Object-Based Databases



*C H A P T E R* **22**

**Practice Exercises**

* 1. A car-rental company maintains a database for all vehicles in its cur- rent fleet. For all vehicles, it includes the vehicle identification number, license number, manufacturer, model, date of purchase, and color. Spe- cial data are included for certain types of vehicles:
     + Trucks: cargo capacity.
     + Sports cars: horsepower, renter age requirement.
     + Vans: number of passengers.
     + Off-road vehicles: ground clearance, drivetrain (four- or two-wheel drive).

Construct an SQL schema definition for this database. Use inheritance where appropriate.

**Answer:** For this problem, we use table inheritance. We assume that

**MyDate**, **Color** and **DriveTrainType** are pre-defined types.

**create type** *Vehicle*

(*vehicle id* **integer**, *license number* **char(15)**, *manufacturer* **char(30)**, *model* **char(30)**, *purchase date* **MyDate**, *color* **Color**)

**create table** *vehicle* **of type** *Vehicle*

**create table** *truck*

(*cargo capacity* **integer**) **under** *vehicle*

**create table** *sportsCar*

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(*horsepower* **integer**

*renter age requirement* **integer**) **under** *vehicle*

# create table *van*

(*num passengers* **integer**) **under** *vehicle*

**create table** *offRoadVehicle* (*ground clearance* **real** *driveTrain* **DriveTrainType**) **under** *vehicle*

* 1. Consider a database schema with a relation *Emp* whose attributes are as shown below, with types specified for multivalued attributes.

*Emp = (ename, ChildrenSet* **multiset***(Children), SkillSet* **multiset***(Skills)) Children = (name, birthday)*

*Skills = (type, ExamSet* **setof***(Exams)) Exams = (year, city)*

1. Define the above schema in SQL, with appropriate types for each attribute.
2. Using the above schema, write the following queries in SQL.
   1. Find the names of all employees who have a child born on or after January 1, 2000.
   2. Find those employees who took an examination for the skill type “typing” in the city “Dayton”.
   3. List all skill types in the relation *Emp*.

# Answer:

1. Write the answer using the .doc material given in etlab
2. Queries in SQL.
   1. Program:
   2. Program:

**select** *ename*

**from** *emp* **as** *e*, *e.ChildrenSet* **as** *c*

**where** ’March’ **in**

(**select** *birthday*.*month*

# from *c*

)

**Practice Exercises** **3**

**select** *e.ename*

**from** *emp* **as** *e*, *e.SkillSet* **as** *s*, *s.ExamSet* **as** *x*

**where** *s.type* = ’typing’ **and** *x.city* = ’Dayton’

* 1. Program:

**select distinct** *s.type*

**from** *emp* **as** *e*, *e.SkillSet* **as** *s*

* 1. Suppose that you have been hired as a consultant to choose a database system for your client’s application. For each of the following appli- cations, state what type of database system (relational, persistent pro- gramming language– based OODB, object relational; do not specify a commercial product) you would recommend. Justify your recommen- dation.

1. A computer-aided design system for a manufacturer of airplanes.
2. A system to track contributions made to candidates for public office.
3. An information system to support the making of movies.

# Answer:

1. A computer-aided design system for a manufacturer of airplanes: An OODB system would be suitable for this. That is because CAD requires complex data types, and being computation oriented, CAD tools are typically used in a programming language envi- ronment needing to access the database.
2. A system to track contributions made to candidates for public office:

A relational system would be apt for this, as data types are ex- pected to be simple, and a powerful querying mechanism is es- sential.

1. An information system to support the making of movies:

Here there will be extensive use of multimedia and other complex data types. But queries are probably simple, and thus an object relational system is suitable.

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* 1. How does the concept of an object in the object-oriented model differ from the concept of an entity in the entity-relationship model? **Answer:** An entity is simply a collection of variables or data items. An object is an encapsulation of data as well as the methods (code) to operate on the data. The data members of an object are directly visible only to its methods. The outside world can gain access to the object’s data only by passing pre-defined messages to it, and these messages are implemented by the methods.