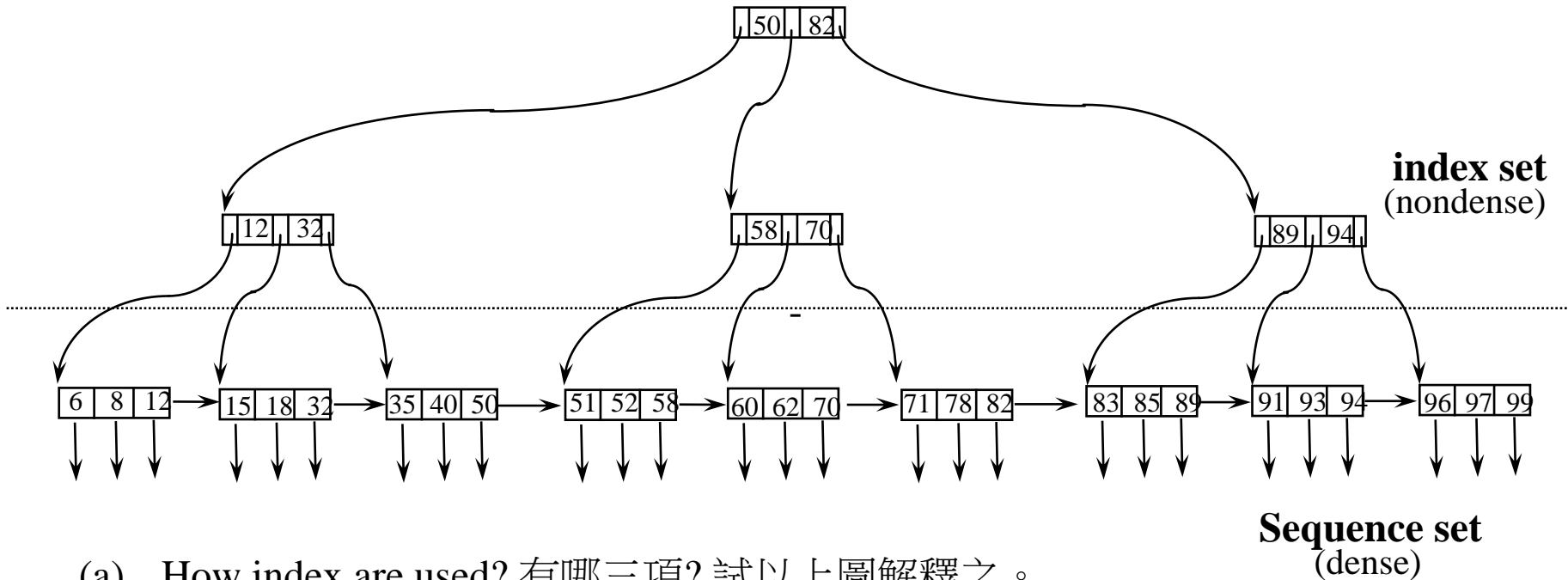


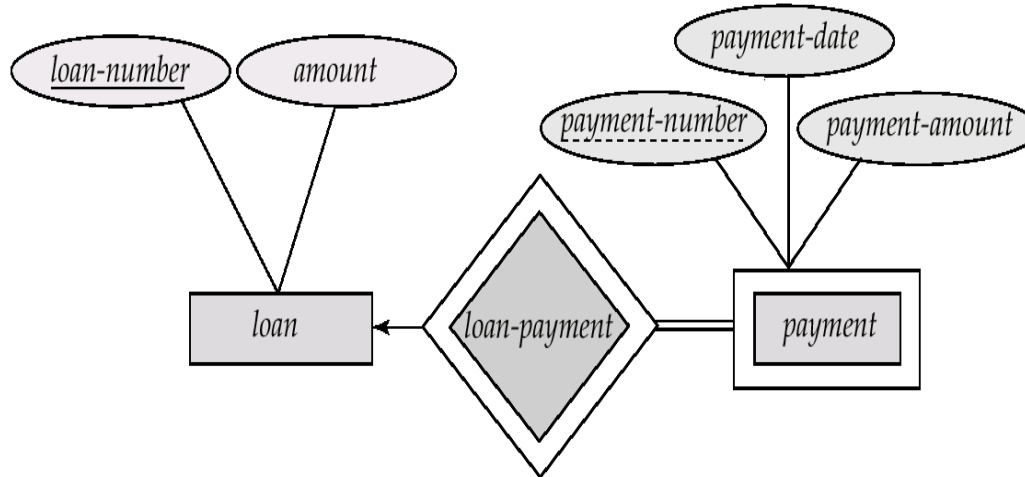
Question 1: [About B+ Tree] (20%)



- How index are used? 有哪三項? 試以上圖解釋之。
- How to get record with key = 18, and how many disk I/O are needed to get it?
- If we want to print out all records, at least, how many disk I/O are needed?
- In general, what are the advantages and disadvantages of using “index”?

Question 2: E-R Model → Tables (20%)

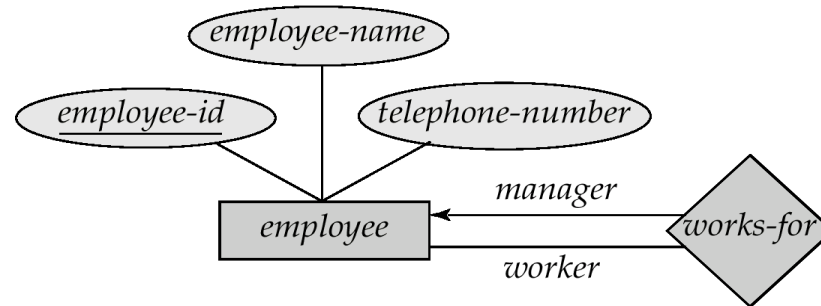
- E.g. Consider weak entity *payment* that depends on entity *loan*



- Draw a relational table for entity *loan*
- What is the primary key for your table *laon*?
- Draw a relational table for weak entity *payment*
- What is the primary key for your table *payment*?

Question 3: Entity Sets vs. Attributes (10%)

- Consider a **Entity Set**: *employee*
 - with attributes (*employee-id*, *employee-name*, *telephone-number*)



- Case 1: telephone-number as an attributes
 - Case 2: Create a entity set: telephone
- a) Discuss case 1 之優缺點
- b) Discuss case 2 之優缺點



Question 4: Explain Terms

(20%)

- Explain the following terms
 - a) blob
 - b) clob
 - c) Logical database design
 - d) **grant** <privilege list> **on** <relation name/view name> **to** <user list>
 - e) EXEC SQL <embedded SQL statement > END-EXEC
 - f) Specialization vs. Generalization in E-R diagram
 - g) UML Diagram
 - h) Update Anomalies!

Question 5: Referential Integrity

(15%)

create table *account*

```
(account-number      char(10),  
branch-name         char(15),  
balance             integer,  
primary key (account-number),  
foreign key (branch-name) references branch  
on delete set null  
on update cascade  
)
```

5. *account*

<i>account-number</i>	<i>branch-name</i>	<i>balance</i>
A-101	Downtown	500
A-102	Perryridge	400
A-201	Brighton	900
A-215	Mianus	700
A-217	Brighton	750
A-222	Redwood	700
A-305	Round Hill	350

1. *branch*

references

<i>branch-name</i>	<i>branch-city</i>	<i>assets</i>
Brighton	Brooklyn	7100000
Downtown	Brooklyn	9000000
Mianus	Horseneck	400000
North Town	Rye	3700000
Perryridge	Horseneck	1700000
Pownal	Bennington	300000
Redwood	Palo Alto	2100000
Round Hill	Horseneck	8000000

- When we delete a tuple in *branch*,
eg. Brighton Brooklyn 7100000,
what will happen in *account*?
- When we update the first tuple in *branch*,
eg. Donghwa Brooklyn 7100000,
what will happen in *account*?
- When we delete the first tuple in *account*,
what will happen in *branch*?



Question 6: About Your Final Term Project (15%)

- **According to your final project as “Design and implement a useful database application system”**
 - a) What is the title of your project?
 - b) Names of members in your team.
 - c) Draw the E-R Diagram of your application system. (You can just give a similar diagram.)
 - d) Draw a table to show one relation used in the system
 - e) Check your answer in d) to see whether it is in the 1NF? Why? Please answer “why” by using the definition of the 1NF.
 - f) Same as e) to see whether it is in the 2NF? Why?
 - g) Same as e) to see whether it is in the 3NF? Why?