

EMPLOYEE

Fname	Minit	Lname	<u>Ssn</u>	Bdate	Address	Sex	Salary	Super_ssn	Dno
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DEPARTMENT

Dname	<u>Dnumber</u>	Mgr_ssn	Mgr_start_date
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DEPT_LOCATIONS

<u>Dnumber</u>	<u>Dlocation</u>
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PROJECT

Pname	<u>Pnumber</u>	Plocation	Dnum
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WORKS_ON

<u>Essn</u>	<u>Pno</u>	Hours
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DEPENDENT

<u>Essn</u>	<u>Dependent_name</u>	Sex	Bdate	Relationship
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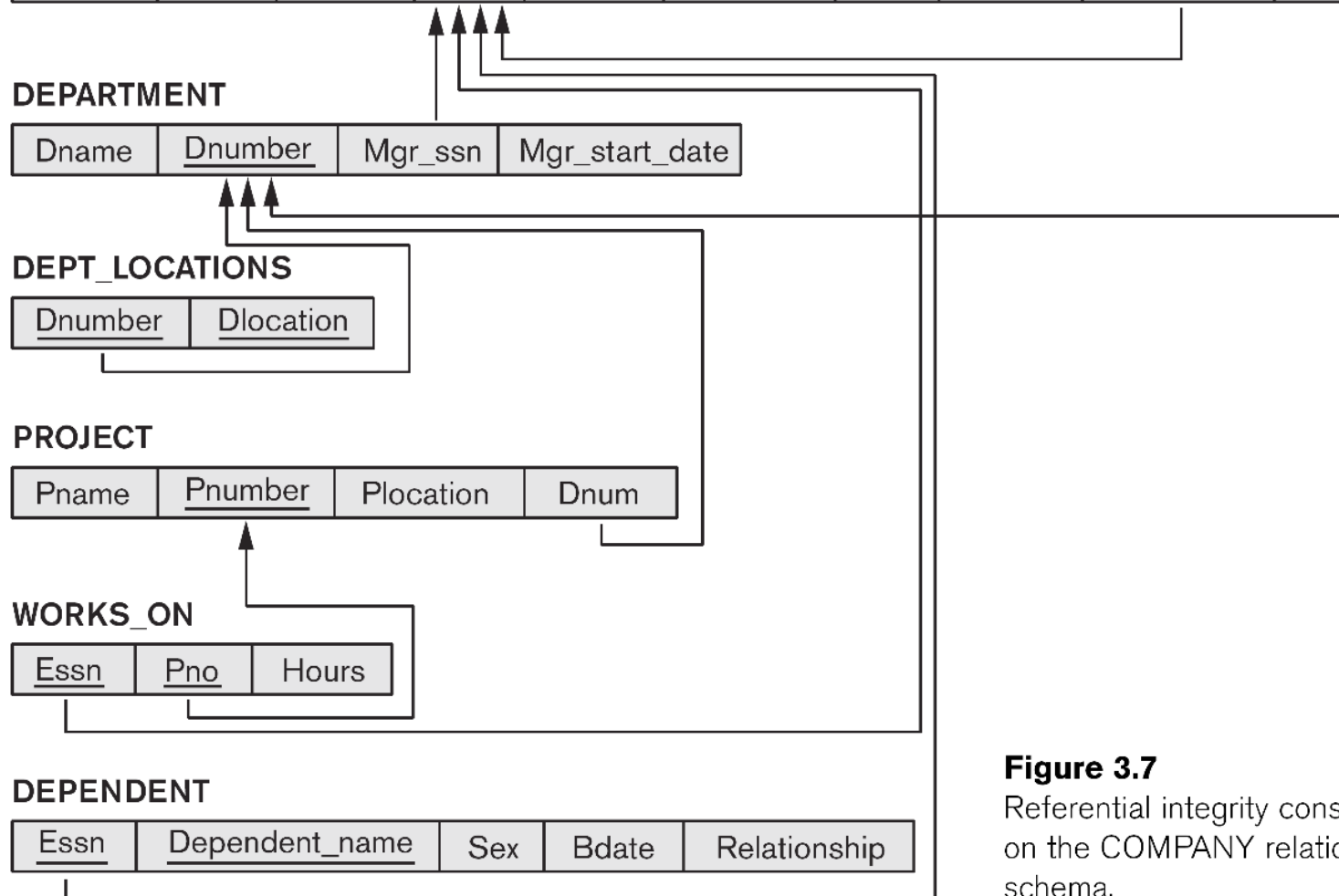


Figure 3.7

Referential integrity constraints displayed on the COMPANY relational database schema.

```
mysql -u cs450_web cs450_cp
```

```
mysql> show tables;
```

Tables_in_cs450_cp
DEPARTMENT
DEPENDENT
DEPT_LOCATIONS
EMPLOYEE
PROJECT
WORKS_ON

```
mysql> describe EMPLOYEE;
```

Field	Type	Null	Key	Default	Extra
FNAME	varchar(15)	NO		NULL	
MINIT	char(1)	YES		NULL	
LNAME	varchar(15)	NO		NULL	
SSN	char(9)	NO	PRI	NULL	
BDATE	date	YES		NULL	
ADDRESS	varchar(30)	YES		NULL	
SEX	char(1)	YES		NULL	
SALARY	decimal(10,2)	YES		NULL	
SUPERSSN	char(9)	YES	MUL	NULL	
DNO	int(11)	NO	MUL	NULL	

```
mysql> select * from EMPLOYEE;
```

FNAME	MINIT	LNAME	SSN	BDATE	ADDRESS	SEX	SALARY	SUPERSSN	DNO
John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000.00	333445555	5
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000.00	888665555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000.00	333445555	5
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000.00	333445555	5
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000.00		1
Jennifer	S	Wallace	987654321	1941-06-20	291 Berry, Bellaire, TX	F	43000.00	888665555	4
Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000.00	987654321	4
Alicia	J	Zelaya	999887777	1968-07-19	3321 Castle, Spring, TX	F	25000.00	987654321	4

```
mysql> select * from DEPARTMENT;
```

DNAME	DNUMBER	MGRSSN	MGRSTARTDATE
Headquarters	1	888665555	1961-06-19
Administration	4	987654321	1995-01-01
Research	5	333445555	1988-05-22

```
mysql> select FNAME, MINIT, LNAME from EMPLOYEE;
```

FNAME	MINIT	LNAME
John	B	Smith
Franklin	T	Wong
Joyce	A	English
Ramesh	K	Narayan
James	E	Borg
Jennifer	S	Wallace
Ahmad	V	Jabbar
Alicia	J	Zelaya

```
mysql> select * FROM EMPLOYEE WHERE DNO=5;
```

FNAME	MINIT	LNAME	SSN	BDATE	ADDRESS	SEX	SALARY	SUPERSSN	DNO
John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000.00	333445555	5
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000.00	888665555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000.00	333445555	5
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000.00	333445555	5

```
mysql> select * from EMPLOYEE WHERE ADDRESS LIKE '%Houston%';
```

FNAME	MINIT	LNAME	SSN	BDATE	ADDRESS	SEX	SALARY	SUPERSSN	DNO
John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000.00	333445555	5
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000.00	888665555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000.00	333445555	5
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000.00		1
Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000.00	987654321	4

```
mysql> select * from EMPLOYEE WHERE ADDRESS LIKE '%Houston%' AND SALARY > 35000;
```

FNAME	MINIT	LNAME	SSN	BDATE	ADDRESS	SEX	SALARY	SUPERSSN	DNO
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000.00	888665555	5
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000.00		1

Cartesian Product

```
mysql> select FNAME, LNAME, DNAME from EMPLOYEE, DEPARTMENT;
```

FNAME	LNAME	DNAME
John	Smith	Administration
John	Smith	Headquarters
John	Smith	Research
Franklin	Wong	Administration
Franklin	Wong	Headquarters
Franklin	Wong	Research
Joyce	English	Administration
Joyce	English	Headquarters
Joyce	English	Research
Ramesh	Narayan	Administration
Ramesh	Narayan	Headquarters
Ramesh	Narayan	Research
James	Borg	Administration
James	Borg	Headquarters
James	Borg	Research
Jennifer	Wallace	Administration
Jennifer	Wallace	Headquarters
Jennifer	Wallace	Research
Ahmad	Jabbar	Administration
Ahmad	Jabbar	Headquarters
Ahmad	Jabbar	Research
Alicia	Zelaya	Administration
Alicia	Zelaya	Headquarters
Alicia	Zelaya	Research

FNAME	LNAME	DNAME
Jennifer	Wallace	Administration
Ahmad	Jabbar	Administration
Alicia	Zelaya	Administration
James	Borg	Headquarters
John	Smith	Research
Franklin	Wong	Research
Joyce	English	Research
Ramesh	Narayan	Research

Join

```
mysql> select FNAME, LNAME, DNAME from EMPLOYEE, DEPARTMENT WHERE DNO=DNUMBER;
```

```
mysql> select FNAME, LNAME, DNAME from EMPLOYEE JOIN DEPARTMENT ON DNO=DNUMBER;
```

Join three tables (many-to-many relationship)

```
mysql> select FNAME, LNAME, PNAME FROM EMPLOYEE, WORKS_ON, PROJECT WHERE SSN=ESSN AND PNO=PNUMBER;
```

FNAME	LNAME	PNAME
Franklin	Wong	Computerization
Jennifer	Wallace	Computerization
Alicia	Zelaya	Computerization
Jennifer	Wallace	Newbenefits
Alicia	Zelaya	Newbenefits
John	Smith	ProductX
Joyce	English	ProductX
John	Smith	ProductY
Franklin	Wong	ProductY
Joyce	English	ProductY
Franklin	Wong	ProductZ
Ramesh	Narayan	ProductZ
Franklin	Wong	Reorganization
James	Borg	Reorganization
Jennifer	Wallace	Reorganization

```
mysql> SELECT DNUMBER AS NUMBER, DNAME AS NAME FROM DEPARTMENT;
```

NUMBER	NAME
4	Administration
1	Headquarters
5	Research

```
mysql> SELECT PNUMBER, PNAME FROM PROJECT;
```

PNUMBER	PNAME
10	Computerization
30	Newbenefits
1	ProductX
2	ProductY
3	ProductZ
20	Reorganization

```
mysql> SELECT DNUMBER AS NUMBER, DNAME AS NAME FROM DEPARTMENT  
UNION SELECT PNUMBER, PNAME FROM PROJECT;
```

NUMBER	NAME
4	Administration
1	Headquarters
5	Research
10	Computerization
30	Newbenefits
1	ProductX
2	ProductY
3	ProductZ
20	Reorganization

```
mysql> INSERT INTO DEPARTMENT VALUES ('Help Desk', 10, 999887777, '2019-10-29');  
ERROR 1142 (42000): INSERT command denied to user 'cs450_web'@'cs31' for table  
'DEPARTMENT'
```

```
mysql> INSERT INTO WORKS_ON VALUES (11111111, 1, 20);  
ERROR 1452 (23000): Cannot add or update a child row: a foreign key constraint fails  
(`cs450_cp`.`WORKS_ON`, CONSTRAINT `WORKS_ON_ibfk_1` FOREIGN KEY (`ESSN`)  
REFERENCES `EMPLOYEE` (`SSN`))
```

```
mysql> UPDATE WORKS_ON SET HOURS=HOURS+10 WHERE ESSN=123456789 AND PNO=2;  
Query OK, 1 row affected (0.00 sec)  
Rows matched: 1  Changed: 1  Warnings: 0
```

```
mysql> DELETE FROM WORKS_ON WHERE ESSN=999887777 AND PNO=1;  
ERROR 1142 (42000): DELETE command denied to user 'cs450_web'@'cs31' for table  
'WORKS_ON'
```