

考試科目	計算機概論	系所別	資訊管理學系/資管組	考試時間	2 月 7 日(五) 第二節
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I. Multiple Choice (48%, 4 points for each)

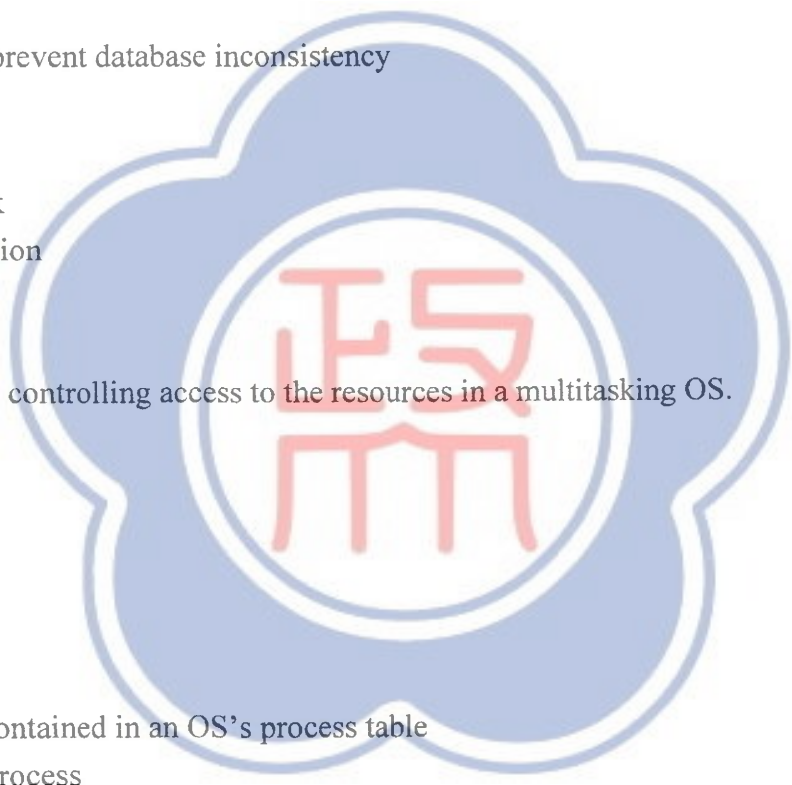
1. _____ is the data communication method used by clients and servers to exchange data on the Internet; whereas _____ is designed for the exchange of data on the Web.
 - a) HTTPS, UML
 - b) HTTPS, XML
 - c) URL, UML
 - d) URL, XML

2. _____ can be used to prevent database inconsistency
 - a) Two-step rollback
 - b) Two-phase commit
 - c) Two-phase rollback
 - d) Two-phase transaction

3. _____ is the technique for controlling access to the resources in a multitasking OS.
 - a) Semaphore
 - b) Interrupt
 - c) Dispatcher
 - d) Reboot

4. _____ would not be contained in an OS's process table
 - a) The priority of the process
 - b) The status of the process
 - c) Memory address
 - d) Machine code

5. The simplest RAID storage design writes data on different drives at the same time is _____.
 - a) duplicating
 - b) mirroring
 - c) partitioning
 - d) striping



備

註

一、作答於試題上者，不予計分。
 二、試題請隨卷繳交。

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6. In a RAID design, _____ can split data, instructions, and information across multiple drives in the array.

- a) duplicating
- b) mirroring
- c) partitioning
- d) striping

7. Which of the following statement(s) is true?

- a. Firmware consists of ROM or memory chips that store permanent instructions, such as start-up instructions
- b. Ethernet is in the data link layer, which transfers data between the network nodes
- c. ASCII can map characters to numeric values that allow a machine to process
- d. TCP/IP is in the presentation layer, which is responsible for delivering information to the application layer

- a) abc
- b) abd
- c) bcd
- d) abcd

8. Which of the following statement(s) is true?

- a. Stack is based on last-in-first-out principle; whereas Queue is based on first-in-first-out principle.
- b. In a queue: offer() is used to add an item, and remove() is used to retrieve an item.
- c. In a stack: push() is used to add an element to the collection, and pop() is used to remove the most recently added element.
- d. The peek() method can be implemented to view the first element in both the Queue and Stack structures.

- a) abc
- b) abd
- c) bcd
- d) abcd

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9. Which of the following statement(s) is true about sorting?

- a. Merge sort always outperform than selection sort.
- b. Selection sort and heap sort can have similar time complexity in the worst case scenario.
- c. Both quick sort and merge sort use the divide and conquer algorithm
- d. The heapsort algorithm first turns the data into a max heap

- a) abc
- b) acd
- c) bcd
- d) abcd

10. Which of the following is NOT true about digital security?

- a) passphrase is a sequence or combination of words, which often contains mixed capitalization and characters
- b) biometrics device authenticates a person's identity by translating his/her physiological or behavioral characteristics into an analog code
- c) symmetric key encryption allows the originator and recipient to use the same secret key to encrypt and decrypt data
- d) a user account enables a user to sign in to a network or computer, which defines who can access resources and when they can access the resources.

11. Which of the following is NOT true about digital storages?

- a) non-volatile NAND flash memory is often used in a solid-state drive
- b) a computer can have both a solid-state drive and a hard disk
- c) defragmentation can optimize the performance in both a solid-state drive and a hard disk
- d) a solid-state drive has quicker access times and runs quieter than a hard disk

12. Which of the following is NOT true about computing components?

- a) a machine cycle includes fetch, decode, execute, and store operations
- b) cache level-1 is built into the processor chip, whereas cache level-2 is separate from the chip and on the motherboard.
- c) a processor contains a control unit, interpreting and executing instructions in memory, and an arithmetic logic unit, performing calculations on the data in memory
- d) registers are at the top of the memory hierarchy, which provide the fastest way to access instructions

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------	-------	-----	------------	------	------------

II. Answer the following questions (52%)

1. What sequence of values will be printed in the following instructions (3%)

```
i = 4
while (i < 7):
    print(i)
    i = i + 2
print(i)
while (i > 2):
    print(i)
    i = i - 2
```

2. Given the following Java code:

```
public class StackExample implements StackGroup
{
    int[] StackEntry = new int[10];
    int StackCnt = 0;

    public void push(int NewStackEntry)
    {
        if (StackCnt < 10)
            StackEntry[StackCnt++] = NewStackEntry;
    }
}
```

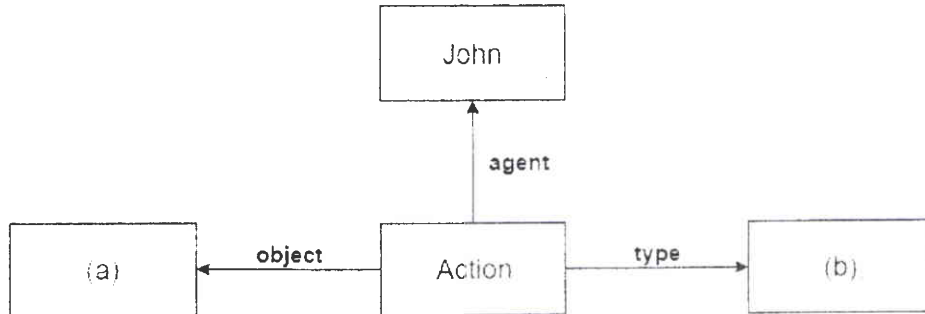
After executing the following statements:

```
StackGroup Stack1, Stack2;
Stack1.push(1);
Stack2.push(5);
Stack2.push(9);
```

- (a) What would be the value of StackEntry[0] associated with Stack1 after executing the above statements (3%)
- (b) What would be the value of StackEntry[0] associated with Stack2 after executing the above statements (3%)
- (c) What would be the value of StackEntry[1] associated with Stack2 after executing the above statements (3%)

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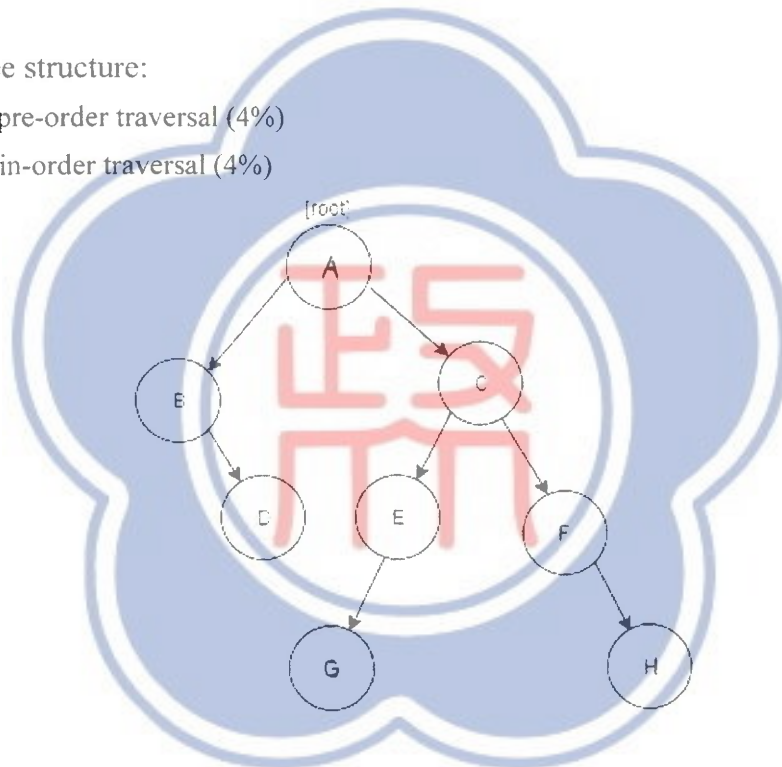
3. Given the semantic net below, fill in (a) and (b) to reflect the meaning of the sentence “John plays volleyball.” (6%, 3 points for each).



4. Given the following tree structure:

(a) what is the output in pre-order traversal (4%)

(b) what is the output in in-order traversal (4%)



5. Given an array containing these input digits: 35794814

(a) Perform a *merge* sort and explain the processes (4%)

(b) Perform an *insertion* sort and explain the processes (4%)

6. What are the differences between the SQL and NoSQL databases, regarding to the:

(a) definition (4%)

(b) scalability (4%)

(c) structure (4%)

(d) best used for (i.e., when to use SQL instead of NoSQL, and vice versa) (6%)