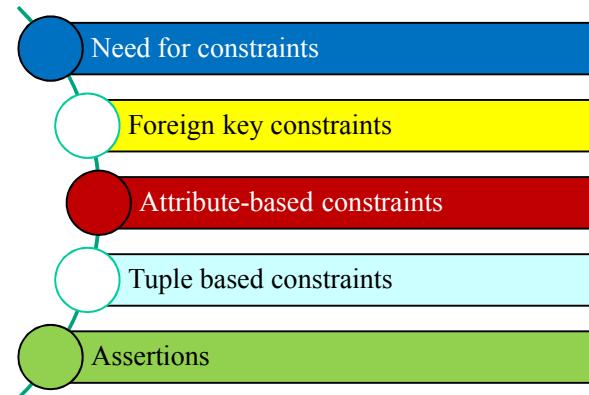


CSE 303: Database

Lecture 09

2016
Constraints (Chapter 7)

Outline



Need for constraints

- Certain properties we'd like our database to hold
- Modification of the database may break these properties
- Build handlers into the database definition

Keys: Fundamental Constraint

- In the CREATE TABLE statement, use:
 - PRIMARY KEY, UNIQUE KEY

```
CREATE TABLE MovieStar (  
  name CHAR(30) PRIMARY KEY,  
  address VARCHAR(255),  
  gender CHAR(1)  
);
```

```
CREATE TABLE MovieStar (  
  name CHAR(30),  
  address VARCHAR(255),  
  gender CHAR(1),  
  PRIMARY KEY(name)  
);
```

Keys: Fundamental Constraint

Only difference between UNIQUE and PRIMARY KEY is
UNIQUE allows NULL values:

```
CREATE TABLE MovieStar (  
  name CHAR(30) UNIQUE,  
  address VARCHAR(255),  
  gender CHAR(1)  
);
```

```
CREATE TABLE MovieStar (  
  name CHAR(30),  
  address VARCHAR(255),  
  gender CHAR(1),  
  UNIQUE(name)  
);
```

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Keys...

- Can use the UNIQUE keyword in same way
 - ...but for any number of attributes

```
CREATE TABLE MovieStar (  
  name CHAR(30) UNIQUE,  
  address VARCHAR(255) UNIQUE,  
  gender CHAR(1)  
);
```

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NOT NULL Constraint...

- May disallow inserting null values
 - ... for any number of attributes

```
CREATE TABLE MovieStar (  
  name CHAR(30) UNIQUE NOT NULL,  
  address VARCHAR(255) UNIQUE,  
  gender CHAR(1)  
);
```

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Keys: Fundamental Constraint

Allows a combination of attributes to be UNIQUE or
PRIMARY KEY. If primary key none of the attributes can
be NULL.

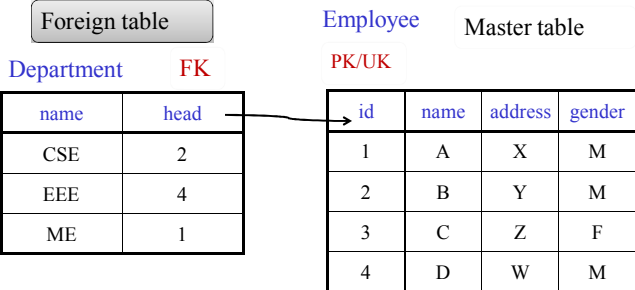
```
CREATE TABLE MovieStar (  
  name CHAR(30),  
  address VARCHAR(255),  
  gender CHAR(1),  
  PRIMAR KEY(name, gender)  
);
```

```
CREATE TABLE MovieStar (  
  name CHAR(30),  
  address VARCHAR(255),  
  gender CHAR(1),  
  UNIQUE(name, gender)  
);
```

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FOREIGN KEY Constraint...

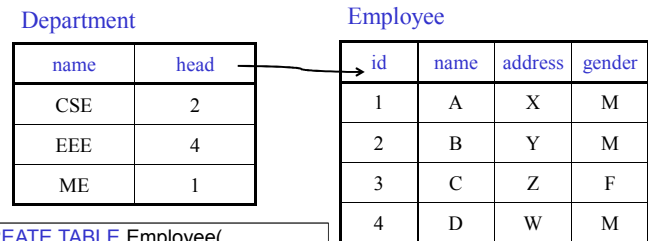


- A departmental head must be an employee
- foreign keys, which reference attributes of a second relation, only reference PRIMARY or UNIQUE KEY

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CREATING Master table...

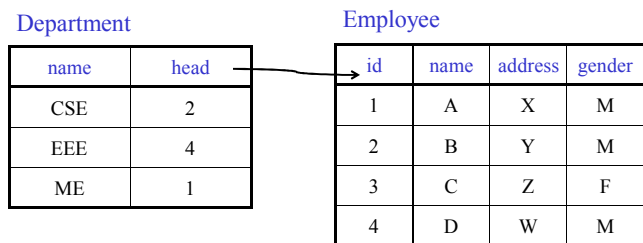


```
CREATE TABLE Employee(
  id INT PRIMARY KEY,
  name CHAR(20),
  address CHAR(20),
  gender CHAR(1)
);
```

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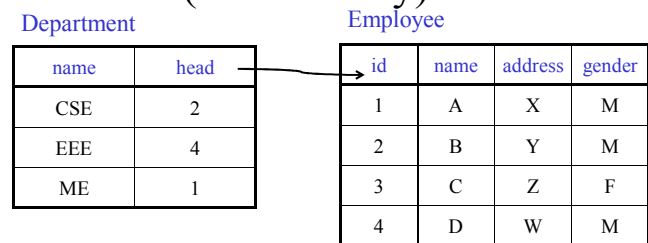
CREATING FOREIGN Table...



```
CREATE TABLE Department(
  name CHAR(3),
  head INT REFERENCES Employee(id)
);
```

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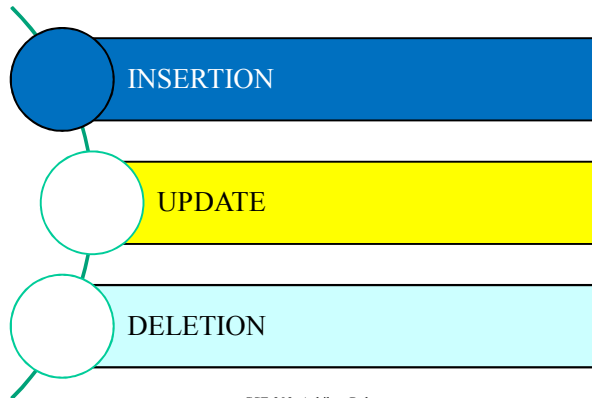
CREATING FOREIGN Table (another way)...



```
CREATE TABLE Department(
  name CHAR(3),
  head INT
  FOREIGN KEY (head) REFERENCES Employee(id)
);
```

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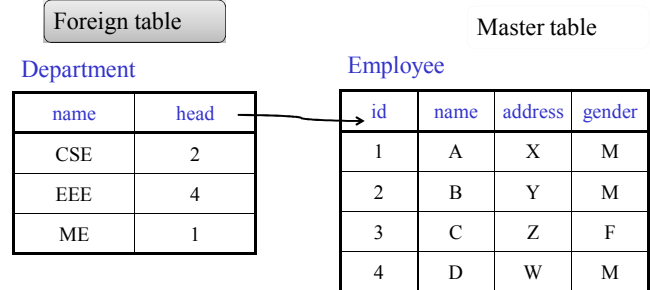
What happens next...



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INSERTION on foreign table



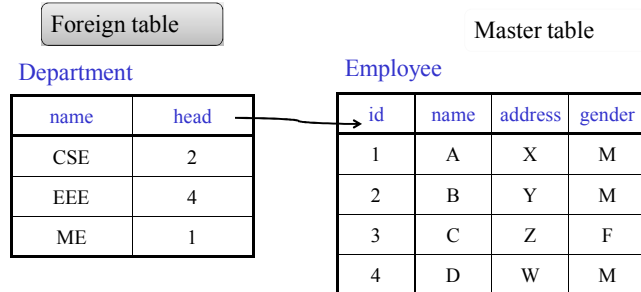
INSERT INTO Department VALUES('CE', 3); → OK

INSERT INTO Department VALUES('CE', 5); → REJECT

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UPDATE on foreign table



UPDATE Department
SET head = 3
WHERE name = 'CSE'

OK

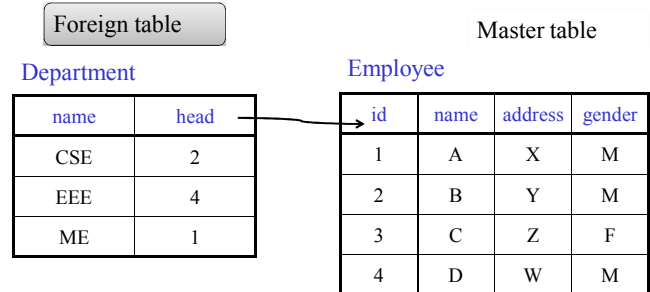
UPDATE Department
SET head = 7
WHERE name = 'CSE'

REJECT

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DELETETION on foreign table



NO WORRIES → Always Permitted

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INSERTION on master table

Foreign table

Master table

Department

name	head
CSE	2
EEE	4
ME	1

Employee

id	name	address	gender
1	A	X	M
2	B	Y	M
3	C	Z	F
4	D	W	M

NO WORRIES → Always Permitted

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UPDATE on master table

Foreign table

Master table

Department

name	head
CSE	2
EEE	4
ME	1

Employee

id	name	address	gender
1	A	X	M
2	B	Y	M
3	C	Z	F
4	D	W	M

UPDATE Employee
SET id = 8
WHERE id = 3

OK

UPDATE Employee
SET id = 9
WHERE id = 4

REJECT

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DELETION on master table

Foreign table

Master table

Department

name	head
CSE	2
EEE	4
ME	1

Employee

id	name	address	gender
1	A	X	M
2	B	Y	M
3	C	Z	F
4	D	W	M

DELETE FROM Employee
WHERE id = 3

OK

DELETE FROM Employee
WHERE id = 4

REJECT

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RETHINK before Rejection

Foreign table

Master table

Department

name	head
CSE	2
EEE	4
ME	1

Employee

id	name	address	gender
1	A	X	M
2	B	Y	M
3	C	Z	F
4	D	W	M

UPDATE Employee
SET id = 9
WHERE id = 4
REJECT

DELETE FROM Employee
WHERE id = 4
REJECT

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RETHINK before Rejection

ON update CASCADE

- If the ID of departmental head is changed it needs to be updated in both table
- If the departmental head retires temporarily it needs to be set null at the foreign table

ON delete set null

DO IT WHILE CREATING FOREIGN Table...

Department

name	head
CSE	2
EEE	4
ME	1

Employee

id	name	address	gender
1	A	X	M
2	B	Y	M
3	C	Z	F
4	D	W	M

```
CREATE TABLE Department(  
  name CHAR(3),  
  head INT REFERENCES Employee(id)  
  ON DELETE SET NULL  
  ON UPDATE CASCADE);
```