Creating Database using Microsoft Access

Project: The Boat Club Database

In this task, you will

1. Implement a database model in Microsoft Access
2. write a series of SQL queries for the database

Objectives

When you successfully complete task you should be able to

- translate a simple Entity-Relationship model into an Access database;
- insert data into the database;
- query the database using SQL; and

Background for the Project

The goal of the "BoatClub" database is to enable members of a boat club to reserve boats for trips lasting several hours. The two major entities are:

- Sailors—members of the boat club who reserve boats; and
- Boats—boats in the club's inventory.

How are these two entities related? In this problem we need to know what boats are reserved by what sailors. Thus, "reservation" is obviously an important relationship in this simple problem. We can model the two entities "Sailors" and "Boats" and the relationship "Reservation" with the Entity-Relationship model shown in figure 3.22.

Figure 3.22—Entity-Relationship Model of BoatClub

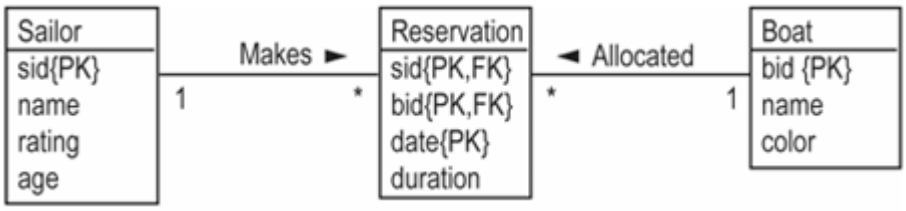


Table 3.23—Attributes of the Sailor Entity

Attribute	Description
SID	A sailor—each sailor is assigned a unique ID
name	The sailor's name
rating	The sailor's rating, ranging from 1 (low) to 10 (high)
age	The sailor's age

Table 3.24—Attributes of the Boat Entity

Attribute	Description
BID	A boat ID—each boat is assigned a unique ID (painted on the bow)
name	The name of the boat (also painted on the bow)
color	The color of the boat

The notation {PK} is used to denote primary keys. You can see that sid and bid are both primary keys, meaning that values of these attributes can be used to uniquely identify each row of their respective tables.

The "Reservation" table is a little more complex. It consists of the attributes in table 3.25.

Table 3.25—Attributes of the Reservation Table

Attribute	Description
SID	Sailor ID
BID	Boat ID
date	The date and time of the reservation
duration	The expected duration of the reservation in minutes

Notice that the "Reservation" table is a bridge table because it allows data from two other tables to be combined. Recall that these tables, "Sailor" and "Boat," are known as base tables.

The attributes SID and BID are called foreign keys. The notation {FK}is used to indicate this fact. In combination, the attributes "sid," "bid," and "date" make up the primary key for the table. The notation {PK} is used to indicate this. Therefore, "sid" and "bid" are individually foreign keys, plus they are part of the primary key.

Look again at figure 3.22. The label "Makes" tells us how to read the relationship between "Sailor" and "Reservation." Thus, we see that a sailor "makes" a reservation. We can also see that a boat is "allocated" to a reservation.

The * and 1 indicate the multiplicity of the relationships. In short, the model states that a sailor can make many reservations (*) but a reservation involves only a single sailor. Similarly, a boat can be allocated to many reservations, but only one boat is allocated to a particular reservation. In other words, these are one-to-many relationships.

Project Description

Given this Entity-Relationship model, your objectives are to implement a database in Access, insert some data into the database, query the database with SQL, and extend the BoatClub ER model to satisfy a new relationship. Details for completing these objectives are outlined below.

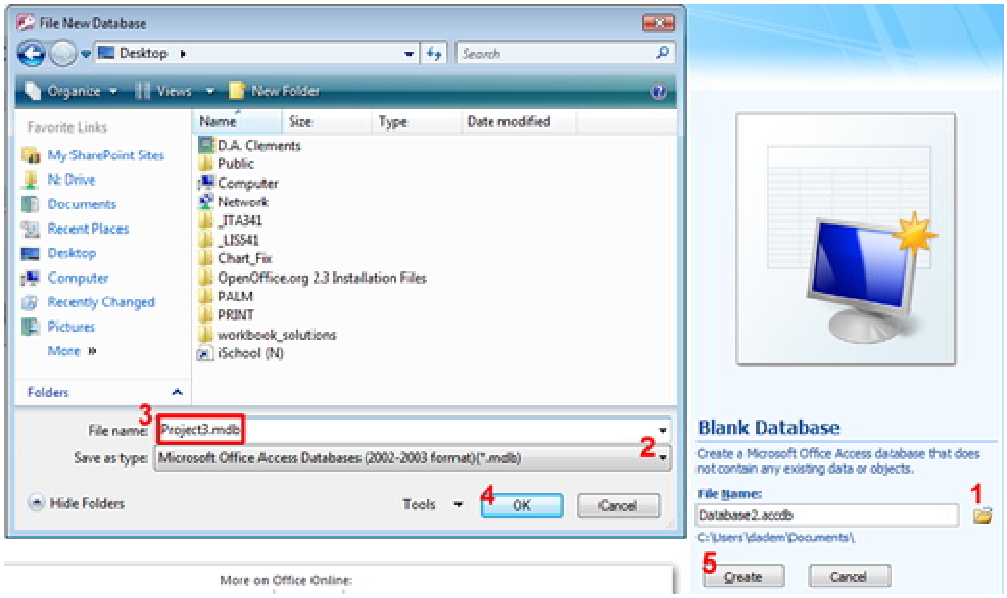
Step 1: Create the Database in Access

Note that steps may vary slightly depending on what version of MS Access you are using. They should be essentially the same, however. E-mail me (smnma@yahoo.com) if you encounter difficulties.

1. Start Access.
2. Click on the Office Icon 

3. Click on New.

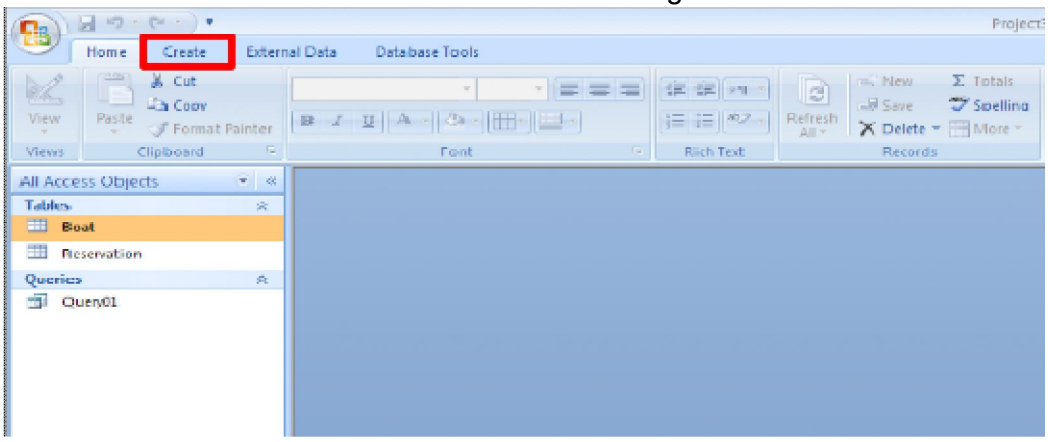
4. Depending on your version of Access, you may be asked whether you want to open a blank database.
    1. Browse to the folder where you wan to store your database. An Explorer window will pop up.
    2. Click the down arrow to change type to Microsoft Office Access Databases (2002-2003)(*.mdb).
    3. For File Name, enter **Project3.mdb**
    4. Click OK.



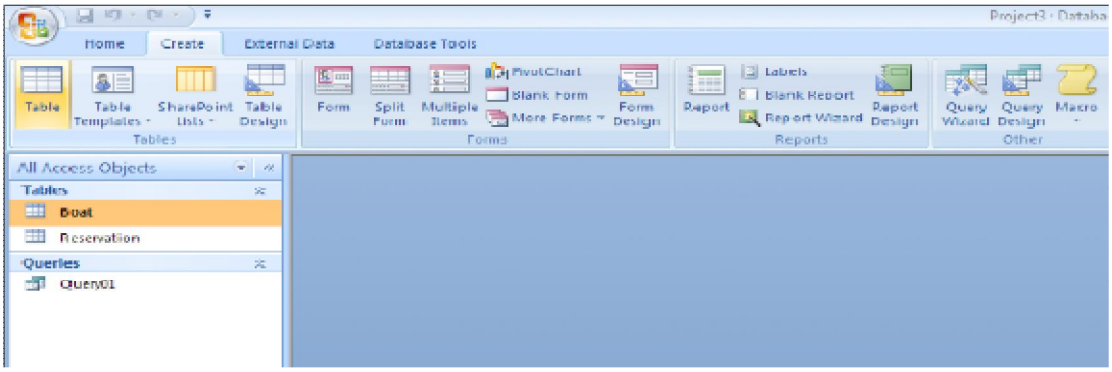
    5. Click Create.

Step 2: Create Tables

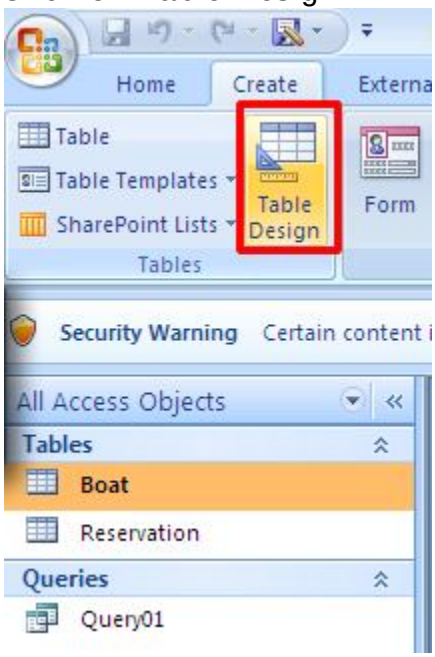
1. Notice that the Home tab is selected. Change to the **Create** tab.



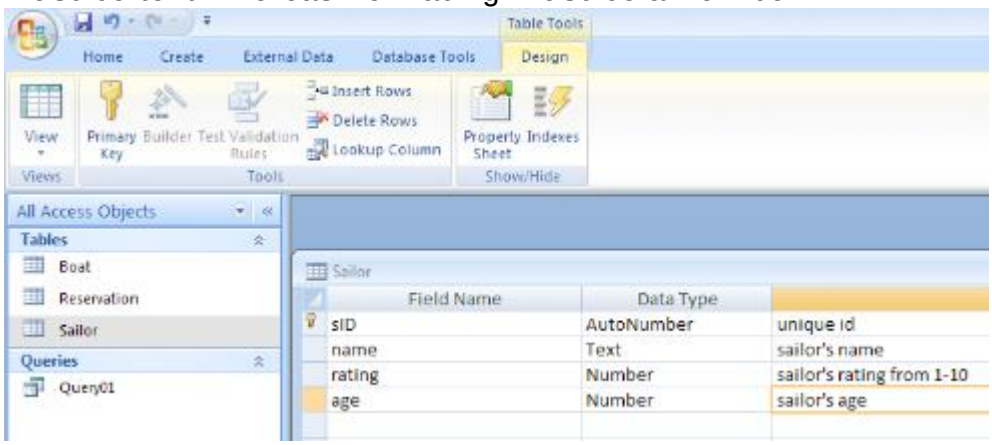
2. Choose Table.



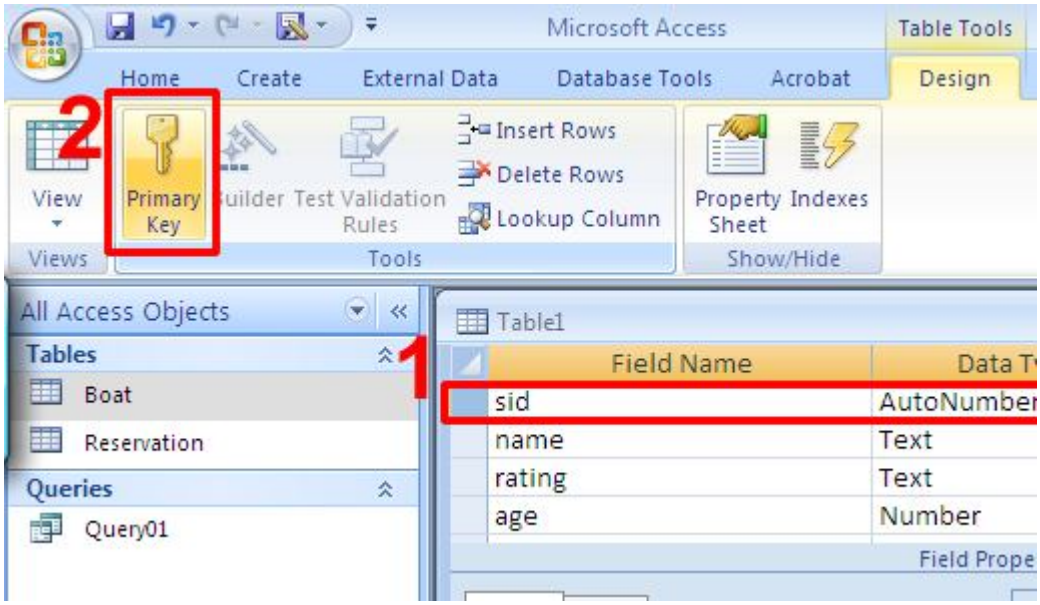
3. Click on Table Design.



4. Design view provides a table dialog box (refer to figure 3.26 below) for entering information about the attributes (or columns) that make up the table. The two key pieces of information are the names of the attributes, "Field Name," and their "Data Types." The data type states the kind of value for the attribute. For example, the data type for a sailor's name must be text whereas her rating must be a number.



5. Click on the first row under "Field Name." Enter the attribute name in the cell, such as "sid."
6. Next, click on the cell under "Data Type" and click on the arrow box to see a list of options. Select "Number" from the pull-down menu.
7. Repeat steps 5–7 for each of the attributes in the sailor table.
8. All tables should have a primary key. To add a primary key to this table, select the attribute "sid" then click on primary key. This makes the attribute sid the primary key. Note the key symbol that now appears to the left of the attribute.



9. Once you are finished adding attributes, you need to save the table by selecting File > Save. The first time you save a table, Access will ask you to name the table. In this case, name the table "Sailor."

10. Note that after you save the table, you are returned to the Home tab and Datasheet view that allows you to enter data into the table.

This is all you need to know about creating and modifying tables for this project. You should now create tables for "Boat" and "Reservation."

Notes

Note 1—Be sure to select "Text" as the data type for a sailor's name.

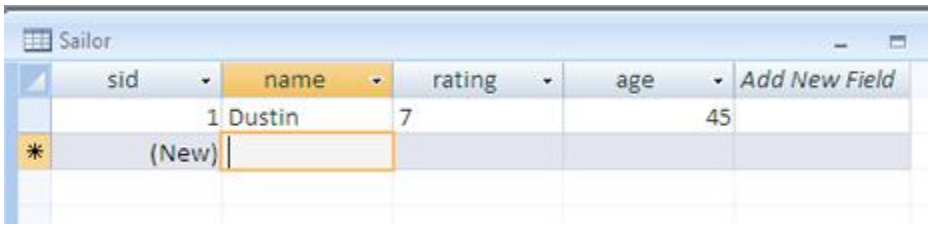
Note 2—Select "Currency" as the data type for the "age" attribute and change its "Format" under Field Properties to "General Number." This prevents values that use decimal points from rounding up or down as they do with the "Number" data type.

Note 3—Unfortunately, Access does not allow a composite primary key,that is, a primary key that consists of multiple attributes. This is a problem for the Reservation table. To address this limitation, please create another attribute, such as "rid" for reservation identification, to uniquely identify each attribute in the table.

Step 3: Insert Data

To insert data:

1. Start Access and open the Project3.mdb database.
2. Select View > Database Objects . . . > Tables.
3. Double click on the table name and the "Sailor: Table" window appears with a tabular form for entering data. See figure 3.28. You can type the values of the attributes into these cells.



4. Enter the sample data from table 3.26 into the "Sailor" table.

Table 3.26—Sample Data for "Sailor"

SID	name	rating	age
1	Dustin	7	45.0
2	Brutus	1	33.0
3	Laura	8	55.5
4	Andy	8	25.5
5	Rusty	10	35.5
6	Horatio	7	35.0
7	Zelda	10	16.0
8	Horatio	9	35.0
9	Amy	3	25.5
10	Bob	3	63.5

5. Enter the sample data from table 3.27 into the "Boat" table.

Table 3.27—Sample Data for "Boat"

BID	name	color
1	Interlake	blue
2	Interlake	red
3	Clipper	green
4	Marine	red

Table 3.28— Sample Data for " Reservation"

RID	SID	BID	date	duration
1	1	1	10/10/07	60
2	1	2	10/10/07	60
3	1	3	10/08/07	60
4	1	4	10/07/07	90
5	3	2	11/10/07	90
6	3	3	11/06/07	60
7	3	4	11/12/07	90
8	6	1	9/05/07	60
9	6	2	9/08/07	60
10	7	3	9/08/07	60