

Acme Sporting Goods



Relational Database



NOTES

ACME SPORTING GOODS – INTRODUCTION

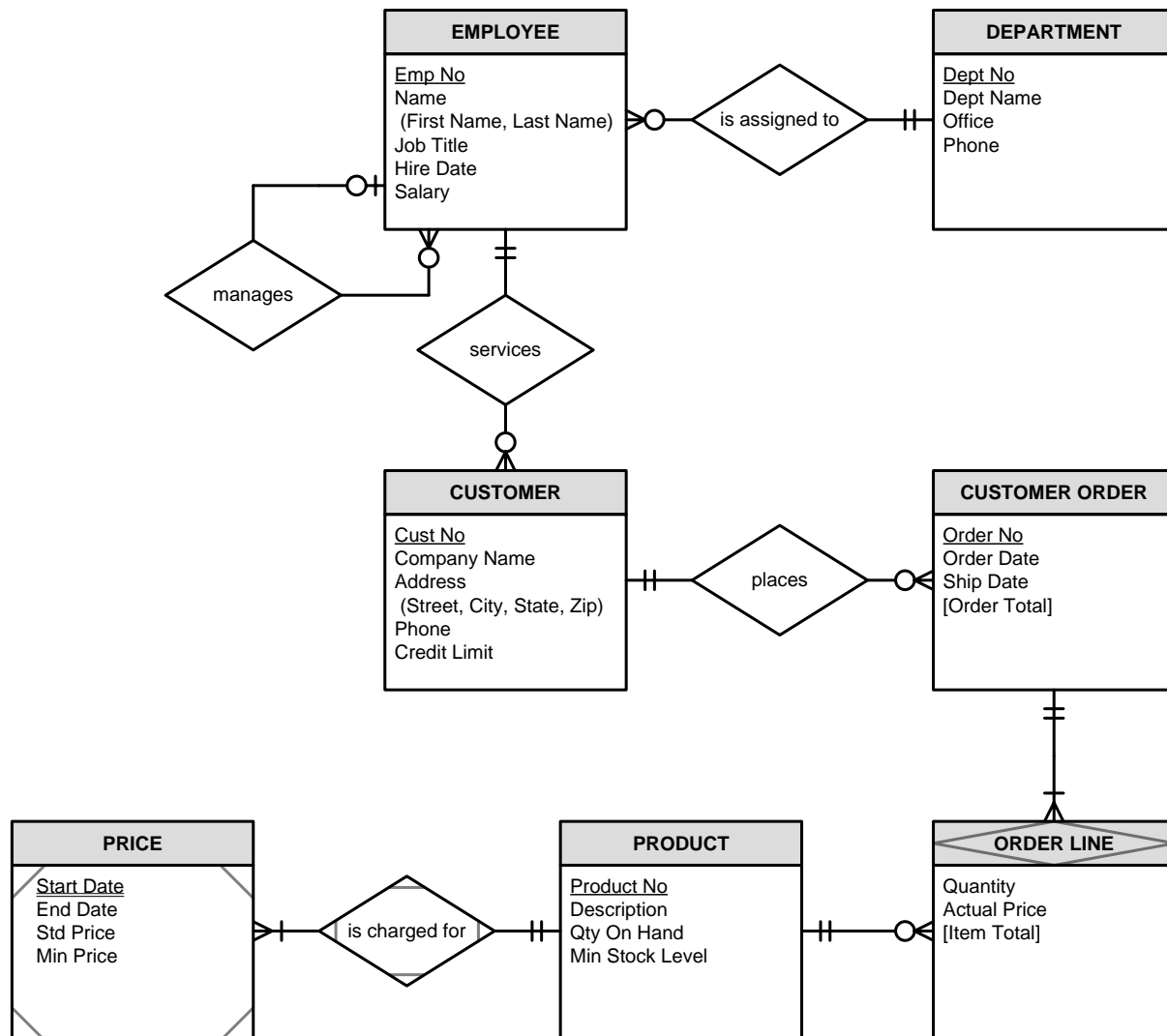
Acme Sporting Goods is a privately-owned startup business located in central Florida. It specializes in supplying products to small retail sporting goods stores. Acme has grown from its initial four employees to a staff of 15, in five departments, in little more than a year. Currently, Acme's product line focuses on a few carefully chosen products in five core sports: baseball, football, basketball, soccer, and tennis. Acme uses a dedicated sales force to acquire and retain customers, and each of Acme's customers has a member of Acme's Sales department assigned to handle their account. These salespersons have broad latitude in negotiating prices with customers when soliciting orders, as competition is keen from larger sporting goods companies. (Management does, however, provide a set of pricing guidelines to the sales force to assist in their negotiations with customers.) Acme is optimistic about its prospects for future growth, as the American public's appetite for sports and leisure continues to grow.

The steady growth of the company convinced Acme's management that the company needed to convert from their manual recordkeeping approach to a modern automated database system. Towards that end, management acquired the consulting services of a database design company and provided it with access to a sampling of Acme's data to assist in the design of a new system. The sample data, along with several database design documents developed by the consultants, are included in this packet. A prototype relational database system representing Acme's business was developed by the consultants (using Microsoft SQL Server), and is also available for examination.

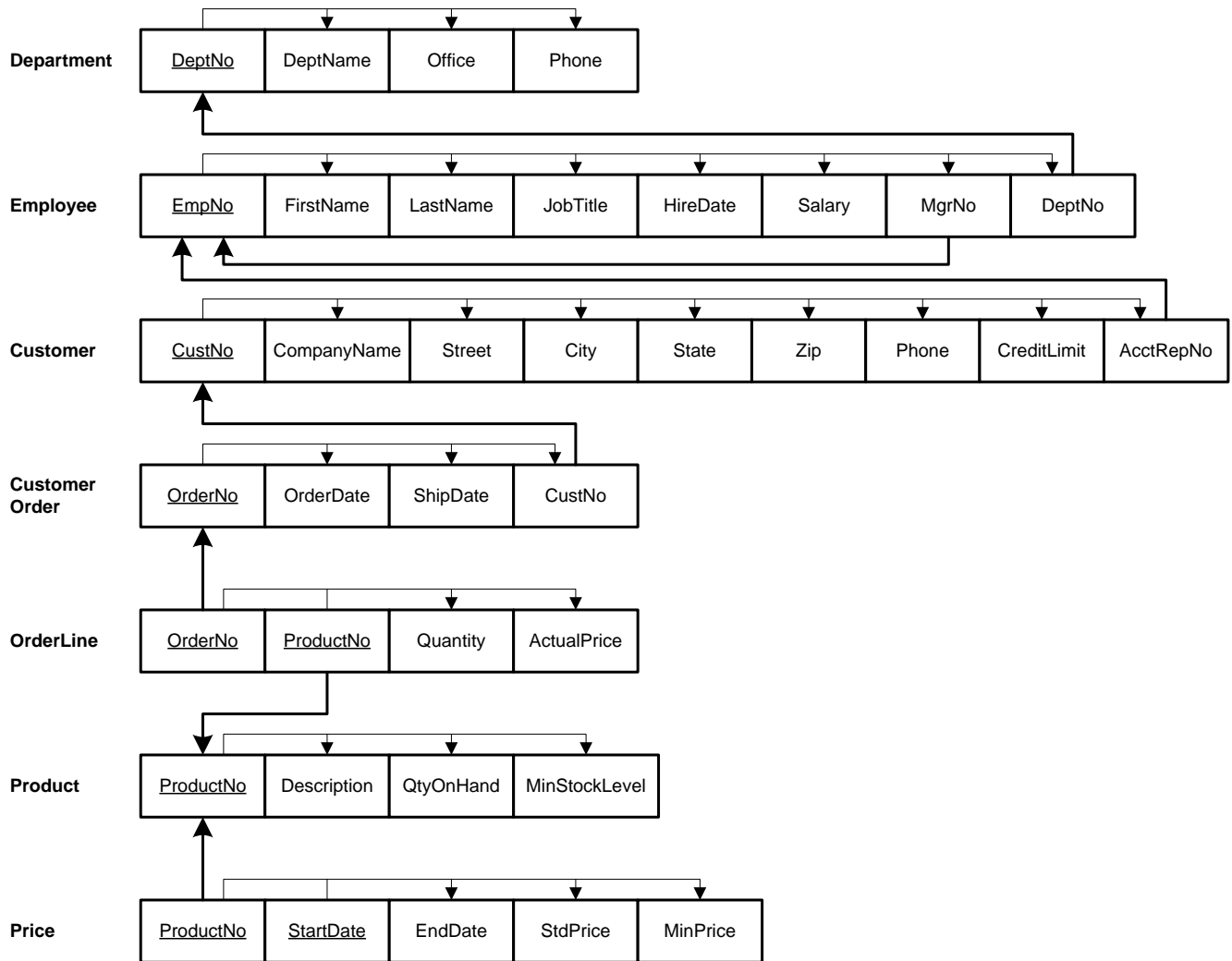
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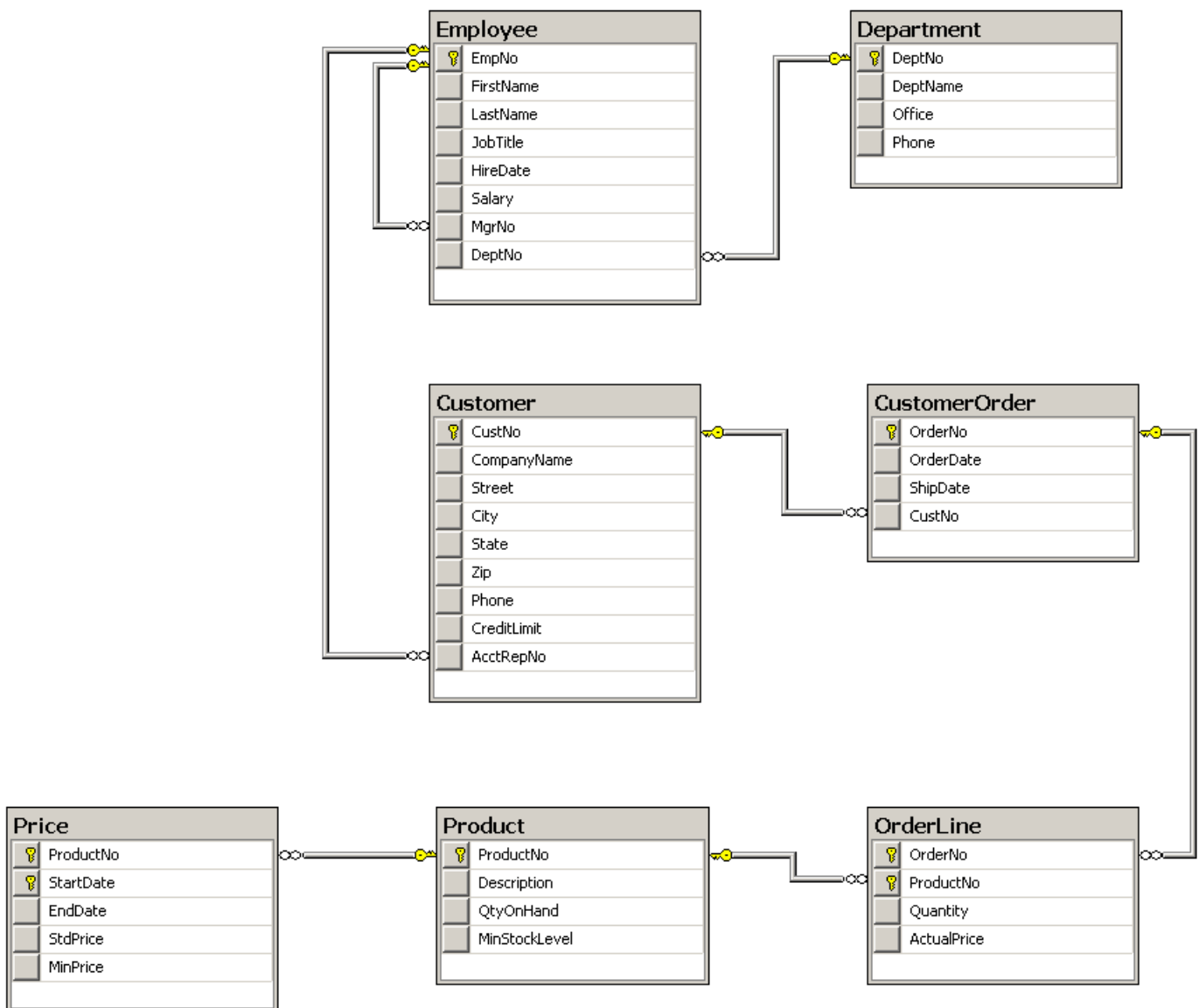
ACME SPORTING GOODS – ENTITY-RELATIONSHIP DIAGRAM



ACME SPORTING GOODS – RELATIONAL SCHEMA



ACME SPORTING GOODS – SQL SERVER DATABASE DIAGRAM



ACME SPORTING GOODS – DATA DICTIONARY

(Microsoft SQL Server Notation)

Table: **Customer**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Check	Allow Nulls	Index
CustNo	PK ; Unique sequential customer number	smallint		Y					Y
CompanyName	Name of customer company	varchar	40						Y
Street	Customer street	varchar	30						
City	Customer city	varchar	25						
State	Customer state	char	2				LIKE '[A-Z][A-Z]'		
Zip	Customer zip	char	5				LIKE '[0-9][0-9][0-9][0-9][0-9]'		
Phone	Customer phone	char	14		Y		LIKE '([0-9][0-9][0-9][0-9]) [0-9][0-9][0-9][0-9]-[0-9][0-9][0-9][0-9]'		Y
CreditLimit	Customer credit limit	smallmoney					>= 0 AND <= 10000		
AcctRepNo	FK to Employee table; synonym for EmpNo; customer account representative	smallint							Y

Table: **CustomerOrder**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Check	Allow Nulls	Index
OrderNo	PK ; Unique sequential order number	int		Y					Y
OrderDate	Date order placed	date				GETDATE()	<= GETDATE()		
ShipDate	Date order shipped	date					>= OrderDate	Y	
CustNo	FK to Customer table	smallint							Y

Table: **Department**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Check	Allow Nulls	Index
DeptNo	PK ; Unique department number	tinyint							Y
DeptName	Department name	varchar	30		Y				Y
Office	Department office number	char	4		Y		LIKE '[A-Z][0-9][0-9][0-9]'		Y
Phone	Department telephone number	char	14		Y		LIKE '([0-9][0-9][0-9][0-9]) [0-9][0-9][0-9][0-9]-[0-9][0-9][0-9][0-9]'		Y

Table: **Employee**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Check	Allow Nulls	Index
EmpNo	PK ; Unique sequential employee number	smallint		Y					Y
FirstName	Employee first name	varchar	15						
LastName	Employee last name	varchar	20						Y
JobTitle	Employee job title	varchar	20						
HireDate	Employee hire date	date				GETDATE()	<= GETDATE()		
Salary	Employee monthly salary	smallmoney					>= 0		
MgrNo	Recursive FK ; synonym for EmpNo; manager of employee	smallint						Y	
DeptNo	FK to Department table	tinyint							Y

Table: **OrderLine**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Check	Allow Nulls	Index
OrderNo	CPK ; FK to CustomerOrder table	int							Y
ProductNo	CPK ; FK to Product table	char	5				LIKE '[A-Z][0-9][0-9][0-9][0-9]'		Y
Quantity	Quantity of product ordered	int					> 0		
ActualPrice	Actual unit price charged for product	smallmoney					>= 0		

Table: **Price**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Check	Allow Nulls	Index
ProductNo	CPK ; FK to Product table	char	5				LIKE '[A-Z][0-9][0-9][0-9][0-9]'		Y
StartDate	CPK ; Effective date of price	date				GETDATE()			Y
EndDate	Date price no longer effective	date					>= StartDate	Y	
StdPrice	Standard (usual) product unit price charged	smallmoney					>= MinPrice		
MinPrice	Minimum product unit price allowed	smallmoney					>= 0		

Table: **Product**

Column Name	Description	Data Type	Size	Identity	Unique	Default	Check	Allow Nulls	Index
ProductNo	PK ; Unique product number	char	5				LIKE '[A-Z][0-9][0-9][0-9][0-9]'		Y
Description	Product description	varchar	30		Y				Y
QtyOnHand	Units of product currently in stock	int					>= 0		
MinStockLevel	Minimum units of product to keep in stock	int					>= 0		

ACME SPORTING GOODS – DATA SETS

Customer

CustNo	CompanyName	Street	City	State	Zip	Phone	CreditLimit	AcctRepNo
100	Turner Sporting Goods	612 Sandstone St.	Ocala	FL	34481	(352) 751-8423	10000.0000	1005
101	Ralph's Outdoor Emporium	3221 Oakdale Ln.	Palm Springs	FL	33461	(561) 324-9097	10000.0000	1005
102	P & T Entertainment	51-A Lincoln St.	Bradenton	FL	34207	(941) 347-8787	5000.0000	1007
103	Sports World	32190 Fresco Dr.	Tampa	FL	33629	(813) 842-1029	7500.0000	1007
105	Fred's Funtime	932 Murray Blvd.	Atlanta	GA	30322	(404) 251-1000	10000.0000	1010
106	Major League Sports	10 Bowdoin Rd.	Trenton	GA	30752	(706) 657-2223	10000.0000	1010
107	Score-4 Sports	444 Windom Pl.	Lakeland	FL	33811	(863) 709-1486	7500.0000	1005
109	Two Guys & A Gal Fitness Center	4 Branson St.	Baton Rouge	LA	70806	(225) 922-8777	5000.0000	1018
110	The Sports Shoppe	2551 Richardson Dr.	Plano	TX	75023	(469) 241-0076	7500.0000	1018
111	JRG Enterprises	43 Central Ave.	Tampa	FL	33615	(813) 885-1111	10000.0000	1007
112	Bats, Balls, & Gloves	1500 Carroll Way	Tulsa	OK	74130	(918) 425-5005	5000.0000	1018
113	Foster Sports Supply	87 Swanson Ln.	Lake City	FL	32024	(386) 755-3365	10000.0000	1010

CustomerOrder

OrderNo	OrderDate	ShipDate	CustNo
10000	2011-05-11	2011-05-16	100
10001	2011-06-09	2011-06-13	100
10002	2011-07-15	2011-07-22	101
10003	2011-07-29	2011-08-02	100
10004	2011-08-01	2011-08-04	102
10005	2011-08-15	2011-08-19	101
10006	2011-08-31	2011-09-05	102
10007	2011-09-29	2011-10-03	103
10008	2011-10-21	2011-10-26	100
10010	2011-10-31	2011-11-04	105
10011	2011-11-18	2011-11-22	101
10012	2011-11-21	2011-11-28	102
10013	2011-12-05	2011-12-08	103
10014	2011-12-20	2011-12-22	105
10015	2012-01-06	2012-01-12	106
10017	2012-01-23	2012-01-25	107
10019	2012-01-31	2012-02-03	101
10020	2012-02-20	2012-02-24	103
10021	2012-03-01	2012-03-03	105
10022	2012-03-03	2012-03-07	106
10023	2012-03-20	2012-03-23	111
10024	2012-03-30	2012-04-03	107
10025	2012-04-17	2012-04-20	103
10026	2012-05-01	2012-05-03	109
10027	2012-05-02	2012-05-05	101
10028	2012-05-15	2012-05-19	110
10029	2012-05-15	2012-05-22	111
10030	2012-05-30	2012-06-02	105
10031	2012-06-19	2012-06-21	113
10032	2012-06-30	2012-07-05	106

Department

DeptNo	DeptName	Office	Phone
10	Accounting	A101	(813) 961-1234
20	Production	A103	(813) 961-2006
30	Sales	A106	(813) 961-5309
40	MIS	B101	(813) 961-9999
50	Research	B105	(813) 961-0181

Employee

EmpNo	FirstName	LastName	JobTitle	HireDate	Salary	MgrNo	DeptNo
1000	Roy	King	President	2011-03-15	9000.0000	NULL	10
1001	Fred	Rogers	Manager	2011-03-15	7500.0000	1000	20
1002	Robert	Slate	Manager	2011-03-15	7000.0000	1000	30
1004	Glenn	Wright	Manager	2011-03-15	7000.0000	1000	40
1005	Kay	Riddle	Salesperson	2011-05-09	5000.0000	1002	30
1007	David	Teeter	Salesperson	2011-05-30	4700.0000	1002	30
1010	Amy	Boyle	Salesperson	2011-10-24	4250.0000	1002	30
1011	John	Doe	Clerk	2011-10-24	2800.0000	1000	10
1012	Mary	Brown	Clerk	2011-10-24	2700.0000	1001	20
1013	William	Gates	Analyst	2011-10-24	4500.0000	1004	40
1015	Robert	Sorrell	Clerk	2012-01-16	2500.0000	1001	20
1016	Aileen	LaMela	Clerk	2012-01-16	2500.0000	1000	10
1017	Steven	Jobs	Analyst	2012-01-16	4250.0000	1004	40
1018	Leonard	Melice	Salesperson	2012-04-24	4000.0000	1002	30
1020	Douglas	Riddle	Clerk	2012-07-05	2400.0000	1001	20

OrderLine

OrderNo	ProductNo	Quantity	ActualPrice
10000	B1001	60	9.0000
10000	B1003	12	125.0000
10000	B1004	24	85.5000
10000	B1005	6	89.9500
10001	B1001	36	9.2500
10001	B1005	12	87.5000
10002	F1001	30	55.2500
10002	F1003	6	4.9500
10002	S1002	12	40.0000
10003	B1001	24	9.5000
10004	K1001	50	65.0000
10005	S1002	12	40.0000
10005	S1005	12	91.7500
10006	K1001	50	67.0000
10007	T1001	72	9.0000
10007	T1002	36	25.0000
10007	T1004	12	25.0000
10007	T1005	12	45.0000
10008	B1101	8	42.0000
10008	B1102	12	42.5000
10008	B1103	12	43.0000
10010	K1001	12	77.5000
10010	T1001	24	9.5000
10011	F1001	24	61.2500
10012	K1001	50	67.5000
10013	T1001	36	9.2500
10013	T1002	24	25.2500
10013	T1005	6	45.0000
10014	K1001	12	77.5000
10014	T1002	6	27.9500
10015	B1001	36	8.9500
10015	B1003	6	139.9500
10015	B1004	6	89.9500
10015	B1103	12	47.5000
10017	S1002	12	44.9500

OrderNo	ProductNo	Quantity	ActualPrice
10017	S1005	12	94.9500
10019	F1001	30	60.0000
10019	F1003	6	4.9500
10019	S1005	6	95.0000
10020	T1002	60	24.0000
10020	T1005	24	50.0000
10021	K1001	12	77.5000
10021	T1001	12	10.0000
10021	T1004	6	29.9500
10022	B1001	36	8.9500
10022	B1005	6	93.9500
10023	F1001	36	60.0000
10023	F1003	12	4.0000
10023	K1001	36	70.0000
10023	S1005	36	90.0000
10024	S1002	12	44.9500
10024	S1005	12	96.9500
10025	T1004	24	26.5000
10025	T1005	24	52.0000
10026	T1002	36	25.0000
10026	T1005	20	52.5000
10026	T2001	12	22.5000
10027	F1001	30	60.0000
10028	B1101	36	42.0000
10028	B1102	36	42.0000
10028	B1103	36	42.0000
10029	F1001	24	61.0000
10029	F2006	12	25.0000
10029	S1002	12	40.0000
10029	S1005	12	95.0000
10030	K2002	24	18.0000
10031	B1003	12	125.0000
10031	B1004	18	85.0000
10031	B1005	18	85.0000
10032	B1001	36	8.9500

Price

ProductNo	StartDate	EndDate	StdPrice	MinPrice
B1001	2011-05-01	NULL	9.9500	8.0000
B1003	2011-05-01	2011-10-20	129.9500	110.0000
B1003	2011-10-21	NULL	139.9500	120.0000
B1004	2011-05-01	2012-02-28	89.9500	75.0000
B1004	2012-03-01	NULL	94.9500	80.0000
B1005	2011-05-01	2012-02-28	89.9500	75.0000
B1005	2012-03-01	NULL	94.9500	80.0000
B1101	2011-10-21	2012-04-23	44.9500	40.0000
B1101	2012-04-24	NULL	45.9500	41.0000
B1102	2011-10-21	2012-04-23	46.9500	41.0000
B1102	2012-04-24	NULL	47.9500	42.0000
B1103	2011-10-21	2012-04-23	48.9500	42.0000
B1103	2012-04-24	NULL	49.9500	43.0000
F1001	2011-05-01	2011-10-20	59.9500	50.0000
F1001	2011-10-21	NULL	69.9500	60.0000
F1003	2011-05-01	NULL	4.9500	4.0000
F2006	2012-04-24	NULL	29.9500	25.0000
K1001	2011-05-01	2011-10-20	75.9500	65.0000
K1001	2011-10-21	NULL	79.9500	70.0000
K2002	2012-04-24	NULL	19.9500	17.5000
S1002	2011-05-01	NULL	44.9500	35.0000
S1005	2011-05-01	2011-10-20	94.9500	85.0000
S1005	2011-10-21	NULL	99.9500	90.0000
S2002	2012-04-24	NULL	19.9500	16.0000
T1001	2011-05-01	2012-02-28	9.9500	9.0000
T1001	2012-03-01	NULL	10.9500	9.5000
T1002	2011-05-01	2012-02-28	27.9500	24.0000
T1002	2012-03-01	NULL	29.9500	25.0000
T1004	2011-05-01	NULL	29.9500	25.0000
T1005	2011-05-01	2011-10-20	49.9500	42.0000
T1005	2011-10-21	NULL	59.9500	51.0000
T2001	2012-04-24	NULL	24.9500	20.0000

Product

ProductNo	Description	QtyOnHand	MinStockLevel
B1001	Major League Baseball	212	120
B1003	Catcher's Mitt	79	72
B1004	Outfielder's Glove - Brown	86	72
B1005	Outfielder's Glove - Black	81	72
B1101	Baseball Bat - 32 in.	98	120
B1102	Baseball Bat - 33 in.	113	120
B1103	Baseball Bat - 34 in.	88	120
F1001	NFL Football	91	96
F1003	Kicking Tee - 1 in.	26	24
F2006	Junior Size Football	49	36
K1001	NBA Basketball	92	60
K2002	Junior Size Basketball	47	48
S1002	MLS Soccer Ball	44	36
S1005	World Cup Soccer Ball	62	72
S2002	Junior Size Soccer Ball	18	18
T1001	4-Pack Green Tennis Balls	121	96
T1002	12-Pack Green Tennis Balls	65	48
T1004	Adult Tennis Racket - Titanium	23	12
T1005	Adult Tennis Racket - Graphite	57	48
T2001	Junior Tennis Racket	41	24

ACME SPORTING GOODS – PRACTICE QUERIES

SELECT [DISTINCT] <i>column list</i>	(column(s) to select)
FROM <i>table list</i>	(table(s) from which to retrieve columns)
[WHERE <i>conditional expression</i>]	(criteria to restrict rows)
[GROUP BY <i>column list</i>]	(column(s) to categorize by)
[HAVING <i>conditional expression</i>]	(criteria to restrict groups)
[ORDER BY <i>column list</i> [DESC]]	(columns(s) to sort by)

The following queries are based on the Acme Sporting Goods example SQL Server database.

1. List all of the values for all of the columns in the Employee table.
2. For all employees hired on or after January 1, 2012, list their last name, title, and hire date.
3. Run the same query as #2 above, but change the employee last name column heading to display as Employee rather than LastName.
4. From the CustomerOrder table, list the order number, order date, ship date, and number of days between the order date and the ship date (call this difference Delay). *Hint: Look up the DATEDIFF function in Help.*
5. Select the employee first name, last name, and title for all employees whose last name begins with R.
6. Select the employee last name, title, and salary for all clerks who earn more than 2500.
7. Select the employee last name, title, and salary for all employees who are either clerks or who earn more than 2500.
8. Select the employee last name, title, and salary for all employees who earn between 2500 and 3000.
9. Select, for all employees, their last name and the name (not number) of the department in which they work.
10. For all orders, select the order number, order date, company name of the customer placing the order, and the last name of the employee serving as the customer's account representative.
11. List the department number, employee last name, and salary for all employees, sorted primarily by department number and, within each department, secondarily by employee last name.
12. Run the same query as #11 above, but sort instead by salary in descending (high to low) order.
13. Select all customer numbers from the customer order table. (Then compare the results with query #14.)
14. Select all unique customer numbers from the customer order table. (List each customer number *once*.)
15. List the highest standard price (StdPrice) stored in the price table.
16. List the product number and standard price for the product with the highest standard price in the price table. *Hint: Try using a subquery to determine the highest value.*
17. List the different employee job titles that exist and the number of employees assigned to each job title.
18. Modify Query #17 so that only jobs held by more than one employee are listed.
19. List each employee's employee number, last name, and manager's last name (using Manager as the heading for the manager last name column). Include all employees in the listing, even employees without managers.
20. List the last name and salary of the employee with the highest salary and the employee with the lowest salary. *Hint: Try using two separate subqueries to determine the highest and lowest values.*

SOLUTIONS TO PRACTICE QUERIES

1. SELECT *
FROM Employee
2. SELECT LastName, JobTitle, HireDate
FROM Employee
WHERE HireDate >= '2012-01-01'
3. SELECT LastName AS Employee, JobTitle, HireDate
FROM Employee
WHERE HireDate >= '2012-01-01'
4. SELECT OrderNo, OrderDate, ShipDate,
DATEDIFF (day, OrderDate, ShipDate)
AS Delay
FROM CustomerOrder
5. SELECT FirstName, LastName, JobTitle
FROM Employee
WHERE LastName LIKE 'R%'
6. SELECT LastName, JobTitle, Salary
FROM Employee
WHERE JobTitle = 'Clerk'
AND Salary > 2500
7. SELECT LastName, JobTitle, Salary
FROM Employee
WHERE JobTitle = 'Clerk'
OR Salary > 2500
8. SELECT LastName, JobTitle, Salary
FROM Employee
WHERE Salary BETWEEN 2500 AND 3000
9. SELECT LastName, DeptName
FROM Employee
INNER JOIN Department
ON Employee.DeptNo = Department.DeptNo
10. SELECT OrderNo, OrderDate, CompanyName, LastName
FROM CustomerOrder
INNER JOIN Customer
ON CustomerOrder.CustNo = Customer.CustNo
INNER JOIN Employee
ON Customer.AcctRepNo = Employee.EmpNo
11. SELECT DeptNo, LastName, Salary
FROM Employee
ORDER BY DeptNo, LastName
12. SELECT DeptNo, LastName, Salary
FROM Employee
ORDER BY Salary DESC
13. SELECT CustNo
FROM CustomerOrder
14. SELECT DISTINCT CustNo
FROM CustomerOrder
15. SELECT MAX(StdPrice)
FROM Price
16. SELECT ProductNo, StdPrice
FROM Price
WHERE StdPrice =
(SELECT MAX(StdPrice)
FROM Price)
17. SELECT JobTitle, COUNT(JobTitle)
FROM Employee
GROUP BY JobTitle
18. SELECT JobTitle, COUNT(JobTitle)
FROM Employee
GROUP BY JobTitle
HAVING COUNT(JobTitle) > 1
19. SELECT E.Empno, E.LastName,
M.LastName AS 'Manager'
FROM Employee E
LEFT OUTER JOIN Employee M
ON E.MgrNo = M.EmpNo
20. SELECT LastName, Salary
FROM Employee
WHERE Salary =
(SELECT MAX(Salary)
FROM Employee)
OR Salary =
(SELECT MIN(Salary)
FROM Employee)