

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



Dr. Abid Sohail Bhutta

abidbhutta@cuilahore.edu.pk

**Department of Computer
Science,**

**COMSATS University , Lahore
Campus**

Database Systems



Lecture 7

Object Orientated Data Model (OODB) and Relational Data Model (RDB)



Recall Lecture 6

- HDBS (Hierarchical)
- NWDB (Network)

OBJECT-ORIENTED DATABASE (OODB)

- The **ODBMS** which is an abbreviation for **object oriented database management system**, is the data model in which data is stored in form of objects, which are instances of classes. These classes and objects together makes an object oriented data model.

OODB a simpler Example

```
class CLERK
{
    //variables
    char name;
    string address;
    int id; int salary;
    //messages
    char get_name();
    string get_address();
    int annual_salary();
};
```

Data Object in OODB

```
{  
  "_id" :      "37010"  
  "city" :     "ADAMS",  
  "pop" :      2660,  
  "state" :     "TN",  
  "councilman" : {  
    name: "John Smith"  
    address: "13 Scenic Way"  
  }  
}
```

OODB Data Object

```
book = {  
    title: "DBMS: The Definitive Guide",  
    authors: [ "Kristina Chodorow", "Mike Dirolf" ]  
    published_date: ISODate("2010-09-24"),  
    pages: 216,  
    language: "English",  
    publisher: {  
        name: "O'Reilly Media",  
        founded: "1980",  
        location: "CA"  
    }  
}
```


Array of Data Objects

```
{
  "anObject": {
    "numericProperty": -122,
    "stringProperty": "An offensive \" is problematic",
    "nullProperty": null,
    "booleanProperty": true,
    "dateProperty": "2011-09-23"
  },
  "arrayOfObjects": [
    {
      "item": 1
    },
    {
      "item": 2
    },
    {
      "item": 3
    }
  ],
  "arrayOfIntegers": [
    1,
    2,
    3,
    4,
    5
  ]
}
```

Advantages and Disadvantages

■ Advantages

- Real world modeling
- Model simplicity
- Reduced data size

■ Advantages

- Lack of SQL query language
- Lack of automotive constraints

Relational Database Model (RDBM)

- Let's user or database designer to operate human logical environment
- Perceived by user as a collection of tables for data storage, while let RDBMS handles the physical details.
- Tables are a series of row/column intersections
- Tables related by sharing **common entity characteristics**
- It allows 1:1, 1:M, M:N relationships

Relational Database Model

Table name: AGENT

| | AGENT_CODE | AGENT_LNAME | AGENT_FNAME | AGENT_INITIAL | AGENT_AREACODE | AGENT_PHONE |
|---|------------|-------------|-------------|---------------|----------------|-------------|
| ▶ | 501 | Alby | Alex | B | 713 | 228-1249 |
| | 502 | Hahn | Leah | F | 615 | 882-1244 |
| | 503 | Okon | John | T | 615 | 123-5589 |

Link through AGENT code

Table name: CUSTOMER

| | CUS_CODE | CUS_LNAME | CUS_FNAME | CUS_INITIAL | CUS_AREACODE | CUS_PHONE | CUS_RENEW_DATE | AGENT_CODE |
|---|----------|-----------|-----------|-------------|--------------|-----------|----------------|------------|
| ▶ | 10010 | Ramas | Alfred | A | 615 | 844-2573 | 05-Apr-2002 | 502 |
| | 10011 | Dunne | Leona | K | 713 | 894-1238 | 16-Jun-2002 | 501 |
| | 10012 | Smith | Kathy | W | 615 | 894-2285 | 29-Jan-2001 | 502 |
| | 10013 | Olowski | Paul | F | 615 | 894-2180 | 14-Oct-2002 | 502 |
| | 10014 | Orlando | Myron | | 615 | 222-1672 | 28-Dec-2002 | 501 |
| | 10015 | O'Brian | Amy | B | 713 | 442-3381 | 22-Sep-2002 | 503 |
| | 10016 | Brown | James | G | 615 | 297-1228 | 25-Mar-2002 | 502 |
| | 10017 | Williams | George | | 615 | 290-2556 | 17-Jul-2002 | 503 |
| | 10018 | Farriss | Anne | G | 713 | 382-7185 | 03-Dec-2002 | 501 |
| | 10019 | Smith | Olette | K | 615 | 297-3809 | 14-Mar-2002 | 503 |

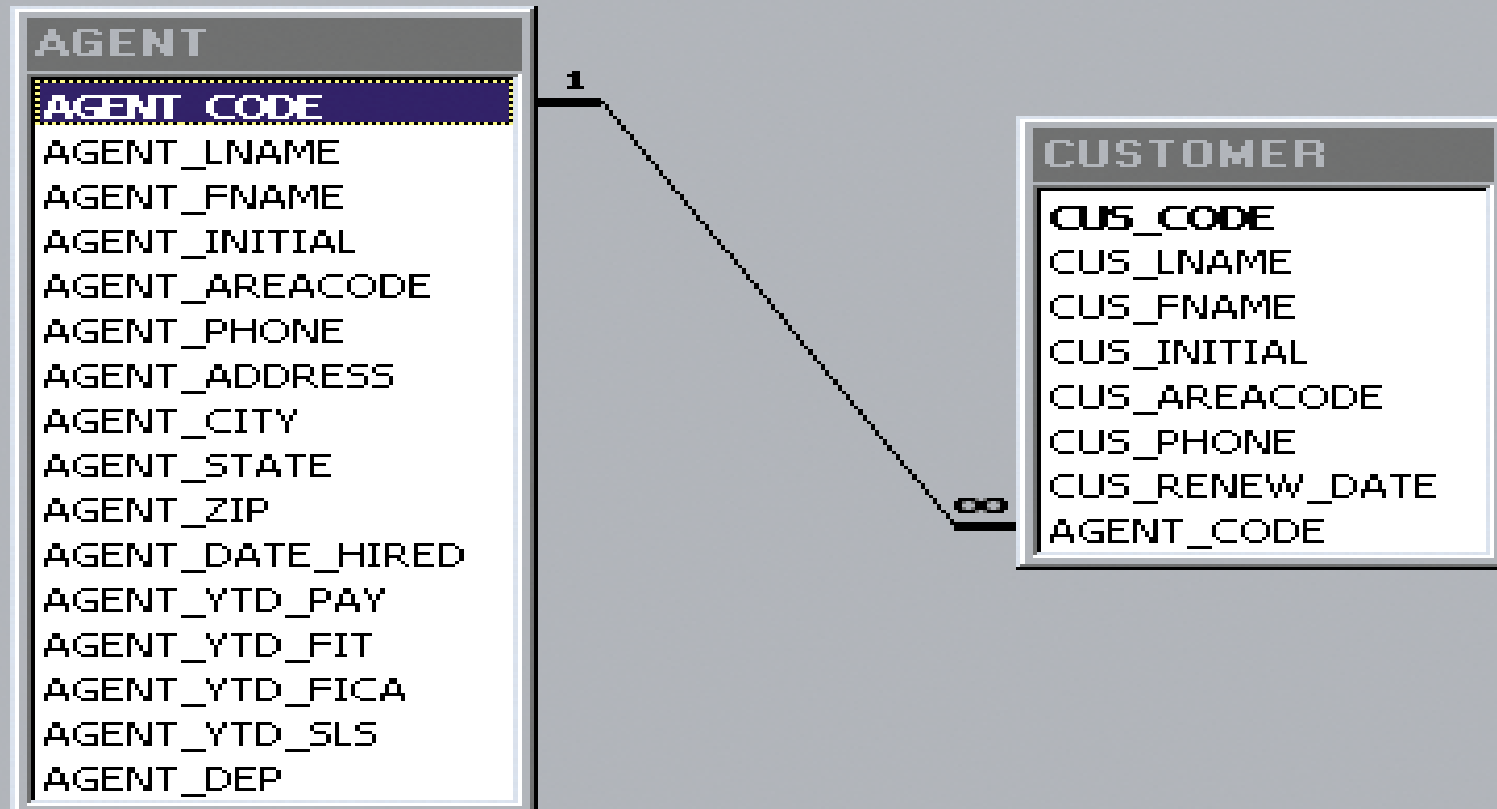


FIGURE 1.12 A RELATIONAL SCHEMA

Relational Database Model

■ Advantages

- ❑ Structural independence: data access path is irrelevant to database design; change structure will not affect the database
- ❑ Improved conceptual simplicity
- ❑ Easier database design, implementation, management, and use
- ❑ Ad hoc query capability with SQL (4GL is added)
- ❑ Powerful database management system

Relational Database Model

■ Disadvantages

- ❑ Substantial hardware and system software overhead
- ❑ Poor design and implementation is made easy
- ❑ May promote “islands of information” problems

Data Models

■ Object-based

- ❑ Entity-relationship
- ❑ Semantic
- ❑ Functional
- ❑ Object-oriented

Knowledge-based

■ Record-based (transactions)

- ❑ Relational
- ❑ Network
- ❑ Hierarchical

Transaction-based

Object-relational

■ Physical

- ❑ Unifying
- ❑ Frame memory

How data are stored

Summary -Record-Based Data Models

- Relational (Oracle, DB2, Sybase, Informix, SQL 7, Ingres, etc.)
 - Based on concepts of mathematical relations
 - Tables, rows, columns
- Network (CODASYL - Conference on Data System Languages) (Image)
 - *Many-to-many* relationships
 - Record types, data items
- Hierarchical (IMS)
 - Segment types, fields

In COBOL: files, records, fields