林肯教育

Introduction to Databases 第二课

Conceptual Modelling

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Joshua 2021.08.07

概念模型建模

Conceptual Modelling

林肯教育

Lecture

Tutorial

Practice

Q&A

Lecture

- 理解数据库设计的各个阶段
- 理解ANSI/SPARC结构在数据库设计中的角色
- 认识实体关系图当中的各个组成部分
- 理解strong/weak entity之间的不同
- 学习绘制概念模型图

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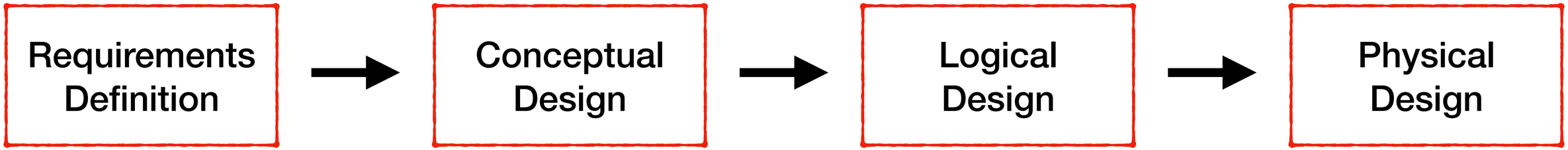
理解数据库设计的各个阶段

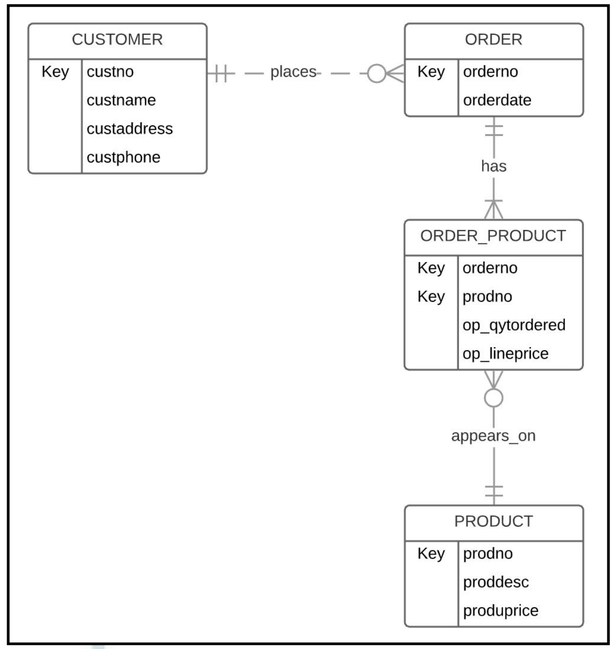


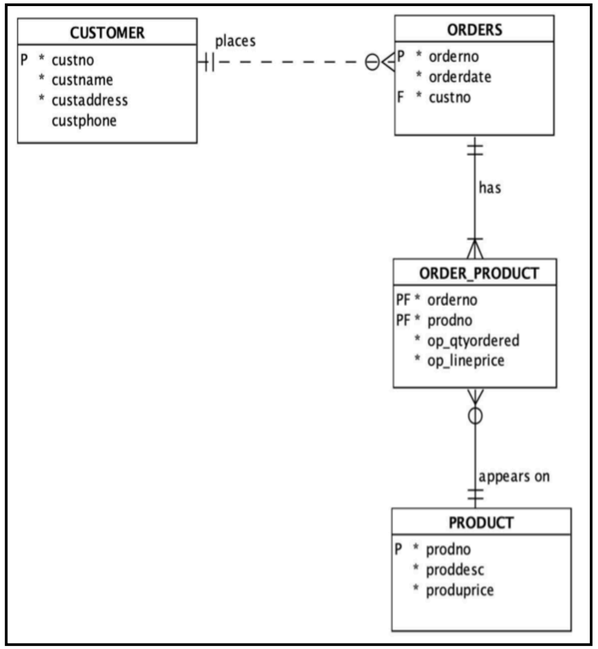
理解数据库设计的各个阶段

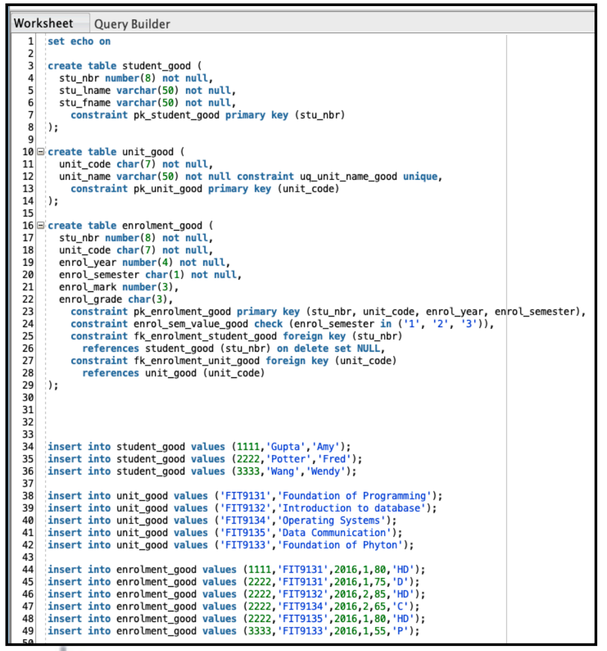
Monash Software Solutions has grown from a small start-up into a well-established company. As the number of employees has increased in the past 12 months, the company has decided that it needs to establish a human resource management team (HR team). The team needs to keep track of several human resource activities.

These activities include:

1. As the number of employees has increased, the company has decided to implement a more clearly defined organisational structure. To achieve this, several teams have been established, each team is assigned a team number. An employee is assigned to be a member of one team, although not all employees are assigned to a team. Teams with more than 5 members will have a team leader appointed. The members of the team elect the team leader. The company also introduced a mentoring system, whereby a new employee will be paired with someone who has been in the company longer .
2. To support the growth of their employees, the company provides several in-house training programs. The HR team needs to keep track of the details about who has done which program and when. An employee can complete several training programs. At the completion of training, a certificate will be provided to the employee containing the training course code, name and the completion date .
3. To attract high calibre talents, the company provides generous remuneration package as well as health insurance support for the employees and their family. To do this, the HR team needs to know the details of the employees' family members. This means that family information, for each employee, will need to be recorded. Each family member is assigned a family member number within that family.
4. The employee details that will be recorded are:
    a. Employee number
    b. Full name
    c. Address
    d. Date of birth
    e. Tax file number
    f. Skill(s). For example, Java, Python, UNIX, Relational DB, Mongo DB, etc





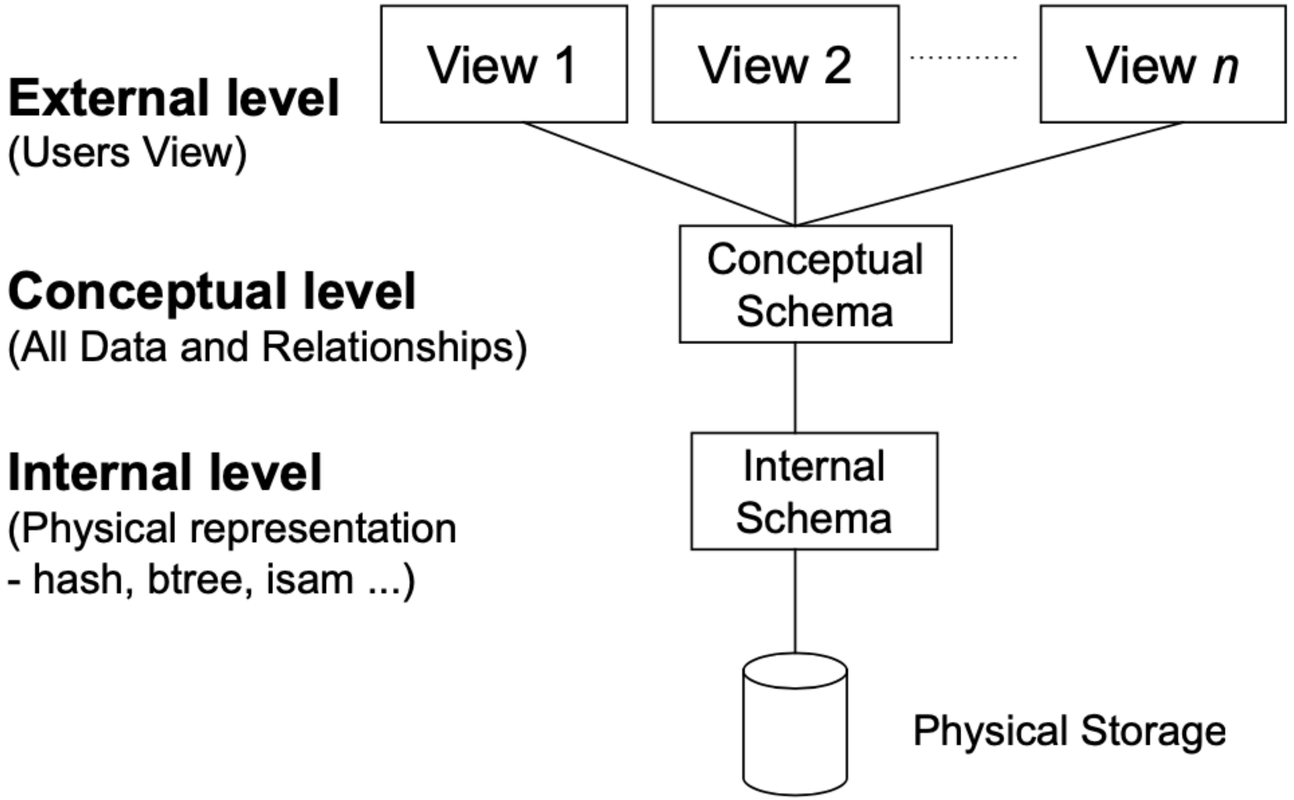


Worksheet | Query Builder

```
set echo on

create table student_good (
  stu_nbr number(8) not null,
  stu_lname varchar(50) not null,
  stu_fname varchar(50) not null,
   constraint pk_student_good primary key (stu_nbr)
);

create table unit_good (
  unit_code char(7) not null,
  unit_name varchar(50) not null constraint uq_unit_name_good unique,
   constraint pk_unit_good primary key (unit_code)
);

create table enrolment_good (
  stu_nbr number(8) not null,
  unit_code char(7) not null,
  enrol_year number(4) not null,
  enrol_semester char(1) not null,
  enrol_mark number(3),
  enrol_grade char(3),
    constraint pk_enrolment_good primary key (stu_nbr, unit_code, enrol_year, enrol_semester),
    constraint enrol_sem_value_good check (enrol_semester in ('1', '2', '3')),
    constraint fk_enrolment_student_good foreign key (stu_nbr)
      references student_good (stu_nbr) on delete set NULL,
    constraint fk_enrolment_unit_good foreign key (unit_code)
      references unit_good (unit_code)
);



insert into student_good values (1111,'Gupta','Amy');
insert into student_good values (2222,'Potter','Fred');
insert into student_good values (3333,'Wang','Wendy');

insert into unit_good values ('FIT9131','Foundation of Programming');
insert into unit_good values ('FIT9132','Introduction to database');
insert into unit_good values ('FIT9134','Operating Systems');
insert into unit_good values ('FIT9135','Data Communication');
insert into unit_good values ('FIT9133','Foundation of Phyton');

insert into enrolment_good values (1111,'FIT9131',2016,1,80,'HD');
insert into enrolment_good values (2222,'FIT9131',2016,1,75,'D');
insert into enrolment_good values (2222,'FIT9132',2016,2,85,'HD');
insert into enrolment_good values (2222,'FIT9134',2016,2,65,'C');
insert into enrolment_good values (2222,'FIT9135',2016,1,80,'HD');
insert into enrolment_good values (3333,'FIT9133',2016,1,55,'P');
```

Requirements Definition → Conceptual Design → Logical Design → Physical Design

理解ANSI/SPARC结构在数据库设计中的角色



认识实体关系图当中的各个组成部分

Entity-Relationship Modeling

ENTITY

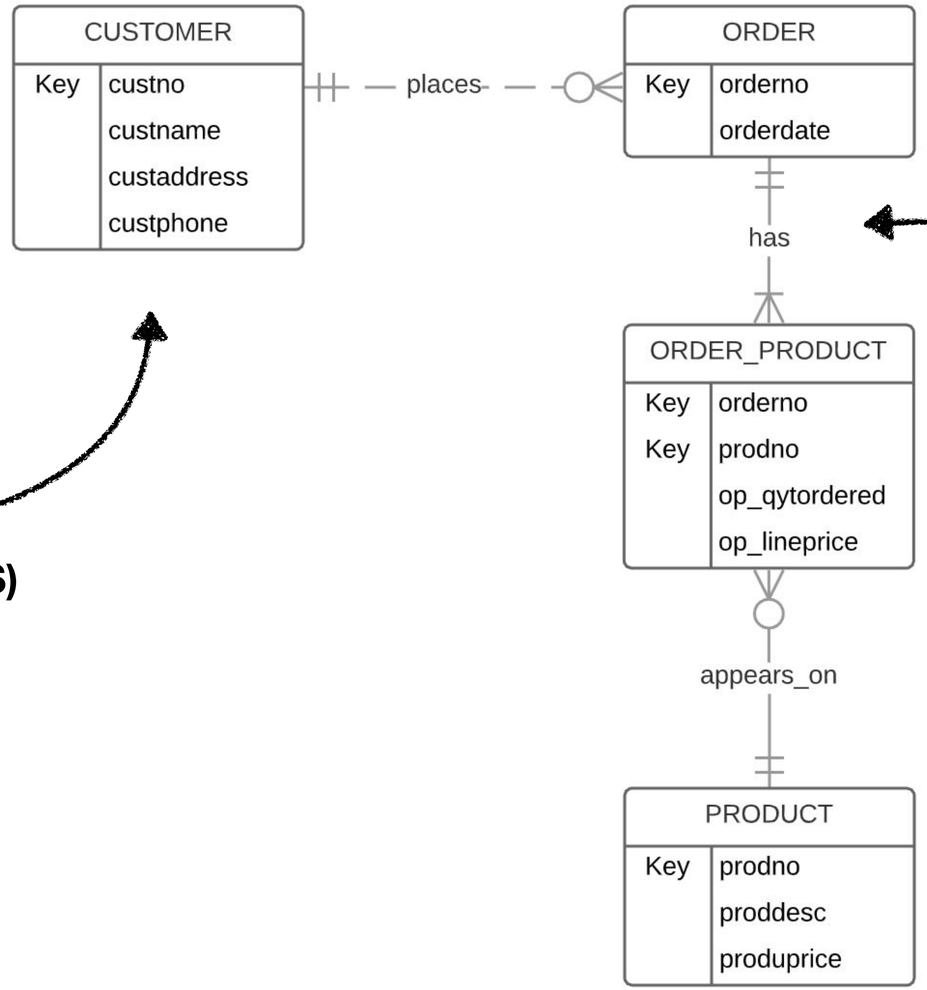
customer的总和

KEY ATTRIBUTE(S)

起到识别作用的属性

NON KEY ATTRIBUTE(S)

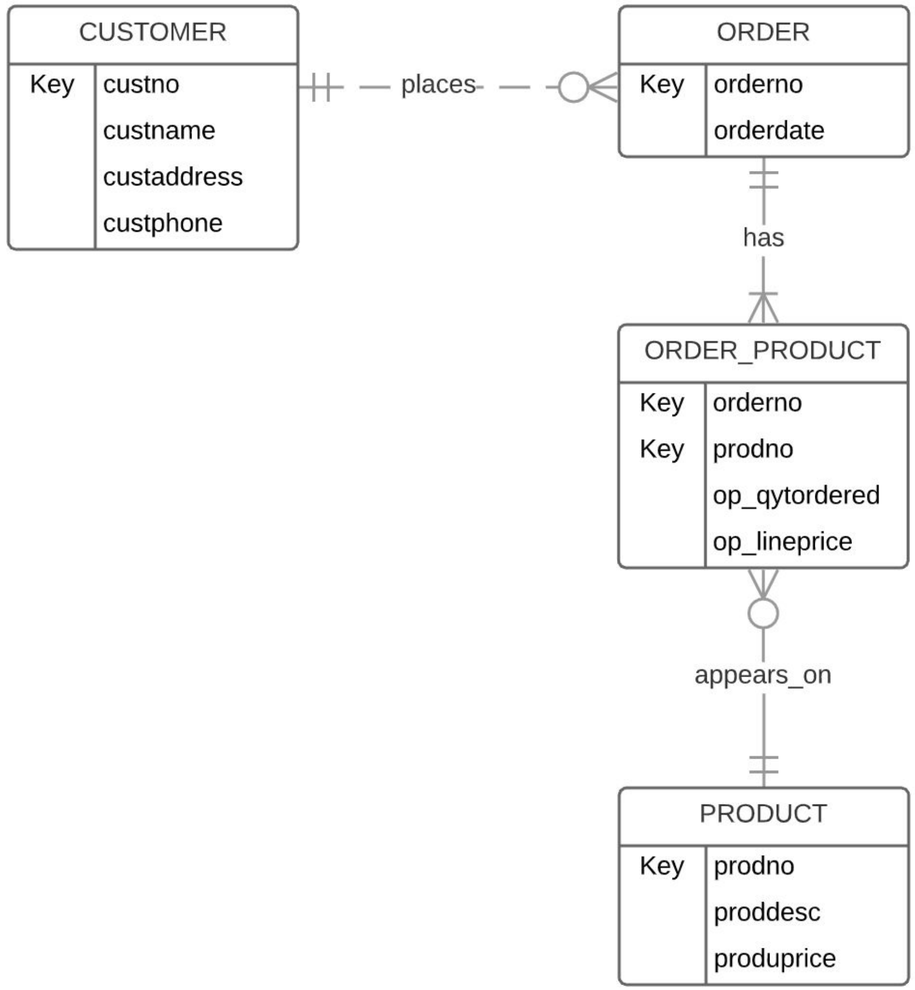
其他的属性



RELATIONSHIP

entity之间的关系

认识实体关系图当中的各个组成部分



Entity

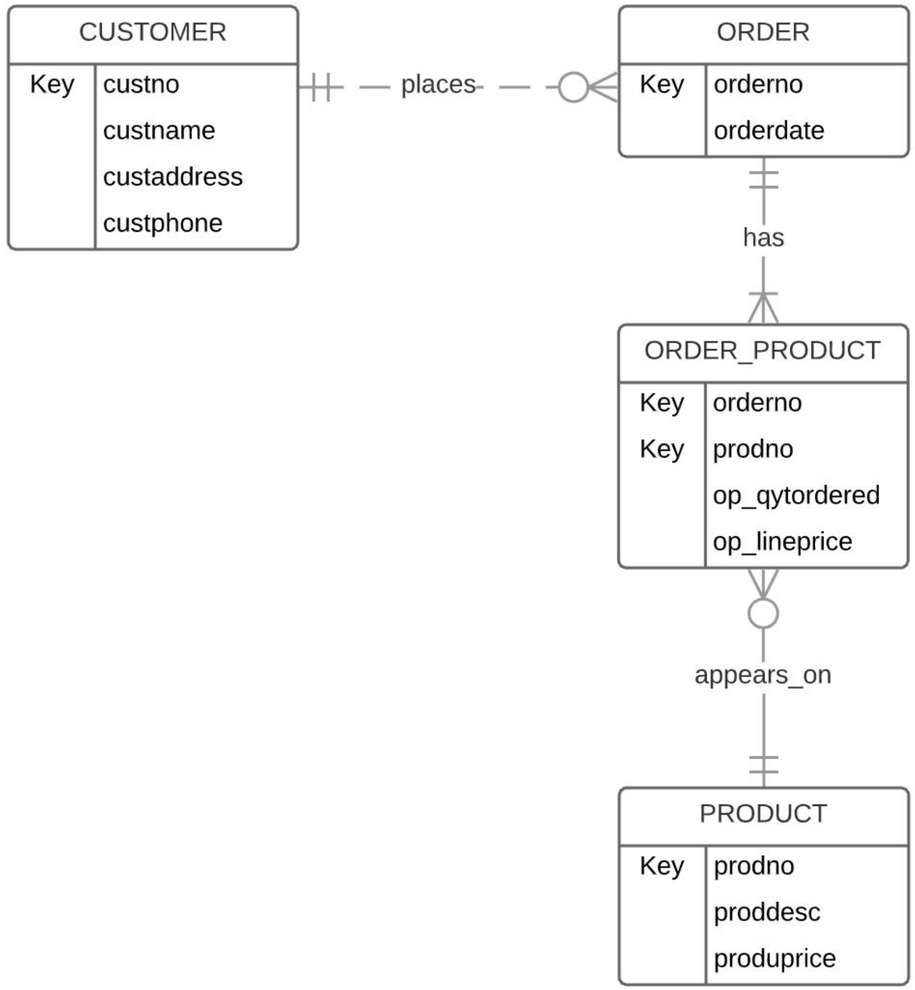
Strong Entity

有不需要借助其他entity就可以作为识别本entity的属性

Weak Entity

有需要借助其他entity就可以作为识别本entity的属性

认识实体关系图当中的各个组成部分



Relationship

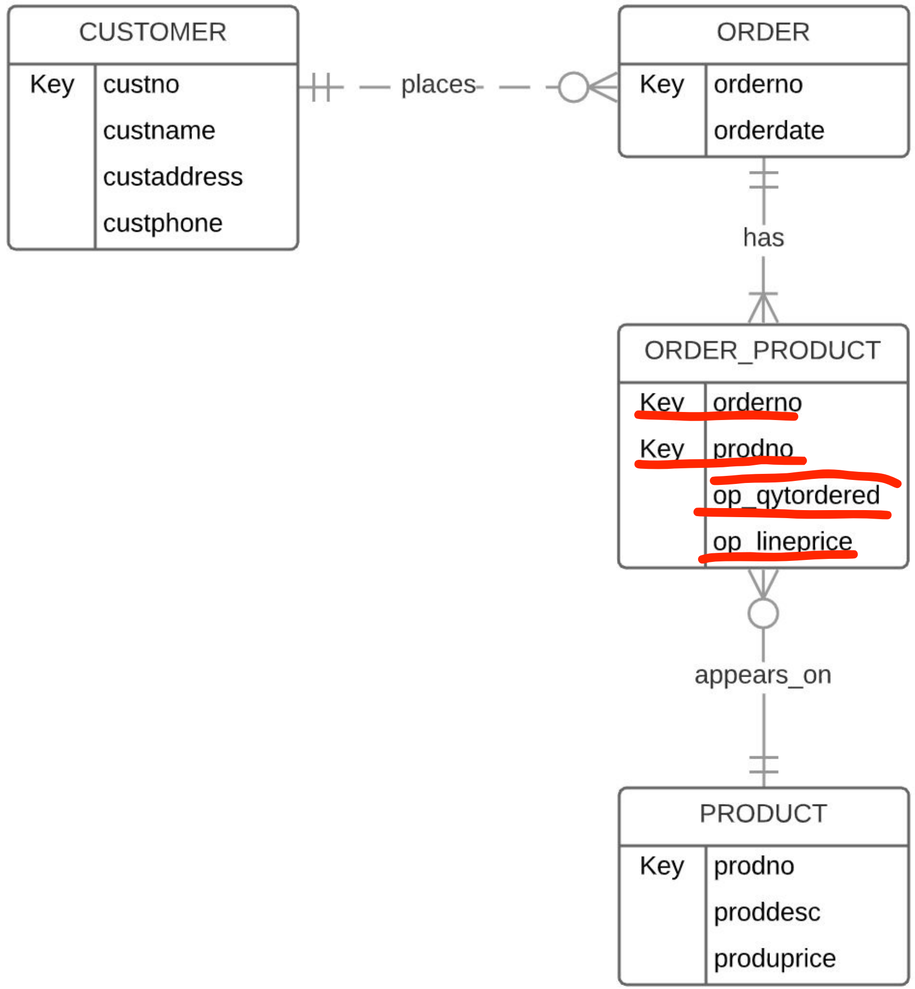
Identifying Relationship

A用来识别的属性是B用来识别的属性的一部分

Non-Identifying Relationship

A用来识别的属性与B用来识别的属性是各自独立的

认识实体关系图当中的各个组成部分



Attributes

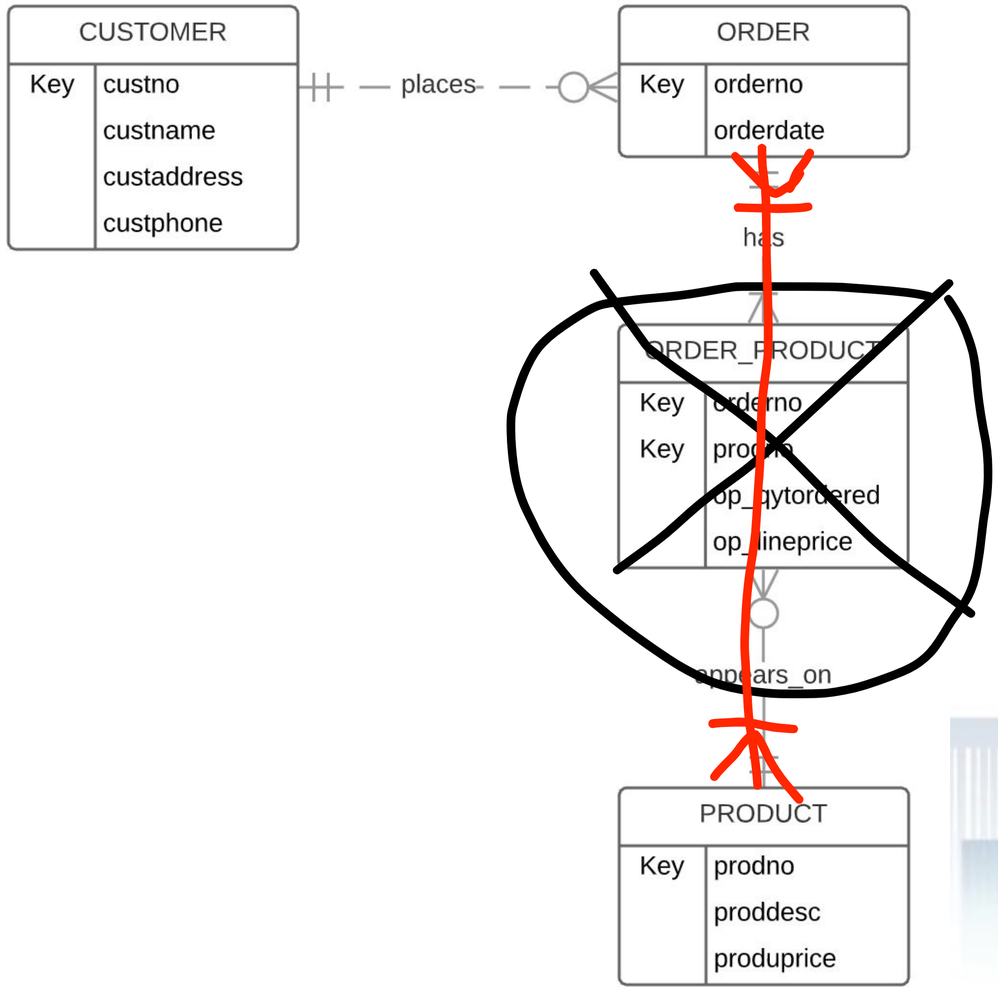
Simple

不能被细分

Composite

可以被细分为更多的属性

认识实体关系图当中的各个组成部分



Attributes

Single-valued

只能有一个值

Multi-valued

可以有多个值

According to above diagram. The relationship between COURSE and COURSE_OFFERING is a(n) ___ relationship.

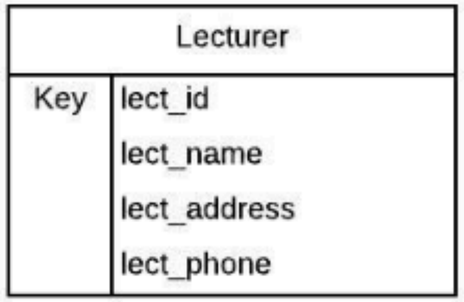
Select one:

- a. non-identifying
- b. identifying
- c. child
- d. parent

The entity relationship model uses the associative entity to represent a(n) _____ relationship between two or more entities.

Select one:

- a. N:1
- b. M:1
- c. M:N
- d. 1:M



According to the above diagram, which attribute(s) could be the composite attribute(s)?

Select one or more:

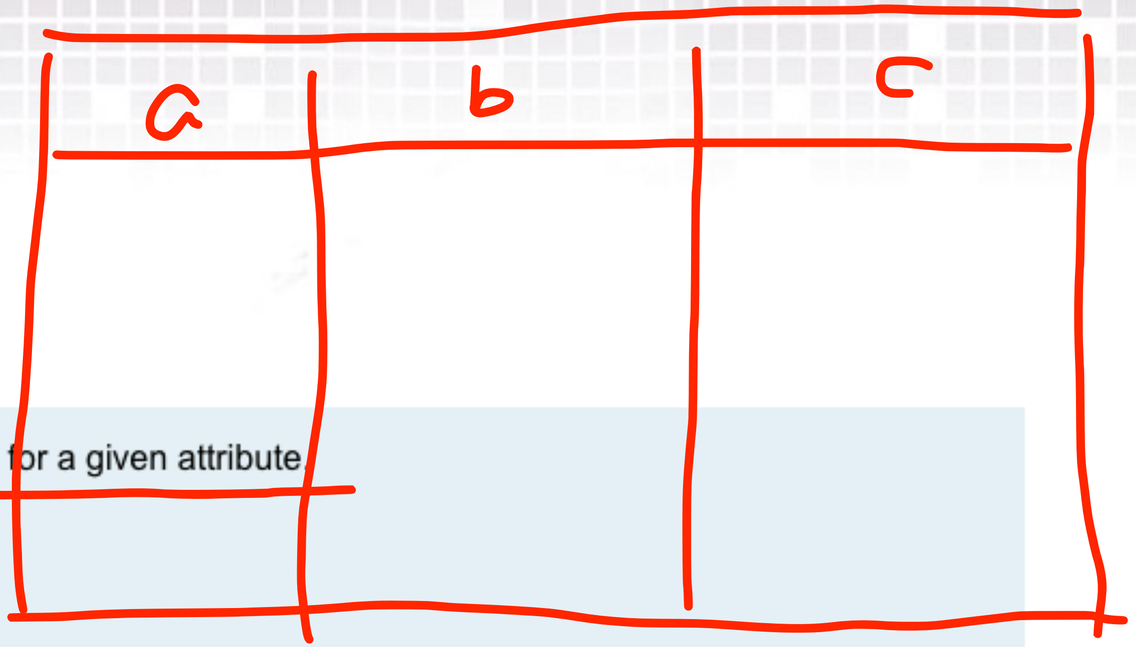
- a. lect_address
- b. lect_id
- c. lect_phone
- d. lect_name

A _____ attribute can be further subdivided to yield additional attributes.

Select one:

- a. multivalued
- b. composite
- c. simple
- d. single-valued

Quiz



A(n) _____ is the set of possible values for a given attribute.

Select one:

- a. domain
- b. key
- c. identifier
- d. range

b → Domain → (0, 1)

A relationship is an association between _____.

Select one:

a. entities

b. databases

c. objects

d. fields

A _____ relationship exists when an association is maintained within a single entity.

Select one:

- a. ternary
- b. strong
- c. weak
- d. unary

The entity relationship diagram (ERD) represents the _____ database as viewed by the end user.

Select one:

- a. physical
- b. logical
- c. condensed
- d. conceptual

According to the above diagram. COURSE_OFFERING has a key that is partially derived from COURSE in the relationship. This entity is known as ___ entity.

Select one:

- a. weak
- b. child
- c. strong
- d. business

According to the above diagram, a new department may NOT have a manager yet. True or False?

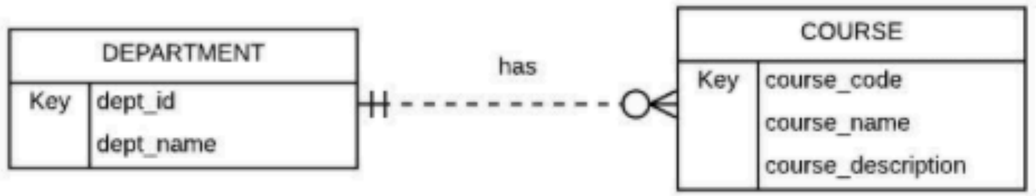
Select one:

- True
- False

According to the above diagram, how many departments may be managed by a lecturer?

Select one or more:

- a. one
- b. many
- c. zero
- d. none



According to the above diagram, a COURSE belongs to ___ DEPARTMENT(s)

Select one:

a. zero or one

b. one

c. many

d. one or many

A _____ attribute is one that cannot be subdivided.

Select one:

- a. multivalued
- b. single-valued
- c. composite
- d. simple

If an entity can exist apart from all of its related entities, then it is existence-independent, and it is referred to as a(n) _____ entity.

Select one:

- a. alone
- b. unary
- c. strong
- d. weak

Tutorial

- 软件安装重述
- Git设置重述
- 用SQL Developer GUI管理数据
- 处理数据异常

Practice

1. 识别主entity
2. 识别relationship
3. 添加non-key attributes

Q & A

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感谢观看 THANK YOU