COSC265 Lab Test 2024 – Solutions

Question 1: Select count(*) from TABLE;

Member: 38 tuples
Author: 41 tuples
Book: 48 tuples
Author_of: 50 tuples

Question 2: Specify a constraint for the MEMBER table, to check that the value of TYPE is either *staff* or *student*.

```
Alter table member
Add constraint check_member_type check (Type in ('student','staff'));
```

Question 3: Create the CHECKOOUT table

CHECKOUT(Book, Member, CheckOutDate, DueDate, CheckInDate)

```
Create table checkout
(Book integer not null references Book,
Member integer not null references Member,
CheckOutDate date not null,
DueDate date not null,
CheckInDate date,
Primary key (Book,Member,CheckOutDate));
```

Question 4: Populate the table

There are 218 tuples.

Question 5: Show unique book types.

```
select distinct type from book;

TYPE
---------------------------------------
science fiction
biography
horror
thriller
fantasy
fiction
satire
guide book
novel
history
poetry
nonfiction

12 rows selected.
```

Question 6: For each book that has been checked out more than five times, show its title and the total number of times it has been checked out.

```
Select title,count(CheckOutDate)
From book join checkout on book=bookid
Group by bookid,title
Having count(Checkoutdate)>5;
```

Question 7: Titles of books which have never been checked out.

```
Select title
From book
Where not exists (select book from checkout
                  Where book=bookid);
```

```
TITLE
-----------------------------------------------------------------
Harry Potter and the Order of Phoenix
Between the lines
Small great things
For Esme - with love and squalor
```

Question 8: For each member who has overdue books, show their name and the number of overdue books. Order the results in the increasing order of overdue books.

```
Select fname, lname, count(duedate) overdue
From member join checkout on member = id
Where checkindate is null and duedate < sysdate
Group by id,fname,lname
Order by overdue;
```

```
FNAME           LNAME           OVERDUE
--------------- --------------- ----------
Elizabeth       Taylor               1
Barbara         Wilson               1
Matt            Nelson               2
Charles         Harris               2
Scott           Bell                 3
```

Question 9: Create the Available_Books view which shows the book number and title for those books that can be checked out.

```
Create View Available_books as
(Select bookid,title
From book)
minus
(select bookid, title
From book join checkout on bookid=book
Where checkindate is null);
```

```
BOOKID  TITLE
---------- ----------------------------------------------------
        28 My sister's keeper
        33 Small great things
        36 Nineteen minutes
        59 Between the lines
        99 Harry Potter and the Order of Phoenix
       137 Black House
       138 For Esme - with love and squalor
       808 The Edge
      1351 Dreamcatcher
      2281 Van Gogh and Gauguin
      2766 Of Mice and Men
```

Question 10: Using a single SQL statement, modify the database to show that Angela Martinez checked out the book titled "My sister's keeper" today. The book is due in two weeks. Your SQL statement must be able to be executed correctly on any day (i.e. do not use constants to specify dates). Explain what happens to the Available_Books view after the statement is executed.

Before INSERT:

```
Select book, member, CheckOutDate, DueDate, CheckInDate
from checkout join book on book=bookid
where title= 'My sister''s keeper';
```

```
BOOK    MEMBER CHECKOUTDA DUEDATE    CHECKINDAT
---------- ---------- ---------- ---------- ----------
 28        111564     2024-06-16 2024-06-30 2024-06-29
 28        111564     2024-07-01 2024-07-15 2024-07-14
 28        128778     2024-07-21 2024-08-04 2024-08-03
```

```
Insert into checkout(member,book,checkoutdate,duedate)
Select member.id, bookid, sysdate, sysdate+14
From member, book
Where fname = 'Angela' and Lname='Martinez' and title = 'My sister''s keeper';
```

AFTER

```
      BOOK     MEMBER CHECKOUTDA DUEDATE    CHECKINDAT
---------- ---------- ---------- ---------- ----------
        28     111564 2024-06-16 2024-06-30 2024-06-29
        28     111564 2024-07-01 2024-07-15 2024-07-14
        28     128778 2024-07-21 2024-08-04 2024-08-03
        28     132977 2024-09-05 2024-09-19
```

```
Select *
From Available_books
Where bookid = 28;
```

No rows selected – the change caused by insert is reflected in the view.

Question 11: A member can borrow a book only if only if they have no more than five other books on loan. Implement this constraint in the database via a trigger on the Checkout table. The trigger should fire when a new tuple is being added to the Checkout table, and should perform error checking (e.g. check that the due date is specified).

Before the new tuple is added to the table, we need to check how many books the student already has checked out.

```
Select member, count(book)
From checkout
Where CheckInDate is null
Group by member;
```

```
Create or replace trigger checkout_possible
Before INSERT on Checkout
for each row
 declare OnLoan integer;
            Avail integer;
 begin
   select count(book) into OnLoan
   from checkout
   where member = :new.member and CheckInDate is null;

  select count(*) into Avail
  from checkout
  where book = :new.book and CheckInDate is null;
```

```
    if (:new.CheckInDate is not null) then
        raise_application_error (num => -20004, msg => 'CheckInDate must be null!');
    elsif(OnLoan =5) then
         raise_application_error (num => -20006,
           msg => 'Cannot process as the member already has too many books on loan');
    elsif(Avail <> 0) then
         raise_application_error (num => -20007, msg => 'That book is not available currently');
    elsif (:new.DueDate <> sysdate + 14) then
        raise_application_error (num => -20008, msg => 'Due date is wrong!');
    elsif(:new.CheckoutDate <> sysdate) then
      raise_application_error (num => -20009, msg => 'Checkout date must be the current date!');
    end if;
    end;
/
```

Showing that the trigger works:

a) The due date is not specified

```
Insert into checkout
Values(33,159542,null,null,null);
ERROR at line 1:
ORA-20003: Due date must be specified!
ORA-06512: at "TANJA.CHECKOUT_POSSIBLE", line 14
ORA-04088: error during execution of trigger 'TANJA.CHECKOUT_POSSIBLE'
```

b) The student has 3 books only

```
Select count(book)
From checkout
Where CheckInDate is null and member=159542;

    Insert into checkout
    Values(33,159542,sysdate,sysdate+14,null);
```

This INSERT was performed.

c) The due date is not correct

```
Insert into checkout
Values(33,159542,sysdate,sysdate,null);
```

d) The book is not available

```
Insert into checkout
Values(33,159542,sysdate,sysdate+14,null);
```

Question 12 Write a single SQL statement to find the name of the author with the highest number of titles in the library.

```
Select fname,lname
From author join author_of on author=authorid
Group by author,fname,lname
Having count(*) = (select max(count(*))
                   From author join author_of on author=authorid
                   Group by authorid);
```

OR

```
Select fname,lname
From author join author_of on author=authorid
Group by author,fname,lname
Having count(*) >= ALL (select count(*)
                   From author join author_of on author=authorid
                   Group by authorid);
```