Perancangan Basis Data(IFWP1007) 3 sks

UKRIDA
Universitas Kristen Krida Wacana

Major: Informatics

Topic: History of the Database

Dosen Pengampu

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Skills

Animasi	**60%**
Programming	**80%**
Konsep OOP	**70%**

Objectives

This lesson covers the following objectives:

- Describe the evolution of the database and give an example of its role in the business world

- Name important historical contributions in database development and design

- List and explain the three major steps in the database development process

Purpose

- History provides perspective for where we are today in information technology.

- The next time you use your computer, your video gaming system, or your smart phone, you will realize how far we've come to get to this point and what events brought us here.

- Data Modeling is the first step in database development.

- This lesson includes an overview of the content that is covered in the remainder of the course.

History of the Database Timeline

- 1960s: Computers become cost effective for private companies, and storage capacity increases.

- 1970-72: E. F. Codd proposes the relational model for databases, disconnecting the logical organization from the physical storage.

- 1976: P. Chen proposes the entity relationship model (ERM) for database design.

History of the Database Timeline

- Early 1980s: The first commercially-available relational database systems start to appear at the beginning of the 1980s with Oracle Version 2.

- Mid-1980s: SQL (structured query language) becomes "intergalactic standard."

- Early 1990s: An industry shakeout begins with fewer surviving companies. Oracle survives.
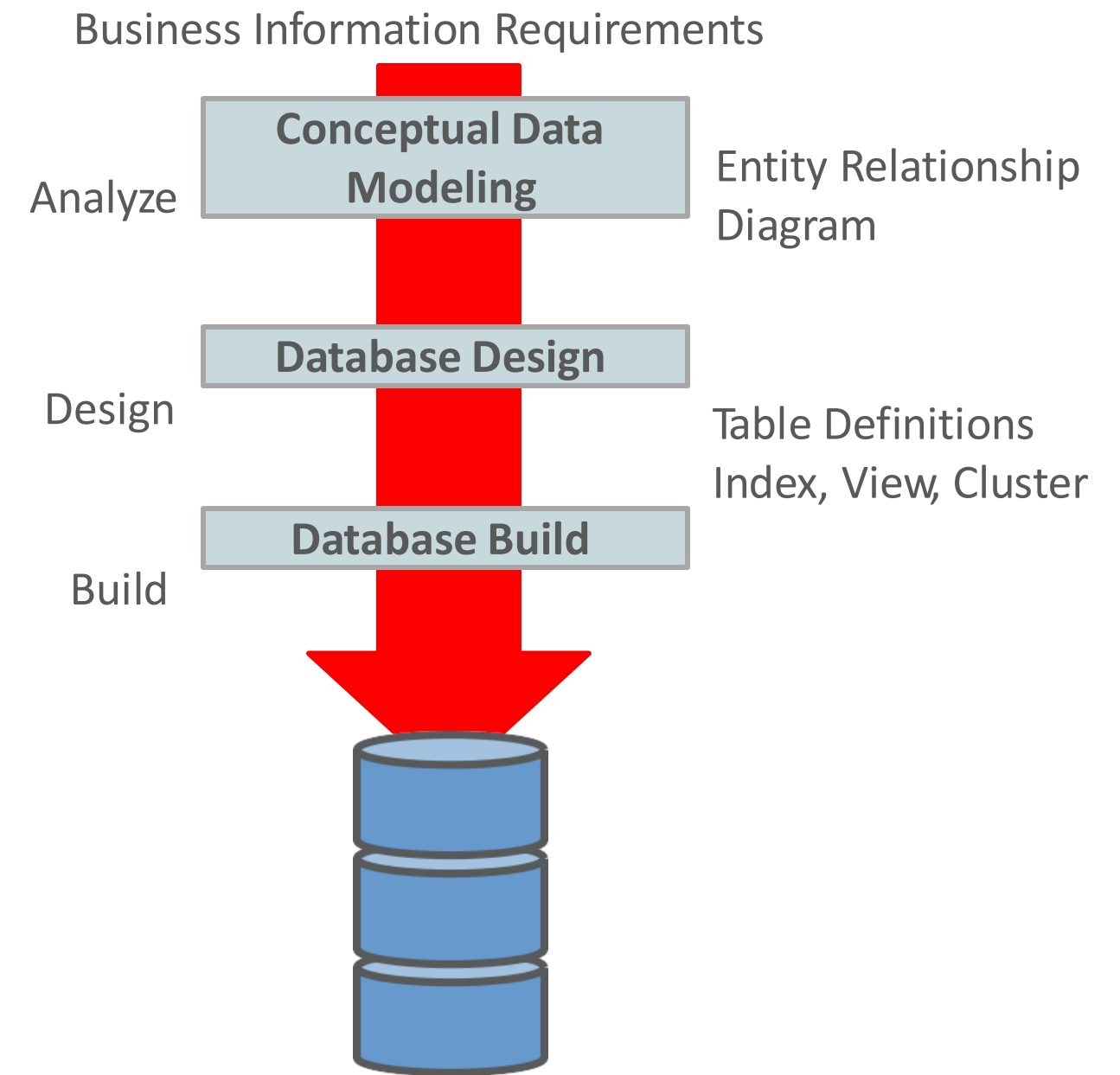
History of the Database Timeline

- Mid-1990s: Kaboom! The usable Internet/World Wide Web (WWW) appears. A mad scramble ensues to allow remote access to computer systems with legacy data.

- Late 1990s: The large investment in Internet companies helps create a tools-market boom for Web/Internet/DB connectors.

- Early 21st century: Solid growth of DB applications continues. Examples: commercial websites (yahoo.com, amazon.com, google.com), government systems (Bureau of Citizenship and Immigration Services, Bureau of the Census), art museums, hospitals, schools, etc.

Question: What Does Data Modeling Have to do with a Database?

- Data modeling is the first step in the database development process.

- It involves collecting and analyzing the data that a business needs to track, and then diagramming the organization of that data in an Entity Relationship Diagram.
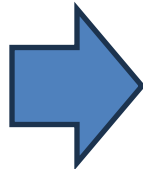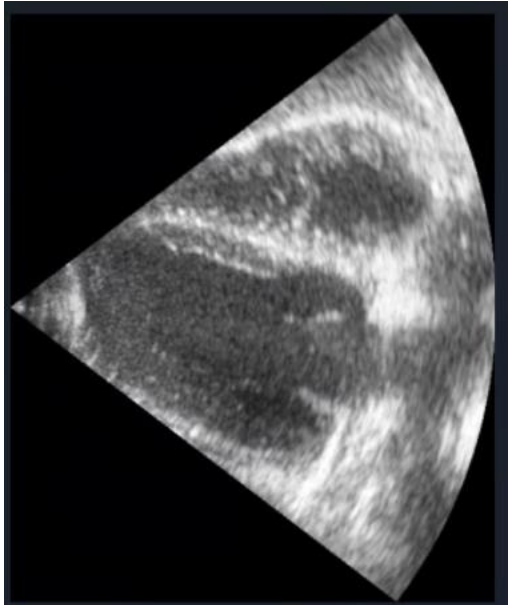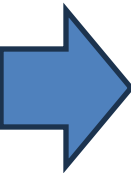
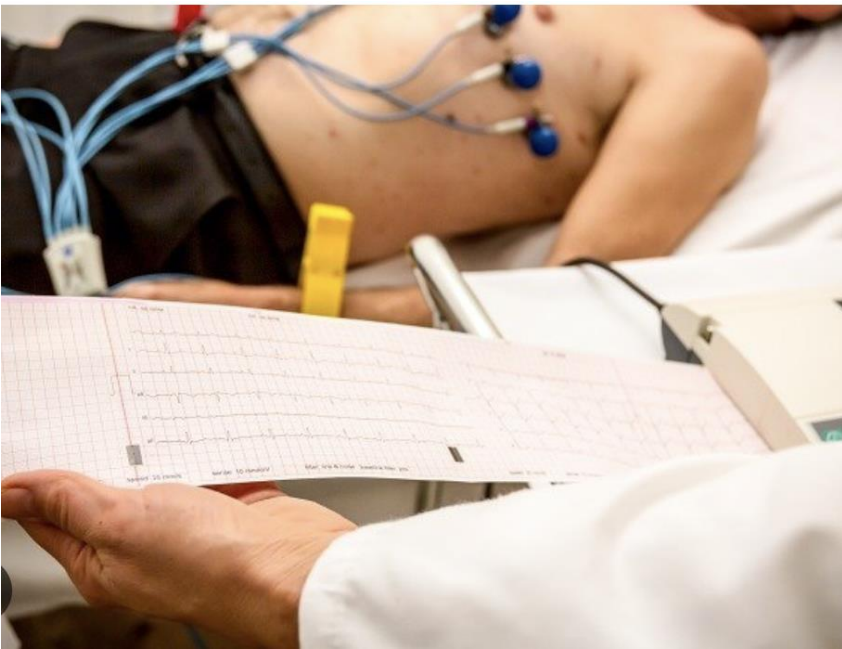**Database Development Process**

Business Information Requirements

| Conceptual Data Modeling | Entity Relationship Diagram |

Analyze

| Database Design | Table Definitions Index, View, Cluster |

Design

| Database Build |

Build

Operational Database

Data

Gender	Age	BMI	PLT	GPT	Glucose	eGFR	NT-proBN	BEB	Lactatemr	LVEF	label
1	97	24.8	176	16	134	55.36	16244.56	-9.3	2.1	32	0
2	71	20.6	232	5115	215.47	33.2	35000	-11.6	3.5	28	0
1	94	16.3	77	13	96	17.2	15709.84	-5.7	6	15	0
1	77	30.9	108	11	148	15.07	5640	-4.7	3.3	35	0
1	93	18.6	128	2060	117	25.96	34629	-3.5	4	12	0
1	77	28.1	151	34	258	21.12	22376	-3.4	6	31	0
2	84	30.1	198	40	717	40.75	7928	-10.6	5.4	53	0
2	69	20.3	200	22	227	71.8	35000	-4.7	5.9	21	0
2	81	33.2	336	50	247	24.06	15166.85	0.7	2.2	54	0
2	84	26.8	146	43	102	16.1	35000	0.8	1.5	37	0

Database Development Process

- Data modeling begins by researching the information requirements of a business.

- Example: Here is a set of information requirements.

  – I manage the Human Resources Department for a large company. We need to store data about each of our company's employees. We need to track each employee's first name, last name, job or position, hire date and salary. For each employee on commission, we also need to track his/her potential commission. Each employee is assigned a unique employee number.

Database Development Process

- Example: Here is a set of information requirements.
  - Our company is divided into departments. Each employee is assigned to a department -- for example, accounting, sales, or development. We need to know the department responsible for each employee and the department location. Each department has a unique number.
  - Some of the employees are managers. We need to know each employee's manager and all of the employees that are managed by each manager.
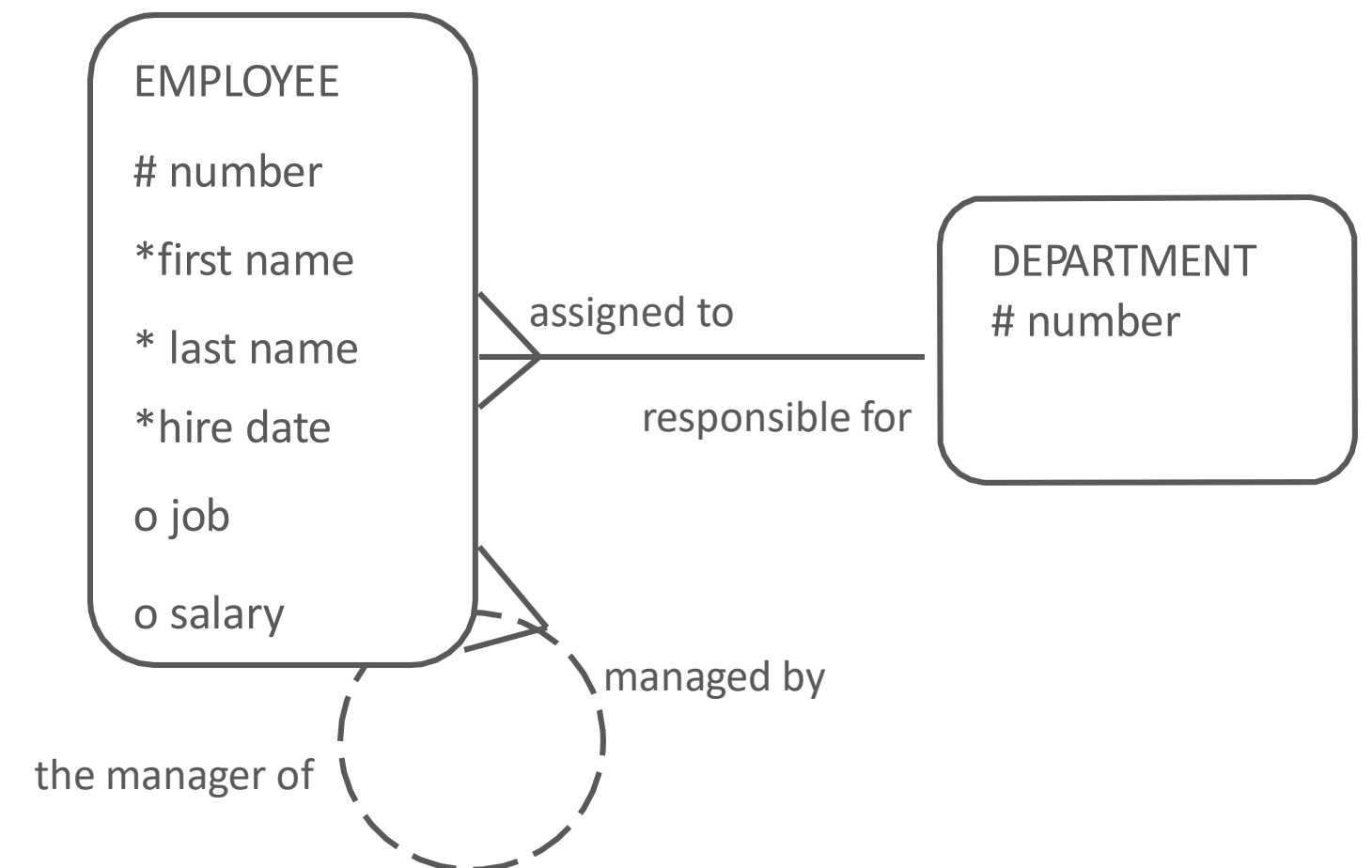
Database Development Process

- An entity relationship diagram should completely capture and accurately model the organization's information needs and support the functions of the business.

EXAMPLE

The following entity relationship diagram represents the information requirements of the Human Resources Department.

EMPLOYEE

number

*first name

* last name

*hire date

o job

o salary

assigned to

responsible for

DEPARTMENT
number

managed by

the manager of

Database Development Process

- Step two, the database design phase of the development process, translates the information modeled on the entity relationship diagram to a table instance chart.
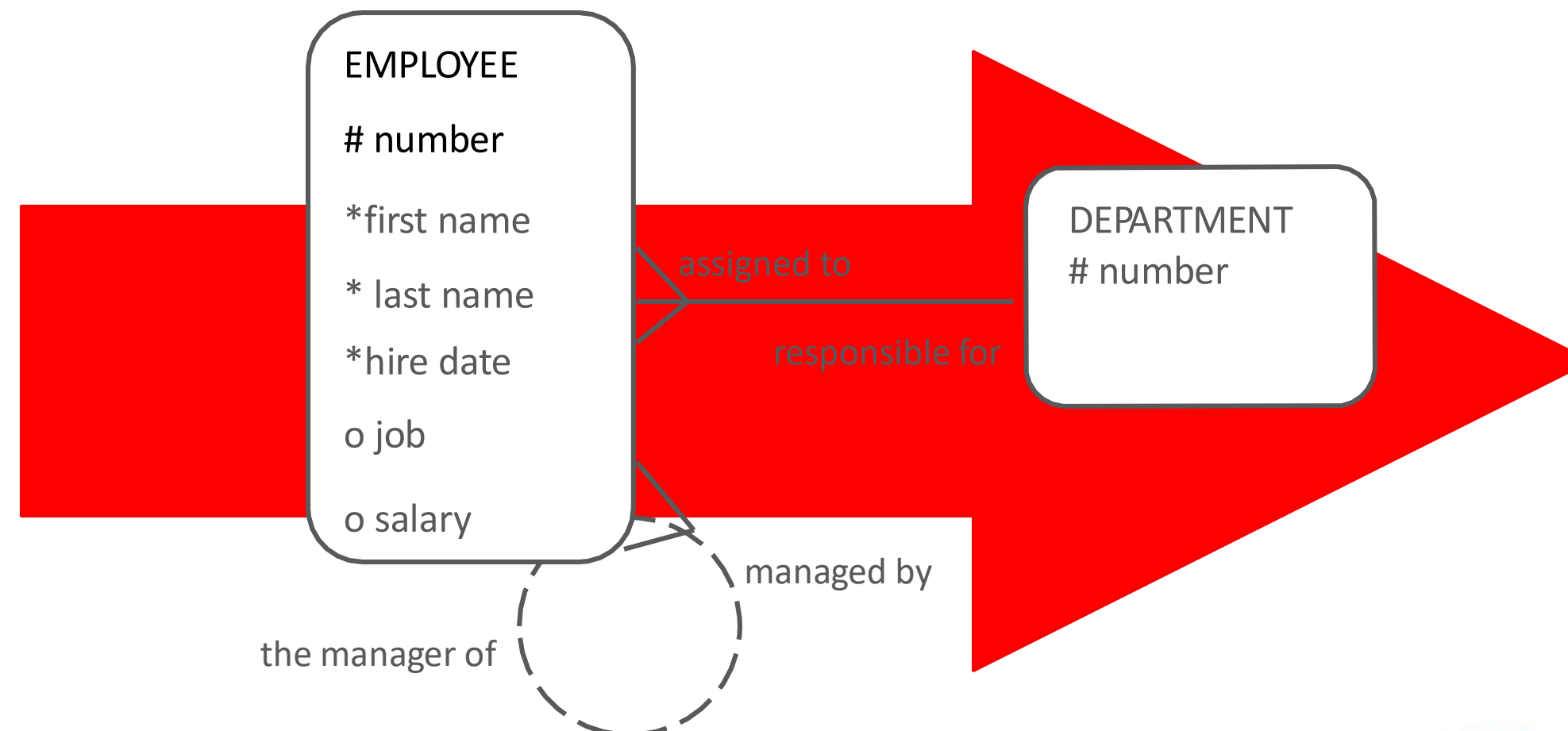
Database Development Process

The table instance chart lists the design specifications of the information and has the following components:

- Table name

- Column names

- Keys: a primary key (PK) is the unique identifier for each row of data; a foreign key (FK) links data in one table to the data in a second table by referring to the PK column in the second table

- Nulls: indicates if a column must contain a value (mandatory)

Database Development Process

- Unique: indicates if the value contained in a column is unique within the table

- Data type: identifies the definition and format of the data stored in each column

Database Development Process

- Structured Query Language (SQL) commands are used to build the physical structure of the database.

```
CREATE TABLE departments
(deptno NUMBER(5) CONSTRAINT depts_deptno_PK PRIMARY KEY,
 name VARCHAR2(25) CONSTRAINT depts_name_NN NOT NULL,
 loc VARCHAR2(30) CONSTRAINT depts_loc_NN NOT NULL);
```

```
CREATE TABLE employees
(empno NUMBER(9) CONSTRAINT emps_empno_PK PRIMARY KEY,
 fname VARCHAR2(15) CONSTRAINT emps_fname_NN NOT NULL,
 lname VARCHAR2(20) CONSTRAINT emps_lname_NN NOT NULL,
 hiredate DATE CONSTRAINT emps_hiredt_NN NOT NULL,
 salary NUMBER(9,2),
 commission NUMBER(9,2),
 mgr NUMBER(9) CONSTRAINT emps_mgr_FK
        REFERENCES employees(empno),
 deptno NUMBER(5) CONSTRAINT emps_deptno_FK
        REFERENCES departments(deptno));
```

Database Development Process

- SQL is also used to populate, access, and manipulate the data within the relational database.

DATABASE BUILD—Step Three

```
INSERT INTO departments
    (deptno,name,loc)
VALUES
    (123,'Accounts','US');
```

```
SELECT fname, lname, deptno
FROM employees
WHERE deptno = 123;
```

```
UPDATE departments
SET name = 'marketing'
WHERE deptno=123
```

Terminology

✧ Key terms used in this lesson included:

- Data type

- Foreign key (FK)

- Nulls

- Primary key (PK)

- Table instance chart

- Unique

Summary

In this lesson, you should have learned how to:

- Describe the evolution of the database and give an example of its role in the business world

- Name important historical contributions in   database development and design

- List and explain the three major steps in the database development process

Thank You

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