Yuwen Sang

COMP 3421: A6

**E/R Schema of the Auto Insurance Company Database:**

Coverage (**coverageID,** cAmount**,** planName**,** price)

States (**stateName,** climate, pDensity)

Driving Records (**recordID,** DRdate, DRtype)

Customers (**customerID**, cname, age, gender, SSN, dlNum, **coverageID, stateName**)

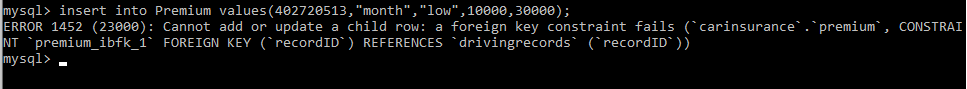
Cars (**VINcode,** brand, color, ctype, **customerID**)

Premium (**premiumID**, paymentPeriod, cAmount**, recordID, customerID**)

1. **Table Creation Script and the insertion that violate the foreign key constraint**

|  |
| --- |
| show databases;  drop database if exists carInsurance;  create database carInsurance;  use carInsurance;  # create 6 tables  #1. Coverage  drop table if exists Coverage;  create table Coverage(  coverageID int NOT NULL,  cAmount varchar(10) NOT NULL,  planName varchar(15) NOT NULL,  price int NOT NULL,  primary key (coverageID));  describe Coverage;  #2. States (here we use states instead)  drop table if exists States;  create table States(  stateName varchar(20) NOT NULL,  climate varchar(15) NOT NULL,  pDensity varchar(10) NOT NULL,  primary key (stateName));  describe States;  #3. DrivingRecords  drop table if exists DrivingRecords;  create table DrivingRecords(  recordID int NOT NULL,  DRdate varchar(15),  DRtype varchar(20) NOT NULL,  primary key (recordID));  describe DrivingRecords;  #4. Customers  drop table if exists Customers;  create table Customers(  customerID int NOT NULL,  cname varchar(30),  age int,  gender varchar(10),  ssn int,  dlNum int,  coverageID int NOT NULL,  stateName varchar(20) NOT NULL,  primary key (customerID),  foreign key (coverageID) references Coverage(coverageID),  foreign key (stateName) references States(stateName));  describe Customers;  #5. Cars  drop table if exists Cars;  create table Cars(  VINcode varchar(20) NOT NULL,  brand varchar(15),  color varchar(15),  ctype varchar(10),  customerID int NOT NULL,  primary key (VINcode),  foreign key (customerID) references Customers(customerID));  describe Cars;  #6. Premium  drop table if exists Premium;  create table Premium(  premiumID int NOT NULL,  paymentPeriod varchar(15),  cAmount varchar(10) NOT NULL,  recordID int,  customerID int NOT NULL,  primary key (premiumID),  foreign key (recordID) references DrivingRecords(recordID),  foreign key (customerID) references Customers(customerID));  describe Premium; |

Suppose we want to directly insert a tuple into the Premium table, we will get the foreign key constraint violation warning as follow:



1. **Create A Procedure**

The code below shows the procedure that outputs the total number of customers have had some specific type of accident (accident\_type, equals to “serious”, “medium”, or “slight”) and age younger than the cust\_age years old.

|  |
| --- |
| **Create The Procedure:**  drop procedure if exists accident\_proc;  delimiter //  create procedure accident\_proc(IN accident\_type varchar(20), IN cust\_age INT, OUT cust\_count INT)  begin  select count(\*) into cust\_count from Customers C, DrivingRecords DR, Premium P where C.customerID = P.customerID and DR.recordID = P.recordID and DR.DRtype = accident\_type and C.age < cust\_age;  end //  delimiter ; |
| **Run The Procedure:**  set @accident\_type = "medium";  set @cust\_age = 30;  set @cust\_count = 0;  call accident\_proc(@accident\_type, @cust\_age, @cust\_count); |
| **Outputs:** |

1. **Show the Speed Difference between Using and Not Using Index in The Selection Statement**

*Test Select statement:*

1. Simple statement: Find the customers that customerID smaller than 10001 (10000 results in the database).

|  |  |
| --- | --- |
| *Selection on a single relation* | *Time Cost* |
| *Not Use Index Code:*  Select C.customerID from Customers C where c.customerID < 10001; | *0.03sec* |
| *Use Index Code:*  create index cust\_index on Customers(customerID);  Select customerID from Customers USE INDEX (cust\_index) where customerID < 10001; | *0.02sec* |

1. Find the customers their personal information and the premium information who don’t have the driving accident record (10001 results in the database)

|  |  |
| --- | --- |
| Selection Involves a Join | Time Cost |
| *Not Use Index Code:*  Select \*  from Customers C  left outer join Premium P on C.customerID = P.customerID and P.recordID is NULL; | 0.06 sec |
| *Use Index Code:*  create index prem\_record on Premium(customerID, recordID);  Select \*  from Customers  left outer join Premium USE INDEX(prem\_record) on recordID = NULL; | 0.02 sec |