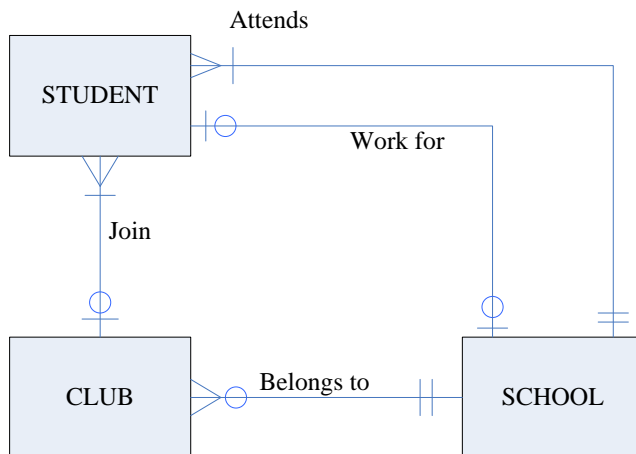


系級：\_\_\_\_\_ 學號：\_\_\_\_\_ 姓名：\_\_\_\_\_

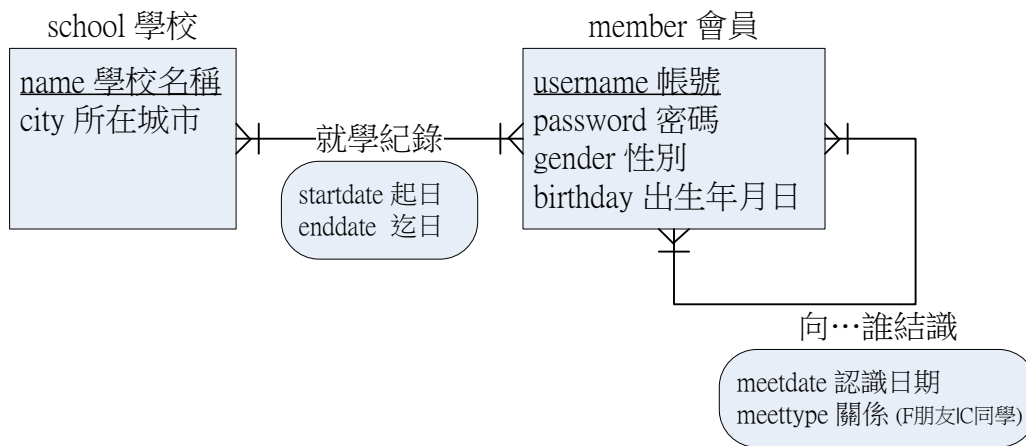
(請先將所有題目瀏覽一遍再作答)

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

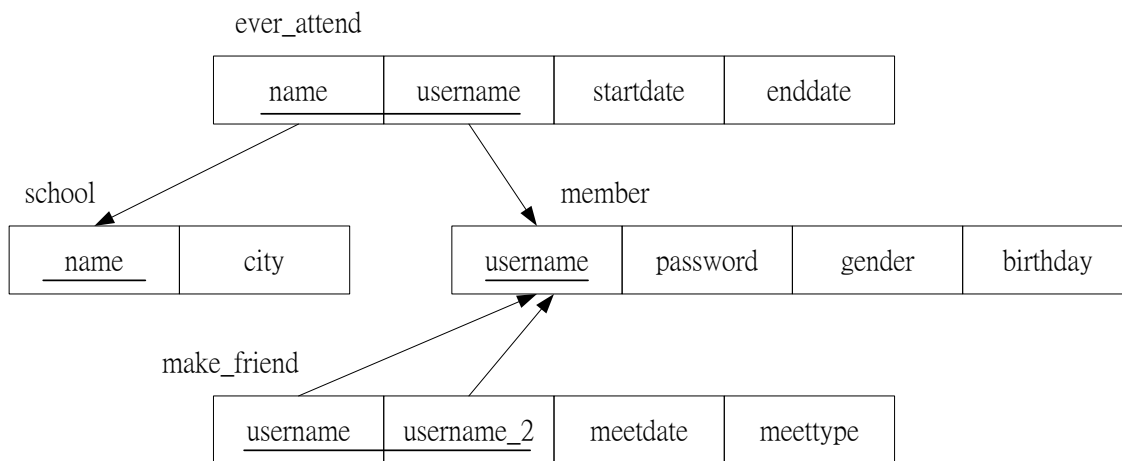
- There are schools (學院), students (學生), and clubs (社團).
- Every student attends one and only one school; every school has more than one student.
- Every student may optionally join one club; every club has more than one student.
- Every club belongs to one school; some schools have more than one clubs, 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**

2. You want to develop 'another Facebook' after watching the movie 'Social Network.' According to the following E-R diagram, please transform it into a set of tables, and indicate clearly the primary keys, foreign keys, and the referential integrity constraints. (15%)

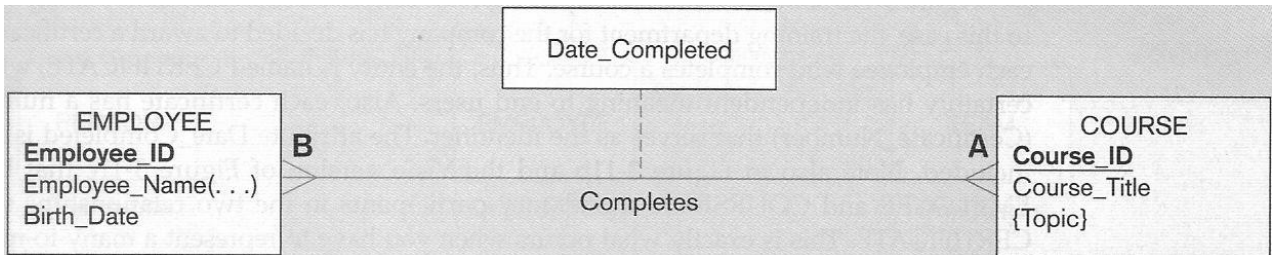


參考講義 Ch5

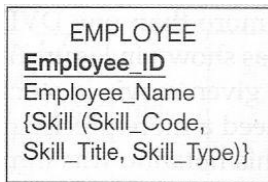


3. Transform each of the following E-R diagrams to a relational schema that shows referential integrity constraints, and functional dependencies. If any of the relations are not in 3NF, transform those relations to 3NF. (20%)

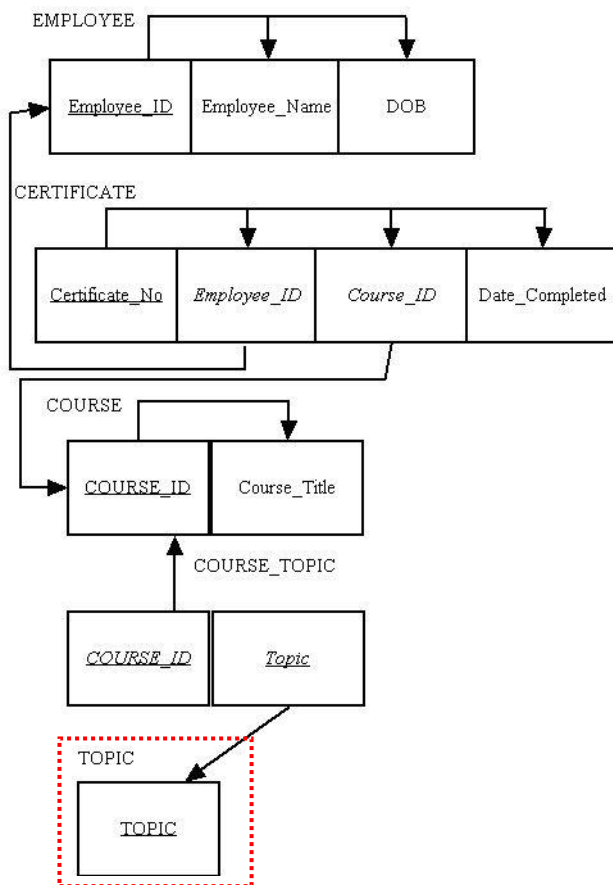
(a) Fig 3-11a



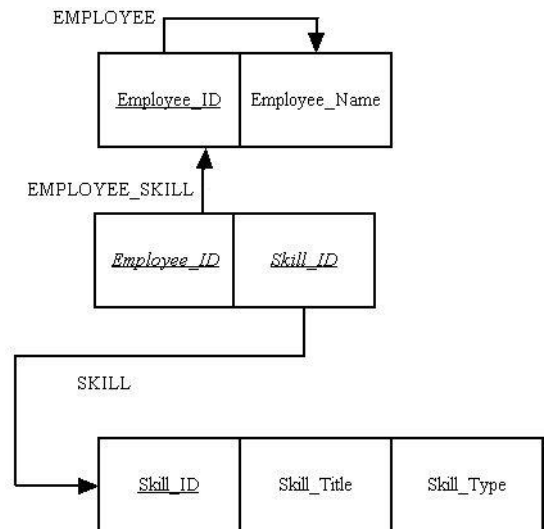
(b) Fig 3-15b



**參考講義 Ch5**



(a) 注意將 Topic 切開，中間並多一個 Associative Entity (虛線部份可略)



(b) 注意將 Skill 切開，中間並多一個 Associative Entity (這樣才能表示一對多，又無重覆資料)

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

**Table 5-4** Grade Report Relation

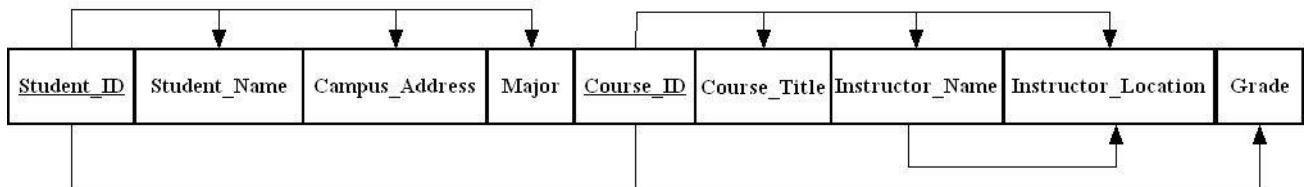
GRADE REPORT		宿舍住址			教師辦公室			
<u>Student_ID</u>	Student_Name	Campus_Address	Major	<u>Course_ID</u>	Course_Tittle	Instructor_Name	Instructor_Location	Grade
168300458	Williams	208 Brooks	IS	IS 350	Database Mgt	Codd	B 104	A
168300458	Williams	208 Brooks	IS	IS 465	Systems Analysis	Parsons	B 317	B
543291073	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, 因此直接併入 Course 內即可, 不需切開

STUDENT

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

REGISTRATION

<u>Student_ID</u>	<u>Course_ID</u>	Grade
-------------------	------------------	-------

COURSE

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

INSTRUCTOR

<u>Instructor_Name</u>	Instructor_Location
------------------------	---------------------

5. 你負責公司的手機維修部門，並擁有以下的資料庫表格，其中故障原因的值只能是 RCP (收訊)、BTY (電池)、或 OTH (其它) 三種。(10%)



- (a) 請寫出可建立這兩張表格的 SQL 指令 (注意主鍵、關聯、值域檢查的部份)  
 (b) 若維修單需新增「model 手機型號」欄位 (內容為文字)，請寫出對應的 SQL 指令

(a) 指令如下

```
CREATE TABLE Customer (
  id      INTEGER NOT NULL,
  name    CHAR(20),
  telno   CHAR(20),
  PRIMARY KEY (id);
```

CREATE TABLE Ticket (

```
  sno      INTEGER NOT NULL,
  id        INTEGER,
  date      DATE,
  type      CHAR(3),
  CHECK (type IN ('RCP', 'BTY', 'OTH')),
  PRIMARY KEY (sno),
  FOREIGN KEY (id) REFERENCES Customer(id);
```

(b) 指令如下

```
ALTER TABLE Ticket ADD ( model char(20) );
```

6. Regarding Referential integrity, please answer the following questions briefly: (10%)

- (a) In a relational database, what are the 3 types of anomalies that may arise in a table ?  
 (b) Referential integrity is supported in SQL. Explain how the ON UPDATE RESTRICT, ON UPDATE CASCADE, and ON UPDATE SET NULL clauses differ.

(a) 講義 Ch5 p40~42 :

Insertion Anomaly – adding new rows forces user to create duplicate data

Deletion Anomaly – deleting rows may cause a loss of data that would be needed for other future rows

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

(b) 講義 Ch7 p21 :

ON UPDATE RESTRICT can only be deleted if it is not found in the FK-side table.

ON UPDATE CASCADE changing the value will result in that value changing in the FK-side table to match.

ON UPDATE SET NULL when the value changed, any value in the FK-side table that matches the old value is set to NULL.

7. 某電信公司徵求顧客關係管理人員 1 位，需熟稔顧客資料操作。顧客資料表格如下，請以 SQL 進行以下 5 個查詢動作。(20%)

顧客			
Customer			
門號	姓名	生日	居住地區
phone_no	name	birthdate	area
char(10)	char(10)	char(8)	char(8)
0935000003	張三	20001020	台北
0935000004	李四	20010120	台北
0918000005	王五	20001120	新竹
0939000006	陳六	20001220	高雄

分店		
branch		
分店代號	名稱	所在地區
branch_code	name	area
char(2)	char(10)	char(8)
1	台北總店	台北
2	新竹店	新竹
3	高雄店	高雄

異動	
action	
異動代號	名稱
action_code	name
char(2)	char(10)
1	新裝
2	變更資費
3	退裝

資費		
rateplan		
資費代號	名稱	單價(秒)
rate_code	name	unit_price
char(2)	char(10)	integer
A	學生族	2
B	商務人士	1

通話紀錄				
log_call				
發話門號	受話門號	開始日期	開始時間	持續秒數
phone_no1	phone_no2	date	time	duration
char(10)	char(10)	char(8)	char(4)	integer
0935000003	0935000004	20091121	0800	60
0935000003	0918000005	20091122	0900	120
0935000003	0939000006	20091122	1000	120
0918000005	0939000006	20091125	1300	180
0935000004	0918000005	20091127	0800	180
0939000006	0932000007	20091129	1400	120

異動紀錄				
log_action				
門號	分店代號	異動代號	資費代號	異動日期
phone_no	branch_code	action_code	rate_code	date
char(10)	char(2)	char(2)	char(2)	char(8)
0935000003	1	1	A	20091005
0935000004	2	1	B	20091015
0918000005	2	1	A	20091025
0939000006	3	1	B	20091105
0935000004	1	2	A	20091115
0939000006	3	3		20091130

- 列出住在台北的顧客姓名
- 列出門號開頭為 0935 的顧客姓名
- 列出各居住地區的顧客人數，由人數多至少排序
- 列出曾發話給 2 個門號以上的發話門號
- 列出所有曾「新裝」為「學生族」資費的門號與異動日期

(a) SELECT name  
FROM customer  
WHERE area='台北';

(b) SELECT name  
FROM customer  
WHERE phone\_no LIKE '0935%';

(c) SELECT area, count(\*)  
FROM customer  
GROUP BY area  
ORDER BY count(\*) DESC;

(d) SELECT phone\_no1, count(\*)  
FROM log\_call  
GROUP BY phone\_no1  
HAVING count(\*)>=2  
ORDER BY count(\*) DESC;

(e) SELECT l.phone\_no  
FROM log\_action AS l, action AS a, rateplan AS r  
WHERE l.action\_code=a.action\_code  
and l.rate\_code=r.rate\_code  
and a.name='新裝' and r.name='學生族';

直接用代碼查詢亦可

END.