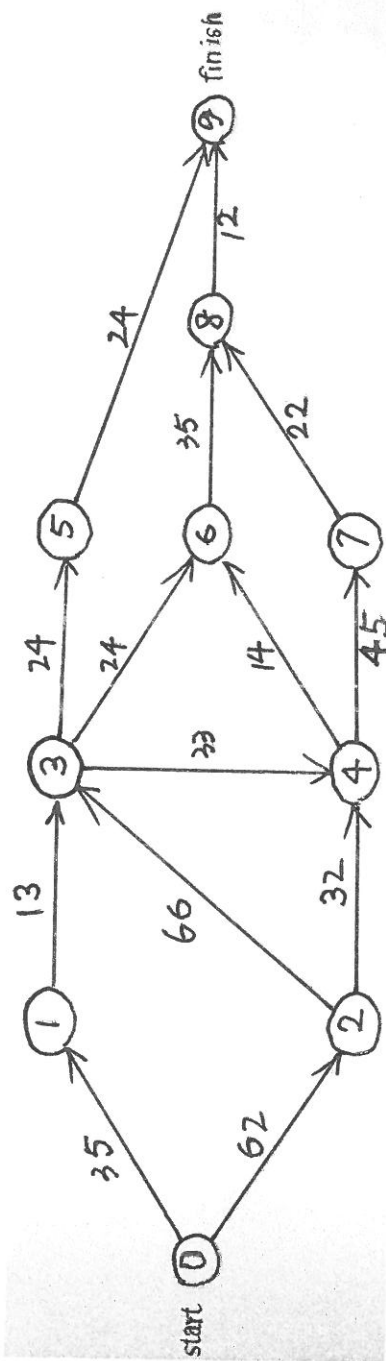
3. What is the corresponding value of 10100000 after performing left shift of (a) logic shift, (b) arithmetic shift, (c) rotation. (15 points, 5 points for each)
4. What elements does the data array contain after the following statements? (15 points)
- ```
double[] values = new double[10];
for (int i = 0; i < values.length; i++)
 values[i] = i * i;
```

一共 4 題，每題 25 分。

1. Please define enterprise systems, supply chain management systems, customer relationship management systems, knowledge management systems, and management information systems and describe their business benefits.
2. Regarding the principal tools and technologies for accessing information from databases to improve business performance and decision making, please
  - a. define big data and describe the technology for managing and analyzing it,
  - b. describe the capabilities of online analytical processing (OLAP),
  - c. define data warehouse and explain how it differs from a data mart,
  - d. define data mining and describe how it differs from OLAP and the types of information it provides, and
  - e. explain how text mining and Web mining differ from conventional data mining.
3. Regarding the components of organizational framework for security and control, please
  - a. define general controls and describe the types of general control,
  - b. define application controls and describe the types of application controls,
  - c. describe the function of risk assessment and explain how it is conducted for information systems,
  - d. define information systems auditing and explain how it promotes security and control, and
  - e. define and describe security policy and identity management.
4. Please describe how social technologies and Fintech (financial technology) have changed e-commerce.

Briefly answer the following questions (20% for each)

1. Please draw the expression tree for following expression  $((((35 + 13) \times 43)/((79 * 5) + -2)) - ((35 \times (+27 - 4)) * 6))$ .
2. For the AOE network of the following figure, please use the forward-backward approach to obtain the early start time and late start time for each activity, and which activities are critical?



3. Consider the railroad switching network in the following graph. Railroad cars numbered 0, 1, 2, 3, ..., n-1 are at the right. Each time (run) only four of cars in a time is brought into the stack and removed in two of cars in a time at any time. For  $n = 8$ , and  $n = 12$ , what are the possible permutations of the cars that can be obtained in the final for the above cases (i.e.,  $n = 8$ , and  $n = 12$ )?



4. Assume that the following ten terms, “ten”, “night”, “eight”, “seven”, “six”, “five”, “four”, “three”, “two”, “one”, in the order is inserted into a null AVL tree one by one. Please draw the two AVL trees after you insert the term, “five” and “two”, respectively.
5. For the following graph, in which each edge is a bi-directional link. Suppose you start from node k to traverse all the nodes in the graph. Please draw the traverse order in Depth-First and Breadth-first search, respectively. Note that if you have more than one node in several directions to traverse in the next move, you should select the first node in the clockwise order, i.e., in the order of upper, upper-right, right, lower-right, lower, lower-left, left, and upper-left.

