

系級：_____ 學號：_____ 姓名：_____

(請先將所有題目瀏覽一遍再作答)

Part I. E-R Diagram and Relational Database

1. Give an example to explain each of the following. (6%)

(a) Derived attribute

Ex. Age 為 Birthday 的衍生欄位，可由目前日期-Birthday 計算而得

(b) Composite attribute

Ex. Name=(First Name, Last Name), Address=(Street Address, City, Country), etc.

2. In a relational database, explain each of the following terms briefly. (6%)

(a) Referential integrity

講義 Ch5 : any foreign key value (on the relation of the many side) MUST match a primary key value in the relation of the one side. (Or the foreign key can be null)

(b) Modification anomaly

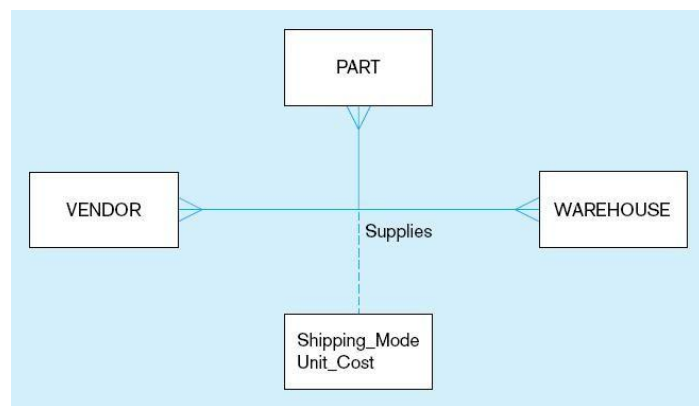
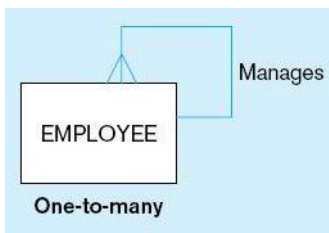
講義 Ch5 : Modification Anomaly – changing data in a row forces changes to other rows because of duplication.

3. Draw an example for each of the following. (8%)

(a) Ternary relationship

(b) Unary relationship

講義 Ch3

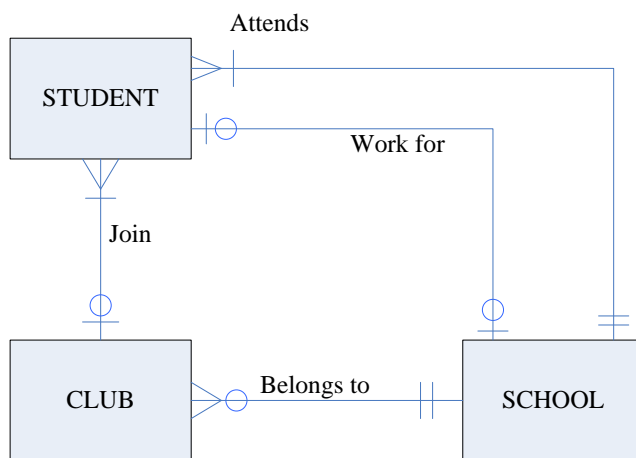


Part II. Exercise

4. According to the following business rules, please draw an E-R diagram, which includes entities, relationships, and cardinalities. (15%)

- There are schools (學院), students (學生), and clubs (社團).
- Every student attends one and only one school; every school has more than one student.
- Every student may optionally join one club; every club has more than one student.
- Every club belongs to one school; some schools have more than one clubs, some schools have none.
- Any student may work as an assistant (助理) for only one school; every school may have one assistant at most.

參考講義 Ch3



5. The following relation called GRADE Report for a university. (10%)

Table 5-4 Grade Report Relation

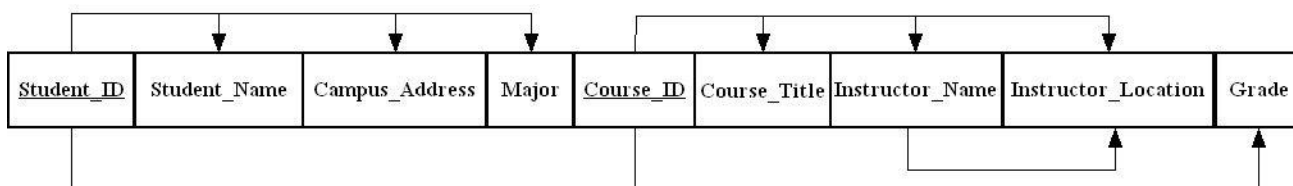
<u>Student_ID</u>	Student_Name	Campus_Address	Major	<u>Course_ID</u>	Course_Tittle	Instructor_Name	Instructor_Location	Grade
168300458	Williams	208 Brooks	IS	IS 350	Database Mgt	Codd	B 104	A
168300458	Williams	208 Brooks	IS	IS 465	Systems Analysis	Parsons	B 317	B
543291073	Baker	104 Phillips	Acctg	IS 350	Database Mgt	Codd	B 104	C
543291073	Baker	104 Phillips	Acctg	Acct 201	Fund Acctg	Miller	H 310	B
543291073	Baker	104 Phillips	Acctg	Mkgt 300	Intro Mktg	Bennett	B 212	A

(a) Please indicate the functional dependencies in the relation.

(b) Decompose the relation into a set of 3NF relations.

參考講義 Ch5

(a)



(b) 將 Student, Course, Instructor 切開,

因 Student 與 Course 的修課關係為 M:N, 故多一張修課關係表 Registration

而 Instructor 與 Course 開課關係為 1:M (FK 併入 Course 內)

STUDENT

<u>Student_ID</u>	Student_Name	Campus_Address	Major
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REGISTRATION

<u>Student_ID</u>	<u>Course_ID</u>	Grade
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COURSE

<u>Course_ID</u>	Course_Tittle	<i>Instructor_Name</i>
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INSTRUCTOR

<u>Instructor_Name</u>	Instructor_Location
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Part III. SQL

6. An internet company hires you as Database administrator for online auction services. (線上拍賣服務). There are three tables as the following.

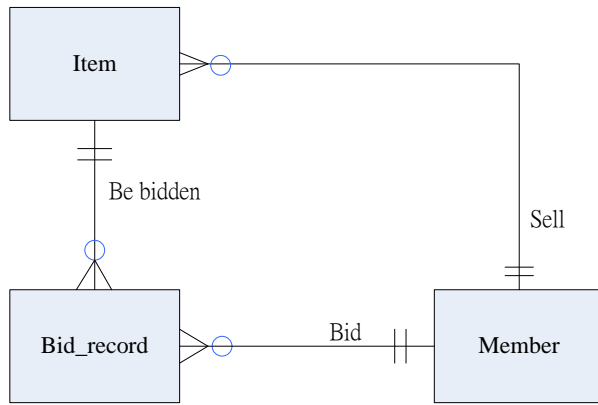
Member 會員					Bid_Record 競標紀錄			
會員編號	姓名	門號	銀行帳號	居住地區	會員編號	物品編號	出價時間	出價金額
id	name	phone_no	bank_acct	area	m_id	i_id	bid_time	bid_price
char(10)	char(10)	char(10)	char(10)	char(8)	char(10)	char(10)	char(16)	integer
M01	John	0935000003	8220000003	台北	M04	I01	2012/11/18 09:00	5000
M02	Mary	0935000004	0120000004	台南	M02	I01	2012/11/19 13:00	10000
M03	Bob	0918000005	8220000005	高雄	M04	I01	2012/11/21 09:00	12000
M04	Kevin	0939000006	0150000006	台北	M01	I02	2012/11/17 14:00	6500
					M02	I02	2012/11/20 13:00	8000
					M01	I03	2012/11/18 13:00	10500

Item 物品						
物品編號	類別	名稱	是否為新品	起標價	結標日期	所屬會員
id	type	name	status	price	end_time	m_id
char(10)	char(10)	char(20)	char(2)	char(8)	char(16)	char(10)
I01	手機	IPHONE 4	N	1	2012/11/20 09:00	M01
I02	平板	NEXUS 7	Y	6000	2012/11/30 13:00	M03
I03	手機	HTC J	Y	10000	2012/11/20 09:00	M02
I04	手機	SONY X10	N	5000	2012/11/23 14:00	M02

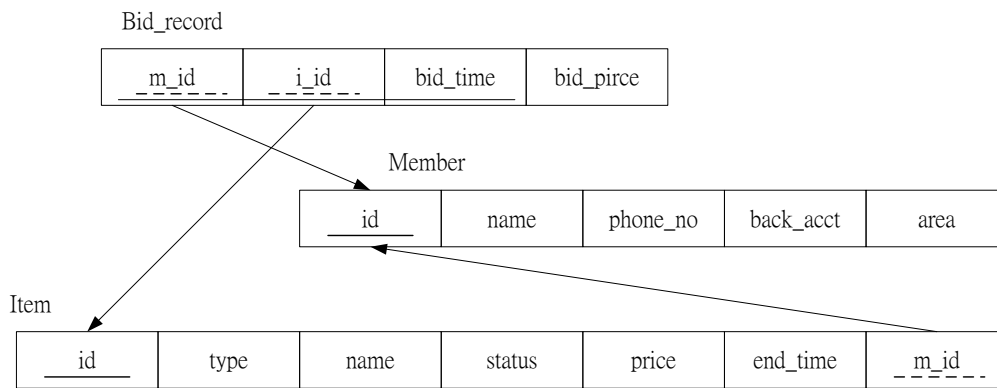
Please answer the questions. (15%)

- They lost the original design document. Please draw an E-R diagram for them, including entity and relationship (and cardinality).
- Also, please draw the relation schema, including table header and referential integrity (primary key and foreign key).
- Write the SQL statement to create table Bid_record, including all necessary constraints.
寫出建立 Bid_record 表格的 SQL 指令, 包含各種限制
- Write the SQL statement to add a field 'gender' to table Member.
寫出新增 gender 性別欄位至 Member 表格的 SQL 指令
- Write the SQL statement to update the member Bob's phone number to 0918000007.
寫出更改會員 Bob 的手機號碼為 0918000007 的 SQL 指令

(a)



(b)



FK 虛線未標不扣分

Bid_record 之主鍵需包含 bid_time (因為同會員對同物品可能出價多次)

```
(c) CREATE TABLE Bid_record (  
    m_id char(10) not null,  
    i_id char(10) not null,  
    bid_time char(16) not null,  
    bid_price integer,  
    constraint pk1 primary key (m_id, i_id, bid_time),  
    constraint fk1 foreign key (m_id) references Member(id),  
    constraint fk2 foreign key (i_id) references Item(id)
```

)
主鍵需包含 bid_time

```
(d) ALTER TABLE Member ADD birthday CHAR(10)
```

```
(e) UPDATE TABLE Member SET phone_no='0918000007' WHERE name='Bob'
```

Please write the SQL statement for each requirement (40%)

- (f) List the names and price of the mobile phones, whose starting prices are lower than 6000.
列出起標價低於 6000, 類別為手機的物品名稱與價格
- (g) List the names of the members in Taipei 列出在台北的會員姓名
- (h) List the names of the members, whose phone numbers start with 0935.
列出門號開頭為 0935 的會員姓名
- (i) List the number of members for every area, in descending order.
列出各地區的會員人數, 由人數多至少排序
- (j) List the names of members, who ever bid two or more times.
列出曾競標 2 次以上的會員姓名 (不分物品)
- (k) List the names of members, who never provide items to bid.
列出不曾提供拍賣物品的會員姓名
- (l) HOT LIST – for every item, list its name and the number of bid, in descending order.
熱門物品列表 – 列出每項物品的名稱與被出價次數, 由次數多至少排序
- (m) TOP LIST – for every item, list its names and price gain from bidding, in descending order.
競價排行榜 – 列出物品名稱與競標價差 (出價減去起標價, 取最大的一筆), 由價差多至少排序

(f) **SELECT name, price**
FROM Item
WHERE type='手機' AND price<6000;

(g) **SELECT name**
FROM Member
WHERE area='台北';

(h) **SELECT name**
FROM Member
WHERE phone_no LIKE '0935%';
用星號亦可

(i) **SELECT area, count(*)**
FROM Member
GROUP BY area
ORDER BY count(*) DESC;

(j) **SELECT m.id, m.name, count(*)**
FROM Member as m, Bid_record as b
WHERE m.id=b.m_id
GROUP BY m.id, m.name
HAVING count(*)>=2

GROUP BY 只用 m.name 亦可 (但不建議)

(k) **SELECT name**
FROM Member
WHERE id
NOT IN
(SELECT m_id
FROM Bid_record);

使用 **LEFT OUTER JOIN** 再判斷 null 亦可

(l) **SELECT i.id, i.name, count(*)**
FROM Item as i, Bid_record as b
WHERE i.id=b.i_id
GROUP BY i.id, i.name
ORDER BY count(*) DESC

GROUP BY 只用 i.name 亦可 (但不建議)

(m) **SELECT i.id, i.name, max(b.bid_price-i.price)**
FROM Item as i, Bid_record as b
WHERE i.id=b.i_id
GROUP BY i.id, i.name
ORDER BY max(b.bid_price-i.price) DESC

GROUP BY 只用 i.name 亦可 (但不建議)

END.