淡江大學九十三學年度碩士班招生考試試題

系別：資訊管理學系　　　　科目：資　訊　概　論

准帶項目請打「○」否則打「×」
簡單型計算機
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本試題雙面印製

1. (10%) Perform an addition operation on the following two decimals in binary representation. The sum should be converted back to a decimal.

$$(-320)_{10} + (228)_{10} = (\ ?\ )_2 + (\ ?\ )_2 = (\ ?\ )_2 = (\ ?\ )_{10}$$

where $(n)_b$ denote a number n in base b.

2. (10%) Write a recursive solution to the following power function,

$$pow(x,y) = x^y,$$

where x,y are integers with $x \neq 0$. Note that x and y can be negative.

3. (10%) Inheritance and polymorphism are two major object-oriented techniques which facilitate software reuse. Explain why.

4. (10%) In C++ and Java, private data members of an object can be accessed by other objects of the same class. Does this violate the encapsulation guideline of the object-oriented programming? Explain why.

5. (10%) What is starvation and deadlock? Is it true that starvation implies deadlock or vice versa. Explain why.

6. (10%) What is a thread pool? In a client-server architecture, why are clients better served by a thread pool than by a single process, multiple processes, or multiple threads?

7. (10%) What is passive-mode ftp? Why is it important for ftp clients behind a firewall to support passive-mode ftp?

8. (10%) What is a personal firewall as compared with an enterprise firewall? Explain how personal firewalls work.

9. (10%) What is an IP sharing device as compared with a router? Explain how IP sharing devices work.

10. (10%) Write-ahead logging with checkpoints can support database recovery with less overhead. Suppose after a system crash, the following records regarding 3 transactions T1, T2, T3, are kept intact in the log.

> —log begins—
> <T1 starts>
> <T1 B 170 150>
> <checkpoint>
> <T1 commits>
> <T2 starts>
> <T2 A 300 500>
> <T2 commits>
> <T3 starts>
> <T3 B 150 200>
> —system crashes—

where <Ti X old new> denotes a transaction Ti which updates data X from value old to value new.

a. Which transactions have to be applied the 'redo' and 'undo' operations respectively?

b. After recovery, what are the values for data A and B?