CSI T5300: Advanced Database Systems

E04: SQL – Part 3 - Exercises

Dr. Kenneth LEUNG

Department of Computer Science and Engineering
The Hong Kong University of Science and Technology
Hong Kong SAR, China

kwtleung@cse.ust.hk
• **Schema:** Suppose a bookstore has the following five relational tables:

  Book (bid, title, aid, subject, quantity_in_stock)
  Author (aid, first_name, last_name)
  Customer (cid, first_name, last_name)
  Order-Details (oid, bid, quantity)
  Order (oid, cid, order_date)

• **Assumptions:**
  - Primary keys are underlined and foreign keys are in red and *italics*
  - Each book has exactly one author
  - Each order is made by exactly one customer and has one or more associated records in Order-Details (e.g., an order may contain different books)
create table Author (  
aid int,  
first_name char(30),  
last_name char(30),  
primary key (aid) )

create table Customer (  
cid int,  
first_name char(30),  
last_name char(30),  
primary key (cid) )

create table Book (  
bid int,  
title char(30),  
aid int not null,  
subject char(30),  
quantity_in_stock int,  
primary key (bid),  
foreign key (aid) references Author on delete cascade )

create table Order (  
oid int,  
cid int not null,  
order_date date,  
primary key (oid),  
foreign key (cid) references Customer on delete cascade )

create table Order-Details (  
oid int not null,  
bid int not null,  
quantity int,  
primary key (oid, bid),  
foreign key (oid) references Order on delete cascade  
foreign key (bid) references Book on delete cascade )
Q2: Customer with id = 1001 purchases all the books of the author(s) with last name “Dickens” on “08/03/2013” in a single order (assume that all these books are in stock). This new order gets id = 12345. Add the appropriate records in the database.

\[
\text{insert into Order values (12345, 1001, “08/03/2013”)}
\]

\[
\text{insert into Order-Details select 12345, B.bid, 1 from Book as B, Author as A where B.aid = A.aid and A.last_name = “Dickens”}
\]

\[
\begin{align*}
\text{update Book} \\
\text{set quantity_in_stock = quantity_in_stock-1 where bid in (}
\text{select B.bid from Book as B, Author as A where B.aid = A.aid and A.last_name = “Dickens”)}
\end{align*}
\]

How can we increase performance?

<table>
<thead>
<tr>
<th>Book (bid, title, aid, subject, quantity_in_stock)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author (aid, first_name, last_name)</td>
</tr>
<tr>
<td>Customer (cid, first_name, last_name)</td>
</tr>
<tr>
<td>Order-Details (oid, bid, quantity)</td>
</tr>
<tr>
<td>Order (oid, cid, order_date)</td>
</tr>
</tbody>
</table>
Q3: Delete customer with id = 1001 from the database

```sql
delete from Customer where id = 1001
```

If cascading deletions were not used in tables Order and Order-Details

```sql
delete from Order-Details as D
Where D.oid in ( 
    select O.oid
    from Order as O
    where O.cid = 1001 )
```

```sql
delete from Order where cid = 1001
```

```sql
delete from Customer where id = 1001
```