

Tutorial Letter 104/3/2021

Database Practice

ICT3722

Semesters 1&2

Computer Science

IMPORTANT INFORMATION

This tutorial letter contains Assignment 04.

Note: This is a fully online module and therefore it is only available on myUnisa.

BARCODE

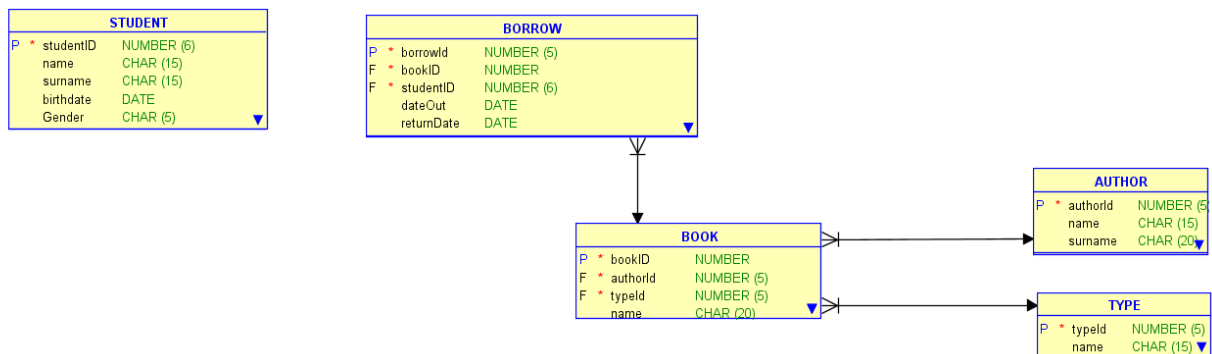


Assignment 04 Solutions

Assignment Type: Written

Due Date: 30 July 2021

Total Marks: 60



The relational model above represents books a student can borrow from a library. All the questions in this assignment are based on this model. You need to create a new database connection and answer the following questions:

Question 1

(8 Marks)

Write an SQL code that will generate the following tables:

1. Book table.
2. Author table

—SOLUTION

```

CREATE TABLE author (
    authorid  NUMBER(5) NOT NULL,
    name      CHAR(15),
    surname   CHAR(20) );
ALTER TABLE author
ADD CONSTRAINT author_pk PRIMARY KEY ( authorid );
  
```

```

CREATE TABLE book (
    bookid    NUMBER NOT NULL,
    name      CHAR(20),
  
```

```
        pagecount    INTEGER,
        authorid     NUMBER(5) NOT NULL,
        typeid       NUMBER(5) NOT NULL );
ALTER TABLE book
ADD CONSTRAINT book_pk PRIMARY KEY ( bookid );

CREATE TABLE borrow (
    bookid          NUMBER NOT NULL,
    borrowid        NUMBER(5) NOT NULL,
    dateout         DATE,
    returndate      DATE,
    studentid       NUMBER(6) NOT NULL );
ALTER TABLE borrow
ADD CONSTRAINT borrow_pk PRIMARY KEY ( borrowid );

CREATE TABLE student (
    studentid       NUMBER(6) NOT NULL,
    name            CHAR(15),
    surname         CHAR(15),
    birthdate       DATE,
    gender          CHAR(5) );
ALTER TABLE student
ADD CONSTRAINT student_pk PRIMARY KEY ( studentid );

CREATE TABLE type (
    typeid         NUMBER(5) NOT NULL,
    name           CHAR(15) );

ALTER TABLE type
ADD CONSTRAINT type_pk PRIMARY KEY ( typeid );

ALTER TABLE book
    ADD CONSTRAINT author_fk
    FOREIGN KEY ( authorid )
    REFERENCES author ( authorid );

ALTER TABLE borrow
    ADD CONSTRAINT book_fk
    FOREIGN KEY ( bookid )
    REFERENCES book ( bookid );

ALTER TABLE borrow
    ADD CONSTRAINT student_fk
    FOREIGN KEY ( studentid )
    REFERENCES student ( studentid );
```

```
ALTER TABLE book
  ADD CONSTRAINT type_fk
    FOREIGN KEY ( typeid )
    REFERENCES type ( typeid );
```

Question 2 (5 Marks)

The tables below in Appendix A shows the contents of the tables that you have generated in Question 1, populate these tables with data as shown in the relevant table by doing the following:

1. Write the code that populates the Book table. Submit this code. (5)

```
INSERT INTO STUDENT(student_id , name, surname ,gender , dob)
VALUES (2002, 'Peter ', 'Smith ', 'Male ', DATE'2009-01-12');
INSERT INTO STUDENT(student_id , name, surname ,gender , dob)
VALUES (2003, 'Mavis ', 'Dhlamini ', 'Female ', DATE'2009-03-12');
INSERT INTO STUDENT(student_id , name, surname ,gender , dob)
VALUES (2004, 'Marcus ', 'Smith ', 'Male ', DATE'2009-05-19');
INSERT INTO STUDENT(student_id , name, surname ,gender , dob)
VALUES (2005, 'Bongi ', 'Mashinini ', 'Female ', DATE'2008-11-29');
INSERT INTO STUDENT(student_id , name, surname ,gender , dob)
VALUES (2006, 'Nathi ', 'Msiza ', 'Female ', DATE'2008-09-22');
INSERT INTO STUDENT(student_id , name, surname ,gender , dob)
VALUES (2007, 'Mary ', 'Peters ', 'Female ', DATE'2009-04-17');
INSERT INTO STUDENT(student_id , name, surname ,gender , dob)
VALUES (2008, 'James ', 'Adams ', 'Male ', DATE'2008-09-02');
INSERT INTO STUDENT(student_id , name, surname ,gender , dob)
VALUES (2009, 'Piet ', 'Prinsloo ', 'Male ', DATE'2007-01-12');
INSERT INTO STUDENT(student_id , name, surname ,gender , dob)
VALUES (2010, 'Zodwa ', 'Nkosi ', 'Female ', DATE'2010-01-12');
```

2. Populate the rest of the tables as in Appendix A. (Do not submit the code).

Question 3 (15 Marks)

In the following questions, write the SQL code, run it and submit the code and the screen capture of the results.

1. List the names and pages of all books. Change the name column to *Book Title* as the new column name. (2)

```
select Name As "Book Title"
from books;
```

2. List the books with a 2 anywhere in the number of pages. (2)

```
select name, page_count as "number of pages"
from books
where page_count like '%2%'
```

3. List the name, gender, date of birth and the age of the students. The list must be sorted in such a way that the male students appear first and the old students appear before the young ones. (6)

```
select name, gender, dob,
trunc(months_between(sysdate, dob)/12,0) as age
from student
order by gender desc, age
```

4. How many book where written by James? (3)

```
select count(*)
from books join author on author.author_id = books.author_id
where author.name = 'James'
```

5. Change the name of the student Jabu to Jabulani. (2)

```
UPDATE student
SET name ='Jabulani'
WHERE name = 'Jabu';
```

Question 4 (32 Marks)

In the following questions, write the SQL code, run it and submit the code and the screen capture of the results.

1. List all student's name, surname, book's name, author name and the borrow's taken date. (7)

```
Select student.name AS "Student Name",
       student.surname AS "student Surname",
       books.name AS "Book title",
       author.name AS "Author name",
       author.surname AS "Author Surname",
       date_out
from student
join borrow on student.student_Id = borrow.student_Id
join books on books.book_Id = borrow.book_Id
join author on author.author_Id = books.author_Id
```

2. List the name and surname of all the students and the number of books they read sorted by the number of books read. The list should also show those who did not read any book. (5)

```
Select name, surname,
(Select count(*) from borrow
where student.student_Id = borrow.student_Id) as BookCount
from student
order by BookCount
```

3. List books that have never been read. Use join in your solution. (4)

```
Select books.*
from books
left join borrow on books.book_Id = borrow.book_Id
where borrow_Id is null
```

4. List the book's name and its author information, with less than 150 pages. (4)

```
Select books.name as bookName, author.name, author.surname
from author
join books on author.author_Id = books.author_Id
where page_count < 150
```

5. List the student's information who reads the book authored by David. (6)

```
Select distinct student.*
from student
join borrow on student.student_Id = borrow.student_Id
join books on books.book_Id = borrow.book_Id
join author on author.author_Id = books.author_Id
where author.name = 'David'
```

6. List the last person to borrow a book. Also, include the date the book was borrowed. (6)

```
Select student.*, date_out
from student
join borrow on student.student_Id = borrow.student_Id
where date_out = (Select max(date_out) from borrow)
```

Appendix A

Tables

Contents of the STUDENT table

STUDENT_ID	NAME	SURNAME	GENDER	DOB
2001	Jabu	Mahlangu	Male	23/NOV/08
2002	Peter	Smith	Male	12/JAN/09
2003	Mavis	Dhlamini	Female	12/MAR/09
2004	Marcus	Smith	Male	19/MAY/09
2005	Bongi	Mashinini	Female	29/NOV/08
2006	Nathi	Msiza	Female	22/SEP/08
2007	Mary	Peters	Female	17/APR/09
2008	James	Adams	Male	02/SEP/08
2009	Piet	Prinsloo	Male	12/JAN/07
2010	Zodwa	Nkosi	Female	12/JAN/10

Contents of the BORROW table

BORROW_ID	STUDENT_ID	BOOK_ID	DATE_OUT	DATE_RETU
-----	-----	-----	-----	-----
1001	2007	1111	01/JAN/20	15/JAN/20
1002	2007	1114	01/JAN/20	15/JAN/20
1003	2001	1115	14/JAN/20	29/JAN/20
1004	2002	1114	11/FEB/20	28/FEB/20
1005	2002	1112	04/FEB/20	20/FEB/20
1006	2001	1113	22/FEB/20	26/FEB/20
1007	2007	1114	25/FEB/20	02/MAR/20
1008	2008	1111	26/FEB/20	03/MAR/20
1009	2009	1115	02/MAR/20	16/MAR/20
1010	2009	1111	09/MAR/20	31/MAR/20

Contents of the BOOK table

BOOK_ID	AUTHOR_ID	TYPE_ID	NAME	PAGE_COUNT
-----	-----	-----	-----	-----
1111	102	2223	Daily prayers	80
1112	101	2222	The death trap	150
1113	102	2222	All night heat	120
1114	104	2333	Introduction to SQL	200
1115	103	2333	Python for beginners	300

Contents of the AUTHOR table

AUTHOR_ID	NAME	SURNAME
-----	-----	-----
101	James	King
102	Mandla	Sithole
103	David	Lovemore
104	Bongi	Zulu

Contents of the TYPE table

TYPE_ID	NAME
2222	Horror
2223	Prayer
2231	Romance
2333	Textbook

UNISA ©2021