Principles of Information and Database Management
198:336
Week 4 – Feb 14

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Today

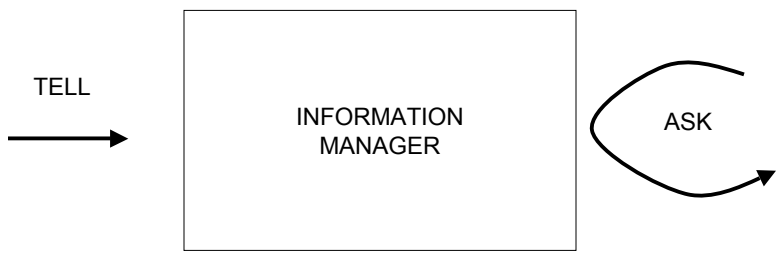
Relational model

- Big picture
- Schemas and tables
- ER diagrams to schemas
- Queries and SQL

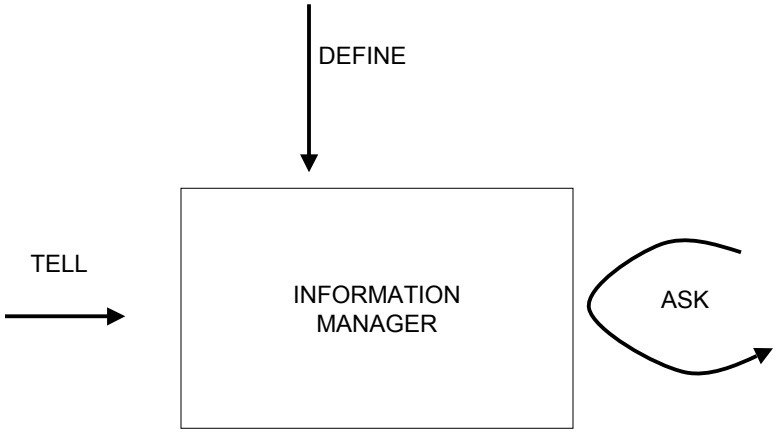
Recap

Week 1: Motivation for info management
Week 2: Theory of representation
Week 3: Practice of representation
Week 4: A classic case study

Pictorial view



Pictorial view



Definition operation

Describes the structure of specific information to IM

- Corresponds to a conceptual model
- Helps avoid errors

Relations

sid	name	login	age	gpa
53666	Jones	jones@cs	18	3.4
53688	Smith	smith@eecs	18	3.2
53650	Smith	smith@math	19	3.8

Example of students relation

Named after logical relation

sid	name	login	age	gpa
53666	Jones	jones@cs	18	3.4
53688	Smith	smith@eecs	18	3.2
53650	Smith	smith@math	19	3.8

Corresponds to

Student(53666,Jones,jones@cs,18,3.4)

Student(53688,Smith,smith@eecs,18,3.2)

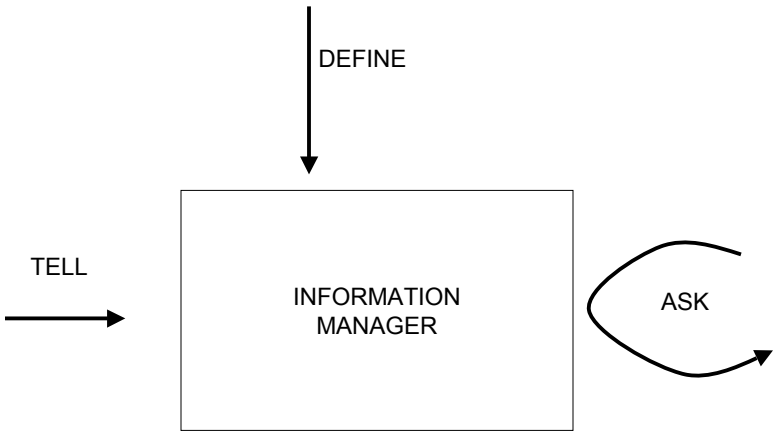
Student(53650,Smith,smith@math,19,3.8)

Also called Tables

sid	name	login	age	gpa
53666	Jones	jones@cs	18	3.4
53688	Smith	smith@eecs	18	3.2
53650	Smith	smith@math	19	3.8

For obvious reasons

In the relational model, IM stores set of relations or tables



Relational model

Define
- – Creates new tables

Tell
- – Inserts new rows into tables

Query
- – SQL expressions describe data of interest
- – Results are returned as tables

Relational Model: Example

Definition statement

```
create table books
( isbn char(13) not null primary key,
  author char(80),
  title char(100),
  price float(4,2)
);
```

Relational model example

Tell statement

```
insert into books values
('0-672-31697-8',
 'Michael Morgan',
 'Java 2 for Professional Developers',
 34.99);
```

Relational model example

Tell statement

– Adds a row to the specified table in the information manager to include the specified entity or relationship.

Relational model example

Query example

```
SELECT author,title
FROM books
WHERE price > 30;
```

Relational model example

This returns a new table

author	title
Michael Morgan	Java 2 for Professional Developers
...	…

Relational Model

Most widely used model.

- Vendors: IBM, Informix, Microsoft, Oracle, Sybase, etc.

"Legacy systems" in older models

- E.G., IBM's IMS

Relational Query Languages

Queries can be written intuitively, and the DBMS is responsible for efficient evaluation.

- The key: precise semantics for relational queries.
- Allows the optimizer to extensively re-order operations, and still ensure that the answer does not change.

Schemas

```
CREATE TABLE name(
  field TYPE OPTIONS,
  …
  field TYPE OPTIONS
);
```

Types

int
char(n)
float(x,y)
date
varchar
text

Options

not null
primary key
references table(field)

Interaction

use *database*;
show tables;
describe *table*;