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Oracle11*g*:
PL/SQL Programming

Chapter 1

Introduction to PL/SQL

Chapter Objectives

PL/SQL

- After completing this lesson, you should be able to understand:
  - PL/SQL and application programming
  - Application models
  - How to locate Oracle resources
  - SQL and PL/SQL tools
  - The databases used in this book
  - SQL SELECT statement and data manipulation syntax

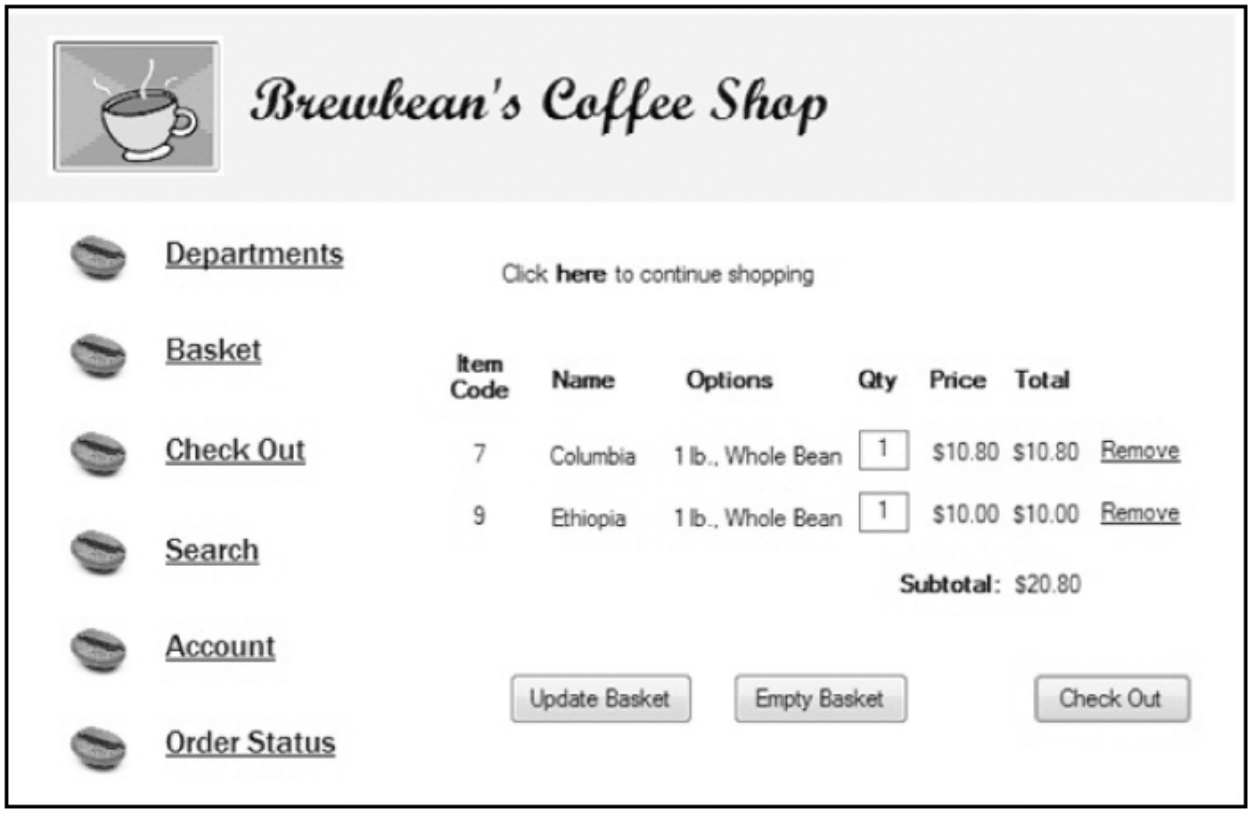
Procedural Languages

- Programming languages allow actions of the end user to be converted to computer instructions
- Procedural languages allow the inclusion of logic processes
- PL/SQL is a procedural language, SQL is not a procedural language

Application Programming

PL/SQL

- Example application screen



Brewbean's Application

PL/SQL

- Processing needed to support the shopping cart check out button
  - Verify quantities are > 0
  - Calculate shipping cost
  - Calculate taxes
  - Check/update product inventory
  - Check shopper profile for credit card information

The PL/SQL Language

- Proprietary Oracle language
- Tightly integrated with SQL
- Can increase performance by grouping statements into blocks of code
- Portable to any Oracle platform
- Used within many Oracle tools
- Stored program units can increase security

Application Models

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- Three main components
  - User interface or screens
  - Program logic (brains behind the screens)
  - Database
- Most models are based on a two- or three-tier structure

Two-tier Model

PL/SQL

- Commonly referred to as client/server
- Parts of the processing occur both on the user's computer and the database server
- Named or stored program units are blocks of PL/SQL code saved in the Oracle database to provide server-side processing

Two-tier Diagram

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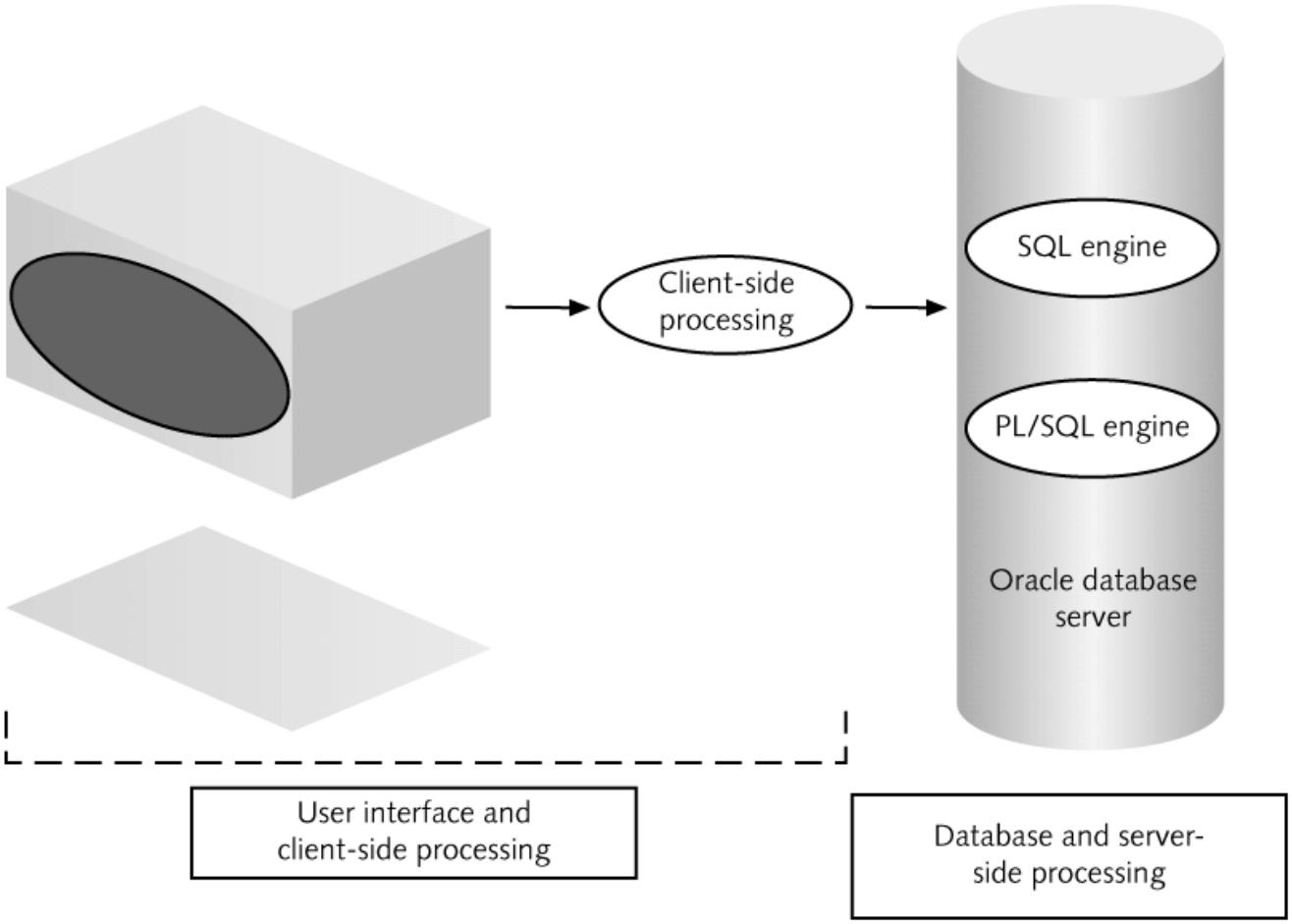

Three-tier Model

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- Thin client with no code loaded on the user machine (browser access)
- Middle tier is the application server – Forms server for Oracle
- Last tier is the database server
- Processing load is on the middle and last tier
- Maintenance is simplified

Three-tier Diagram

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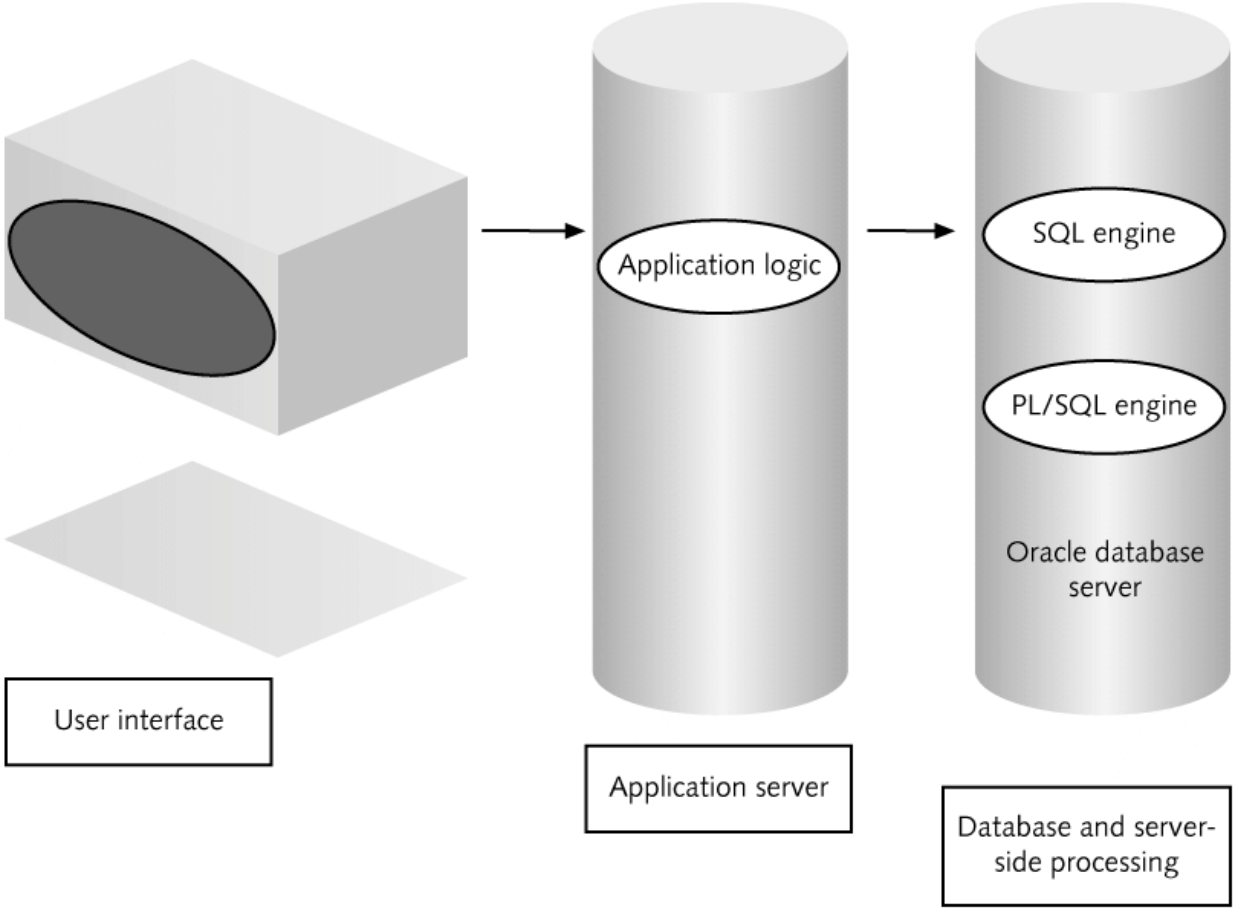

Oracle Documentation

PL/SQL

- Oracle Technology Network (OTN): otn.oracle.com
  - Documentation
  - Sample Code
  - Discussion Forums
- User Web sites: PL/SQL Obsession

SQL & PL/SQL Tools

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- SQL*Plus
- SQL Developer
  - Appendix B
- Other software introduced in appendices
  - TOAD
  - SQL Navigator

SQL*Plus Client Interface

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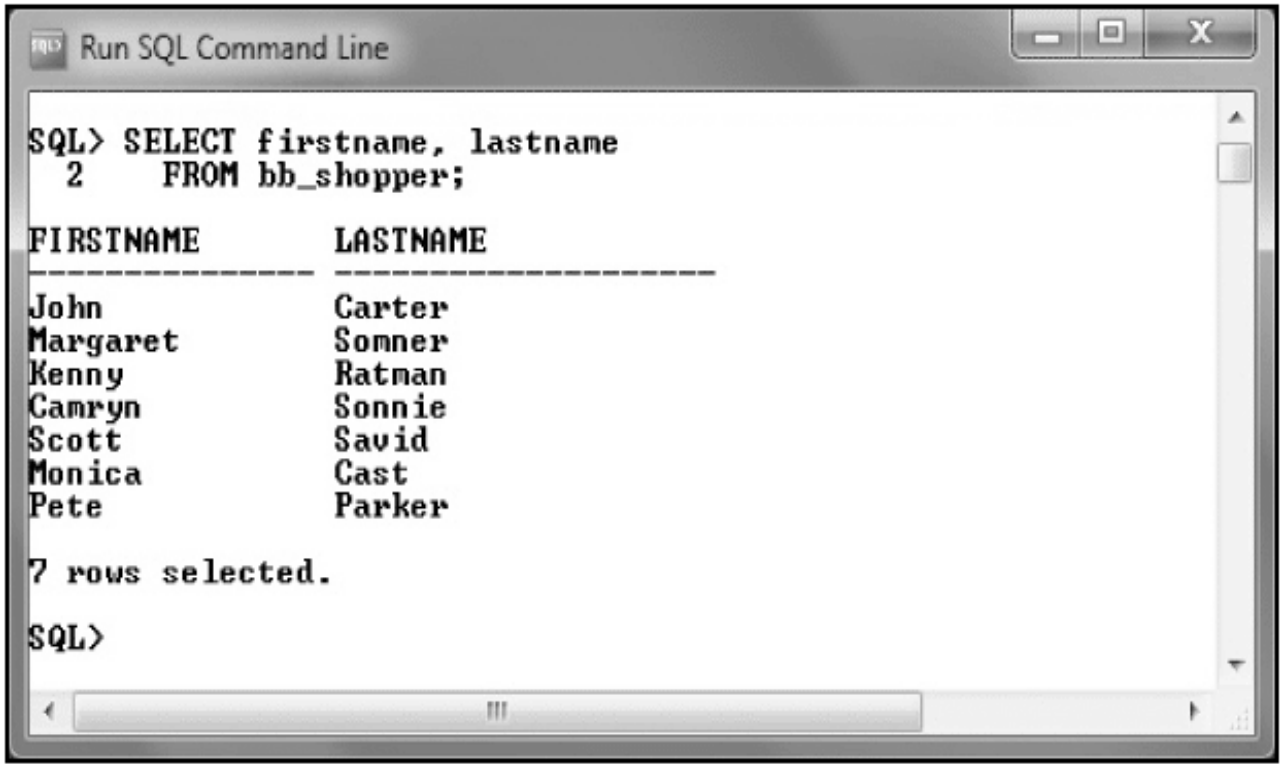
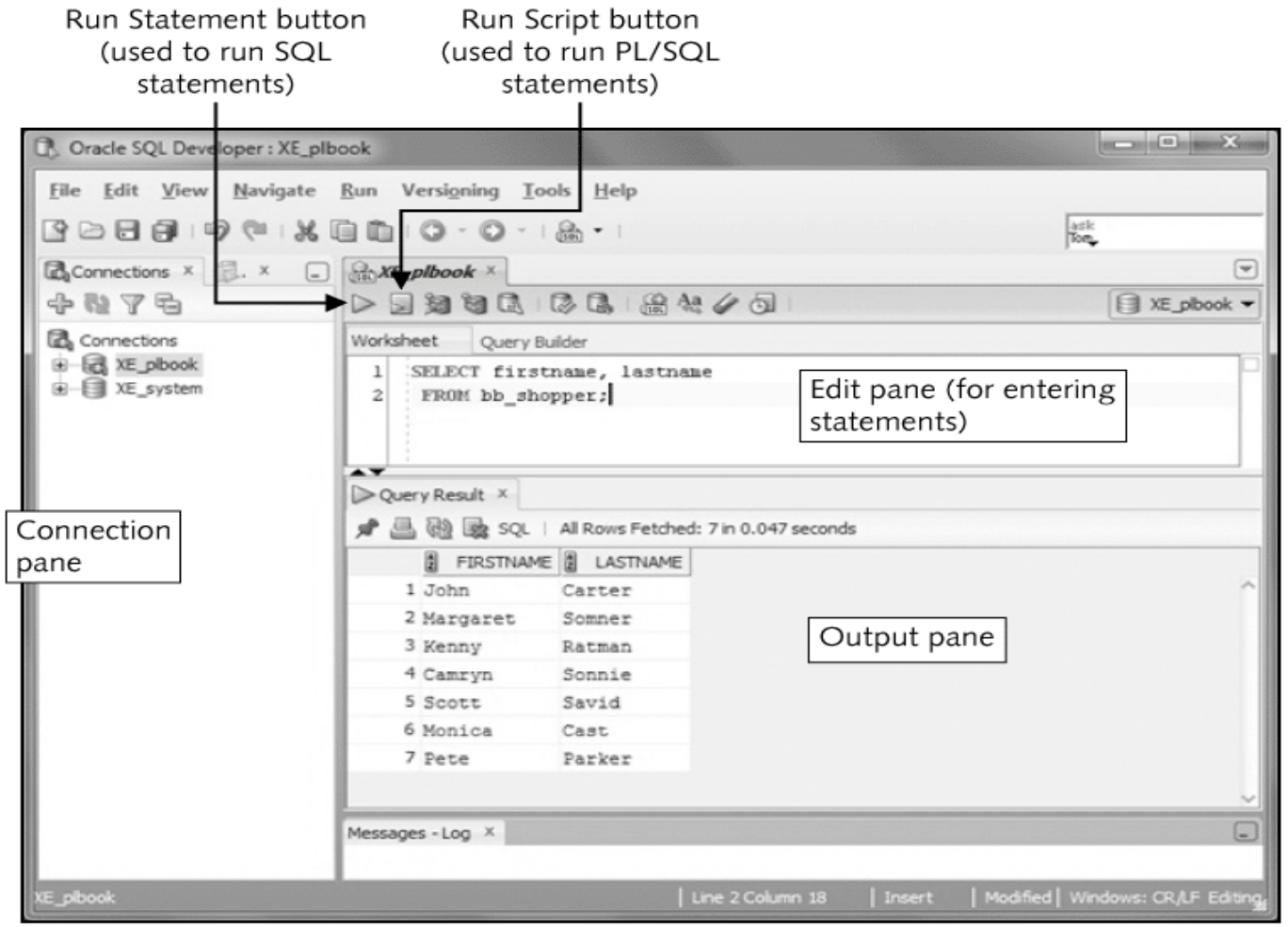


SQL Developer



Databases Used

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- Brewbean's Company
  - In text examples
  - Assignments
- DoGood Donor
  - Assignments
- More Movie Rentals
  - Case Projects

The Brewbean's Company

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- Retails coffee and brewing equipment via the Internet, phone, and stores
- Used in chapter explanations, examples, and exercises
- Databases create script provided for each chapter

ERD for Brewbean's DB

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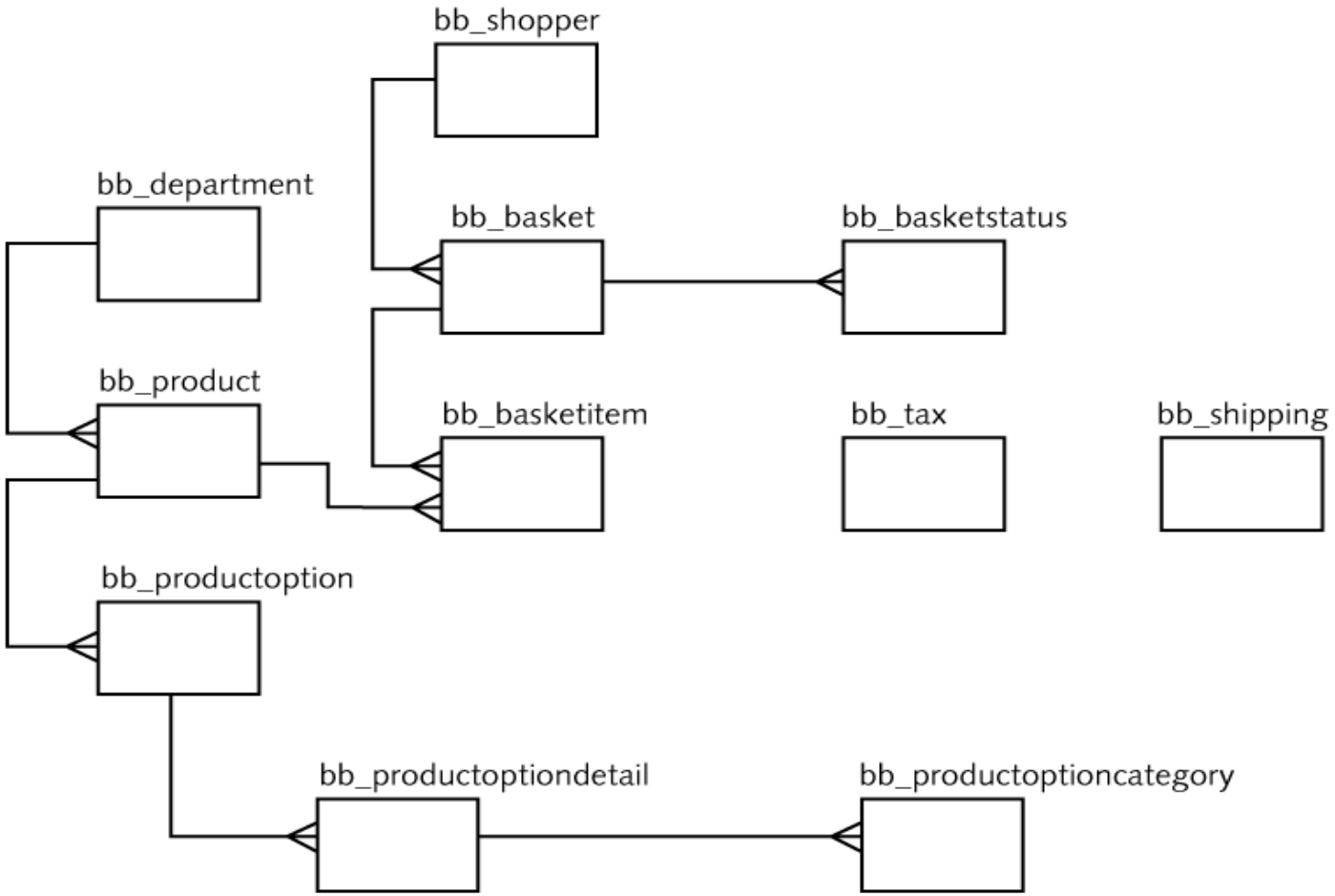
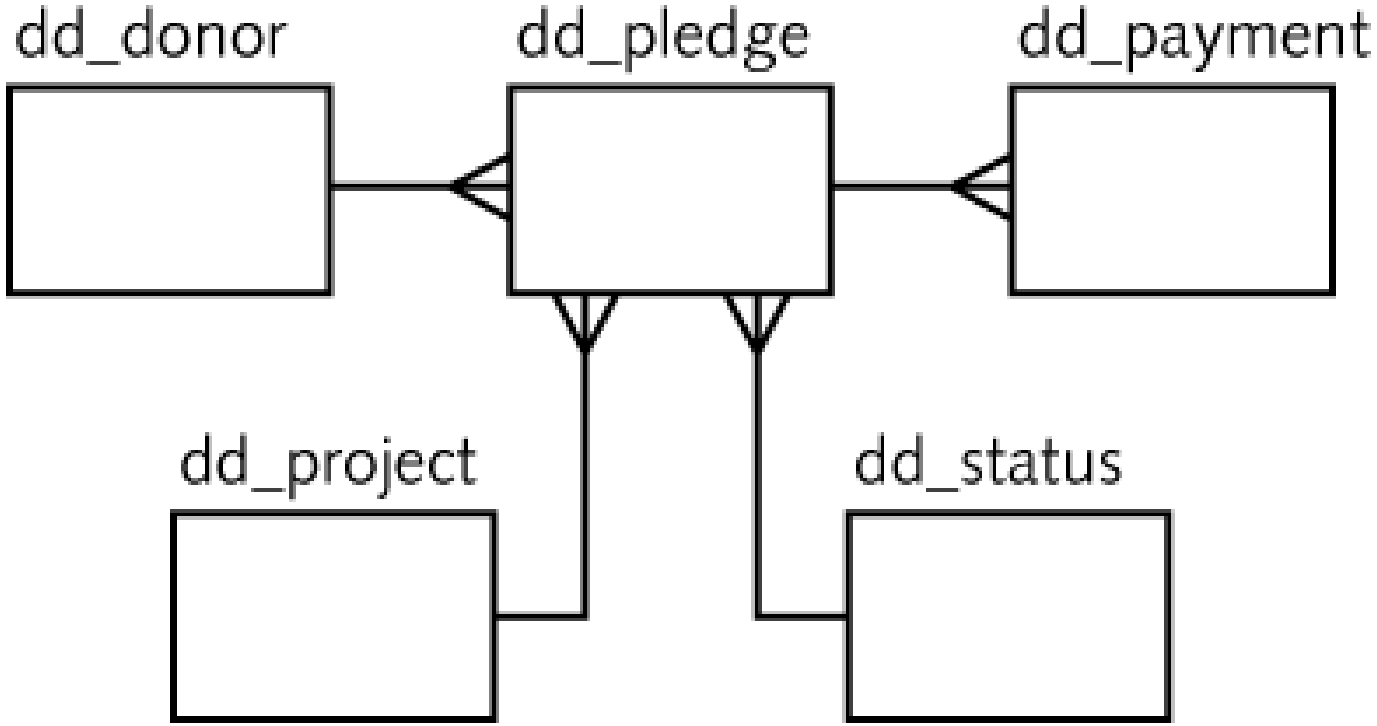


DoGood Donor ERD

- Track donation, pledges, and payments



More Movies ERD

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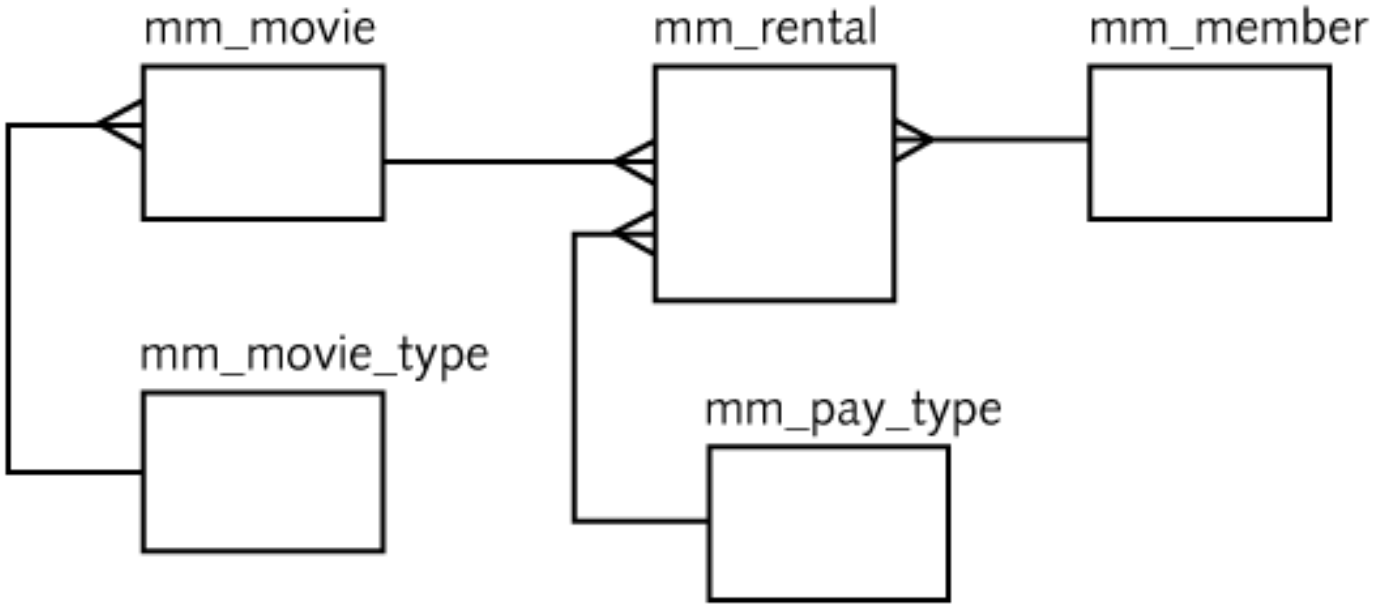
- Movie rental company used in an ongoing case study



SQL Query Syntax

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```
SELECT <columns>
   FROM <tables, views>
   WHERE <conditions>
   GROUP BY <columns>
   HAVING <aggregation conditions>
   ORDER BY <columns>;
```

Traditional Join

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Worksheet | Query Builder

```
1  SELECT p.productname, p.active, d.deptname
2    FROM bb_product p, bb_department d
3    WHERE p.iddepartment = d.iddepartment;
```

Query Result

SQL | All Rows Fetched: 10 in 0.046 seconds

	PRODUCTNAME	ACTIVE	DEPTNAME
1	CapressoBar Model #351	1	Equipment and Supplies
2	Capresso Ultima	1	Equipment and Supplies
3	Eileen 4-cup French Press	1	Equipment and Supplies
4	Coffee Grinder	1	Equipment and Supplies
5	Sumatra	1	Coffee
6	Guatamala	1	Coffee
7	Columbia	1	Coffee
8	Brazil	1	Coffee
9	Ethiopia	1	Coffee
10	Espresso	1	Coffee

ANSI Join

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Worksheet | Query Builder

```
1  SELECT p.productname, p.active, d.deptname
2    FROM bb_product p INNER JOIN bb_department d
3           USING(iddepartment);
```

Query Result

SQL | All Rows Fetched: 10 in 0 seconds

	PRODUCTNAME	ACTIVE	DEPTNAME
1	CapressoBar Model #351	1	Equipment and Supplies
2	Capresso Ultima	1	Equipment and Supplies
3	Eileen 4-cup French Press	1	Equipment and Supplies
4	Coffee Grinder	1	Equipment and Supplies
5	Sumatra	1	Coffee
6	Guatamala	1	Coffee
7	Columbia	1	Coffee
8	Brazil	1	Coffee
9	Ethiopia	1	Coffee
10	Espresso	1	Coffee

Aggregate function

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Worksheet | Query Builder

```
1  SELECT deptname, COUNT(idproduct)
2    FROM bb_product p INNER JOIN bb_department d
3           USING(iddepartment)
4   GROUP BY deptname;
```

Query Result

SQL | All Rows Fetched: 2 in 0.047 seconds

	DEPTNAME	COUNT(IDPRODUCT)
1	Coffee	6
2	Equipment and Supplies	4

WHERE clause filter

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Worksheet | Query Builder

```
1  SELECT AVG(price)
2    FROM bb_product
3    WHERE type = 'C';
```

Query Result

SQL | All Rows Fetched: 1 in 0.032 seconds

	AVG(PRICE)
1	10.35

Creating Tables

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0.031 seconds

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Worksheet | Query Builder

```
1  CREATE TABLE autos
2    (auto_id NUMBER(5),
3     acquire_date DATE,
4     color VARCHAR2(15),
5     CONSTRAINT auto_id_pk PRIMARY KEY (auto_id));
```

Query Result | Script Output

Task completed in 0.031 seconds

```
table AUTOS created.
```

DML - Insert

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0.078 seconds

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Worksheet | Query Builder

```
1  INSERT INTO autos (auto_id, acquire_date, color)
2    VALUES (45321, '05-MAY-2012', 'gray');
3  INSERT INTO autos (auto_id, acquire_date, color)
4    VALUES (81433, '12-OCT-2012', 'red');
5  COMMIT;
6  SELECT * FROM autos;
```

Query Result | Script Output

Task completed in 0.078 seconds

```
1 rows inserted.
1 rows inserted.
commited.
AUTO_ID ACQUIRE_DATE COLOR
------- ------------ ---------------
  45321 05-MAY-12    gray
  81433 12-OCT-12    red
```

DML - Update

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0 seconds XE_plbo

Worksheet Query Builder

```
1  UPDATE autos
2    SET color = 'silver'
3    WHERE auto_id = 45321;
4  SELECT *
5    FROM autos;
```

Query Result Script Output

Task completed in 0 seconds

```
1 rows updated.
AUTO_ID ACQUIRE_DATE COLOR
------- ------------ ---------------
  45321 05-MAY-12    silver
  81433 12-OCT-12    red
```

DML - Delete

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0.015 seconds

Worksheet | Query Builder

```
1  DELETE FROM autos
2    WHERE auto_id = 45321;
3  SELECT *
4    FROM autos;
```

Query Result | Script Output

Task completed in 0.015 seconds

```
1 rows deleted.
AUTO_ID ACQUIRE_DATE COLOR
------- ------------ ---------------
  81433 12-OCT-12    red
```

Drop Table

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Worksheet | Query Builder

```
1  DROP TABLE autos;
2  SELECT *
3    FROM autos;
```

Query Result | Script Output

Task completed in 0.203 seconds

```
table AUTOS dropped.

Error starting at line 2 in command:
SELECT *
  FROM autos
Error at Command Line:3 Column:7
Error report:
SQL Error: ORA-00942: table or view does not exist
00942. 00000 -  "table or view does not exist"
```

Review to prepare

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- Review SQL statement syntax
- Explore the Brewbean’s database