

所別：資訊管理學系碩士班 甲組 科目：計算機概論
乙組
丙組

一、選擇題

作答必須依序標明每小題之題號；答案所填之選項號碼，請如同試題用大寫 A, B, C, D, 否則不予計分。(2% each)

- 1.1 Referring to project management, what are quantitative measures of selected aspects of the process or the system?
(A) Software code inspections (B) Software metrics (C) Software milestones (D) Software project reviews
- 1.2 In the systems analysis phase, which one of the following is a good means of solidifying uncertain requirements?
(A) Prototyping (B) Information engineering (C) Structured programming (D) Inheritance
- 1.3 In the systems analysis phase, what is the graphical model that has proven to be quite valuable for modeling processes?
(A) ERD (B) DFD (C) CRC (D) Class Diagram
- 1.4 In object-oriented modeling, a particular sequence diagram documents the information flow within _____.
(A) an object (B) a subsystem (C) a single use case (D) a set of use cases
- 1.5 In structured design, one main principle is that program modules should be designed that each module accomplishes one clear task. What is the main principle?
(A) Loosely coupled (B) Tight coupled (C) Low cohesive (D) Highly cohesive
- 1.6 In UML, classes are depicted by boxes composed of three compartments - the top, the center and the bottom compartment. What is displayed in the center compartment?
(A) Name (B) Message (C) Operations (D) Attributes
- 1.7 Concurrency control can be a DBMS feature that is used to coordinate the simultaneous execution of transactions in a multiprocessing database system while preserving _____.
(A) consistency (B) independence (C) fragmentation (D) integrity
- 1.8 In the conceptual design stage, what will be done to reduce data redundancies?
(A) E-R modeling (B) Data analysis (C) Data model verification (D) Normalization
- 1.9 _____ is the database access middleware developed by Microsoft to provide a middleware API to Windows applications.
(A) Open DataBase Connectivity (ODBC) (B) Information resource manager (IRM) (C) Online analytical processing (OLAP) (D) Object-oriented database management system (OODBMS)
- 1.10 Referring to normalization in database, a table is in second normal form if it is in 1NF and it includes no _____.
(A) partial dependencies (B) repeating groups (C) transitive dependencies (D) non-candidate key determinants
- 1.11 In SQL, you use the WHERE clause to indicate _____ that is used to link the tables.
(A) the common primary key (B) the common tuple (C) the common attribute (D) the common foreign

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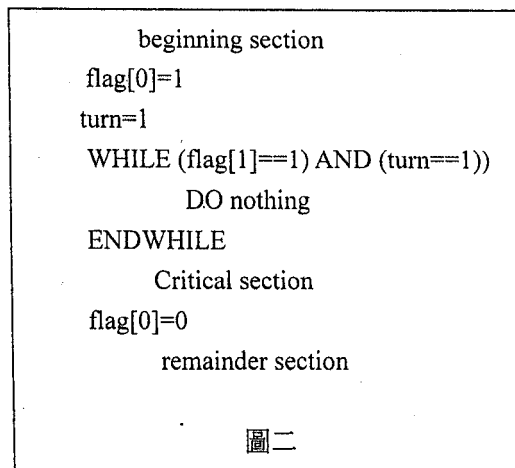
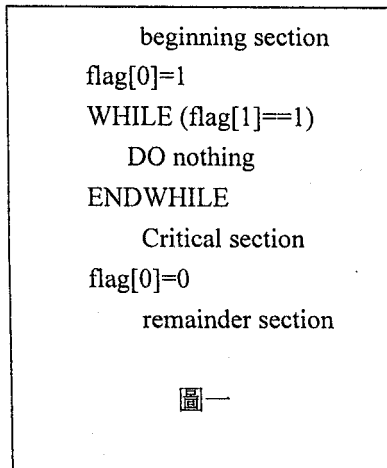
key

- 1.12 Referring to database, _____ is a condition in which different versions of the same data yield different results.
(A) data integrity (B) data dependence (C) data inconsistency (D) data fragmentation
- 1.13 作業系統利用行程控制表(Process Control Block, PCB)來管理行程(process)。以 Unix 為例，請問下列哪一類資訊不會記錄在該表中？
(A)行程執行時間 (B) 信號(signals) (C) CPU 型別與暫存器個數 (D) 虛擬記憶體分頁表
- 1.14 對於磁碟來說，下列容量單位的大小關係何者正確？
(A) track > cylinder > sector > cluster (B) cylinder > track > cluster > sector (C) track > cylinder > cluster > sector (D) cylinder > cluster > track > sector
- 1.15 動態連結函式庫(dynamic linking library)與靜態連結函式庫(static linking library)技術相比較，下列何者正確？
(A) 使用動態連結技術的程式執行較快 (B) 使用靜態連結技術的程式較有安全顧慮 (C) 使用動態連結技術的程式節省磁碟空間 (D) 以上皆是

二、下圖一是兩個行程(process)間要做 mutual exclusion 時的一種同步機制，請首先說明圖中 critical section 的意義為何？(2%)

然後再說明該機制有哪些問題存在？(4%)

圖二是圖一的改進，為什麼？請說明你的理由。(4%)



- 三、(1)何謂分頁錯誤(page fault)？(2%)
(2)作業系統如何得知分頁錯誤？(2%)
(3)當程式發生分頁錯誤時，作業系統會採取哪些步驟來處理此錯誤？(4%)
(4)系統管理員可以採取哪些方法來減少程式執行時的分頁錯誤？(2%)

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四、下列每一項網路技術各屬於 OSI 七層模型的那一層或那幾層：(2% each)

- (1) Allows a process to add synchronization point to a stream of data
- (2) Flow control
- (3) Interface to transmission media
- (4) Defines frames
- (5) Provides independence from differences in data representation
- (6) Communicates directly with user's application program
- (7) Route determination
- (8) Reliable process-to-process message delivery

五、請舉出三項 Web 2.0 的資訊技術，並簡單說明它的必要性。(9%)

六、程式題

6.1 (5%) When should "downcast" be explicitly used to avoid run-time error in Java? [single or multiple choices]

- A. When accessing the method of the superclass.
- B. When accessing the method of the subclass.
- C. When accessing the attribute of the superclass.
- D. When accessing the attribute of the subclass.
- E. None of the above.

6.2 (5%) What are the most important four "P"'s in project management? [single choice]

- A. Productivity, People, Project, Process.
- B. Product, People, Project, Process.
- C. Product, People, Project, Plan.
- D. Productivity, People, Project, Progress.

6.3 (5%) Choose correct answers regarding interface and abstract class in Java. [single or multiple choices]

- A. They are the same.
- B. Both can have constants as their attributes.
- C. Abstract class is used in Java to realize *multiple inheritance*.
- D. Interface cannot define any method implementation, but abstract class can.
- E. To have any instance of their type instantiated, they both need other class(es).

6.4 (10 points) The following code is all in one file "Tent.java". Please identify the output of its execution from answers (a) to (e).

```
// begin of Tent.java
class Equipment {
    String equipmentName;
    Equipment() {System.out.println("Equipment()");}
    Equipment(String name){
        equipmentName = name;
        System.out.println("Equipment("+equipmentName+"");
    }
}
class LivingSpace {
    Equipment u;
    LivingSpace() {
        System.out.println("Meal()");
    }
}
```

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```
}
LivingSpace(String equipmentName) {
    System.out.println("equipment name = " + equipmentName);
    u = new Equipment(equipmentName);
    System.out.println("LivingSpace("+equipmentName+"");
}
}
class Chair{
    Chair() {System.out.println("Chair()");}
}
class Desk{
    Desk() {System.out.println("Desk()");}
}
class Stool{
    Stool() {System.out.println("Stool()");}
}
class Sofa {
    Sofa() {System.out.println("Sofa()");}
}
class House extends LivingSpace {
    House() {
        super("anEquipmentForHouse");
        System.out.println("House ()");
    }
    House (String equipmentName) {
        super(equipmentName);
        System.out.println("House("+equipmentName+"");
    }
}
class PortableHouse extends House{
    PortableHouse () {
        super("anEquipmentForPortableHouse");
        System.out.println("PortableHouse ()");
    }
    PortableHouse (String equipmentName) {
        super(equipmentName);
        System.out.println("PortableHouse("+equipmentName+ ")");
    }
}
}
public class Tent extends PortableHouse {
    Chair b = new Chair();
    Desk c;
    Stool l = new Stool();
    Sofa t = new Sofa();
    Tent() {
        System.out.println("Tent()");
    }
    Tent(String equipmentName) {
        super();
        System.out.println("Tent(" +equipmentName+ ")");
    }
}
public static void main(String[] args) {
    System.out.println("Begin");
    Tent y = new Tent("smallEquipment");
    System.out.println("End"); }
}
// end of Tent.java
```

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Possible output:

(a)

Begin

End

(b)

Begin

equipment name = anEquipmentForPortableHouse

Equipment (anEquipmentForPortableHouse)

LivingSpace (anEquipmentForPortableHouse)

House (anEquipmentForPortableHouse)

PortableHouse ()

Chair()

Desk()

Stool()

Sofa()

Tent()

End

(c)

Begin

equipment name = anEquipmentForPortableHouse

Equipment (anEquipmentForPortableHouse)

LivingSpace (anEquipmentForPortableHouse)

House (anEquipmentForPortableHouse)

PortableHouse ()

Chair()

Desk()

Stool()

Sofa()

Tent (smallEquipment)

End

(d)

Begin

equipment name = anEquipmentForPortableHouse

Equipment (anEquipmentForPortableHouse)

LivingSpace (anEquipmentForPortableHouse)

House (anEquipmentForPortableHouse)

PortableHouse ()

Chair()

Stool()

Sofa()

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```
Tent()  
End  
  
(e)  
Begin  
equipment name = anEquipmentForPortableHouse  
Equipment(anEquipmentForPortableHouse)  
LivingSpace(anEquipmentForPortableHouse)  
House(anEquipmentForPortableHouse)  
PortableHouse()  
Chair()  
Stool()  
Sofa()  
Tent(smallEquipment)  
End
```