

CISC 7510X Midterm Exam

For the below questions, use the following schema definition.

```
book(isbn,title,subject)
person(pid,fname,lname,dob)
author(isbn,pid)
libevent(eid,eventtype,isbn,pid,timestamp)
```

This is a schema for a library. The **book** table info on books. The **person** table has all the individuals, such as book borrowers and book authors. The **author** table links **person** authors to **book** records. The **libevent** has the log of book transactions. For example:

```
libevent(1,eventtype=N,isbn=123456789,pid=NULL,timestamp=2012-01-02) // new book
libevent(2,eventtype=B,isbn=123456789,pid=2,timestamp=2013-03-27)    // book borrowed
libevent(3,eventtype=R,isbn=123456789,pid=2,timestamp=2013-04-07)    // book returned
libevent(4,eventtype=X,isbn=123456789,pid=NULL,timestamp=2024-11-07) // book destroyed
```

In other words, for **eventtype**, N=new book, B=borrow, R=return, and X=book destroyed. Note that **book** table doesn't tell you what books are available in the library, you need to consult the **libevent** table for that.

Pick the best answer that fits the question. 5-points per question. Not all of the answers may be correct. If none of the answers fit, write your own answer. There are at most 2 questions where writing your own answer may be appropriate.

1. Find ISBN number of a book Catch 22.

- (a) select title from book where upper(title)='CATCH 22';
- (b) select isbn from author where upper(title)='CATCH 22';
- (c) select isbn from book where upper(title)='CATCH 22';
- (d) select isbn from libevent where upper(title)='CATCH 22';
- (e) Other:

2. How many books have “computer” in their title?

- (a) select group by count(*) from book where upper(title) like '%COMPUTER%';
- (b) select title,count(*) from book where upper(title) like '%COMPUTER%' group by title;
- (c) select sum(1)/count(*) from book where upper(title) like '%COMPUTER%';
- (d) select count(*) from book where upper(title) like '%COMPUTER%';
- (e) Other:

3. Find author of 'Catch 22'

- (a) select fname,lname from book where upper(a.title)='CATCH 22'
- (b) select b.fname,b.lname from book a inner join author b where upper(a.title)='CATCH 22'
- (c) select c.fname,c.lname from book a inner join author b on a.pid = b.pid inner join person c on b.isbn=c.isbn where upper(a.title)='CATCH 22'
- (d) select c.fname,c.lname from book a inner join author b on a.isbn = b.isbn inner join person c on b.pid=c.pid where upper(a.title)='CATCH 22'

- (e) Other:
4. Find average age of individuals with first name “Jack”.
- (a) `select avg(dob) from person where fname='Jack';`
 - (b) `select avg(cast(to_char(now()-dob,'YYYY') as int)) from person where fname='Jack';`
 - (c) `select avg(age) from person where fname='Jack';`
 - (d) `select avg(cast(age as int)) from person where fname='Jack';`
 - (e) Other:
5. Create **bookauthors** table that will only have book authors.
- (a) `create table bookauthors as select * from person where author is true;`
 - (b) `create table bookauthors as select distinct c.* from book a inner join author b on a.isbn = b.isbn inner join person c on b.pid=c.pid;`
 - (c) `create table bookauthors as select * author;`
 - (d) `create table bookauthors as select c.* from book a inner join author b on a.isbn = b.isbn inner join person c on b.pid=c.pid;`
 - (e) Other:
6. Find average age of a book author.
- (a) `select avg(cast(to_char(now()-dob,'YYYY') as int)) from book a inner join author b on a.isbn = b.isbn inner join person c on b.pid=c.pid;`
 - (b) `select avg(age) from book a inner join author b on a.isbn = b.isbn inner join person c on b.pid=c.pid;`
 - (c) `select avg(cast(to_char(now()-dob,'YYYY') as int)) from bookauthors;`
 - (d) `select avg(dob) from bookauthors;`
 - (e) Other:
7. Find all books without an author.
- (a) `select a.isbn from book a inner join author b on a.isbn = b.isbn where b.isbn is null;`
 - (b) `select a.isbn from book a left outer join author b on a.isbn = b.isbn where b.isbn is null;`
 - (c) `select a.isbn from book a left outer join author b on a.isbn = b.isbn where a.isbn is null;`
 - (d) `select a.isbn from book a left outer join author b on a.isbn = b.isbn;`
 - (e) Other:
8. Find all books with more than 2 authors.
- (a) `select a.isbn from book a inner join author b on a.isbn = b.isbn and count(*)>2;`
 - (b) `select a.isbn from book a inner join author b on a.isbn = b.isbn having count(*)>2;`
 - (c) `select a.isbn from book a inner join author b group by a.isbn having count(*)>2;`
 - (d) `select a.isbn from book a inner join author b on a.isbn = b.isbn group by a.isbn having count(*)>2;`

(e) Other:

9. Find all books written by Mark Twain.

- (a) `select c.* from person a inner join author b on a.pid=b.pid inner join book c on b.isbn=c.isbn where a.fname='Mark' and lname='Twain';`
- (b) `select b.* from person a inner join author b on a.pid=b.pid where a.fname='Mark' and lname='Twain';`
- (c) `select a.* from person a inner join author b on a.pid=b.pid inner join book c on b.isbn=c.isbn where a.fname='Mark' and lname='Twain';`
- (d) `select c.* from person a inner join book c on b.isbn=c.isbn where a.fname='Mark' and lname='Twain';`

(e) Other:

10. Find all books NOT written by anyone named “John”.

- (a) `select a.isbn from book a left outer join author b on a.isbn=b.isbn left outer join person c on b.pid=c.pid group by a.isbn having fname!='John' and lname!='John';`
- (b) `select a.isbn from book a left outer join author b on a.isbn=b.isbn left outer join person c on b.pid=c.pid group by a.isbn having coalesce(max(case when c.fname='John' then 1 else 0 end),0)=0;`
- (c) `select a.isbn from book a left outer join author b on a.isbn=b.isbn left outer join person c on b.pid=c.pid where fname!='John' and lname!='John';`
- (d) `select a.* from book a left outer join author b on a.isbn=b.isbn left outer join person c on b.pid=c.pid having coalesce(max(case when c.fname='John' then 1 else 0 end),0)=0;`

(e) Other:

11. What percentage of authors are named ‘John’?

- (a) `select sum(case when fname='John' then 1.0 else 0.0 end)/sum(1.0)*100.0 prcnt from authors`
- (b) `select percentage() from authors where fname='John'`
- (c) `select sum(when fname='John' then 1 end)/sum(when fname!='John' then 1 end) from authors`
- (d) `select percentage( sum(case when fname='John' then 1.0 else 0.0 end) ) from authors`

(e) Other:

12. What percentage of individuals (person) in our database are book authors?

- (a) `select sum(case when author=true then 1.0 else 0.0 end)/sum(1.0)*100.0 prcnt from person a`
- (b) `select sum(case when b.pid is null then 1.0 else 0.0 end)/sum(1.0)*100.0 prcnt from person a left outer join authors b on a.pid=b.pid`
- (c) `select percentage(author='Y') prcnt from person a left outer join authors b on a.pid=b.pid`
- (d) `select sum(case when b.pid is not null then 1.0 else 0.0 end)/sum(1.0)*100.0 prcnt from person a left outer join authors b on a.pid=b.pid`

- (e) Other:
13. Authors who have ever borrowed their own book.
- (a) `select b.pid from book a inner join author b on a.isbn=b.isbn`
 - (b) `select b.pid from book a inner join libevent b on b.isbn=c.isbn and b.pid=a.pid where b.eventtype='B'`
 - (c) `select b.pid from book a inner join author b on a.isbn=b.isbn inner join libevent c on b.isbn=c.isbn and b.pid=c.pid where c.eventtype='B'`
 - (d) `select max(b.pid) from book a inner join libevent c on a.isbn=c.isbn and a.pid=c.pid where c.eventtype='B'`
 - (e) Other:
14. How many books does the library have?
- (a) `select sum(case when eventtype='N' then 1 when eventtype='X' then -1 else 0 end) from libevent`
 - (b) `select count(*) from books`
 - (c) `select count(*) from libevent where eventtype='N'`
 - (d) `select sum(case when eventtype='N' then 1.0 end) from libevent`
 - (e) Other:
15. How many copies of 'Catch 22' are in the library?
- (a) `select count(*) from book where title='CATCH 22'`
 - (b) `select sum(case when eventtype='N' then 1 when eventtype='X' then -1 else 0 end) from libevent a inner join book b on a.isbn=b.isbn where upper(b.title)='CATCH 22'`
 - (c) `select count(distinct isbn) from book where title='CATCH 22'`
 - (d) `select sum(case when eventtype='N' then 1 when eventtype='X' then -1 else 0 end) from libevent a having upper(b.title)='CATCH 22'`
 - (e) Other:
16. What's the most popular book (borrowed most often) in the library?
- (a) `select title from book where max(borrowed) = count(*)`
 - (b) `select max(title) from libevent where eventtype='B' having count(*) = max(count(*))`
 - (c) `with allcnts as (select * from libevent where eventtype='B'), maxcnt as (select max(count(*)) mc from allcnts) select a.isbn from allcnts a inner join maxcnt b on a.cnt=b.mc;`
 - (d) `with allcnts as (select isbn,count(*) cnt from libevent where eventtype='B' group by isbn), maxcnt as (select max(cnt) mc from allcnts) select a.isbn from allcnts a inner join maxcnt b on a.cnt=b.mc;`
 - (e) Other:
17. Who borrows the most books?
- (a) `select count(*) from individual where borrower = max(borrower);`

- (b) with allcnts as (select pid,count(*) cnt from libevent where eventtype='B' group by pid), maxcnt as (select max(cnt) mc from allcnts) select a.pid from allcnts a inner join maxcnt b on a.cnt=b.mc;
- (c) select max(count(*)) from libevent group by pid;
- (d) select pid from (select count(*) from libevent group by pid) a where cnt=max(count(*))
- (e) Other:

18. Who has the most unreturned books?

- (a) with unreturned as (select sum(unreturned) cnt from libevent where eventtype in ('N')), maxcnt as (select max(cnt) mc from allcnts) select a.pid from allcnts a inner join maxcnt b on a.cnt=b.mc;
- (b) with counts as (select count(*) cnt from libevent where eventtype='R' group by pid), maxcnt as (select sum(cnt) mc from allcnts) select a.pid from allcnts a inner join maxcnt b on a.cnt=b.mc;
- (c) with allcnts as (select pid,sum(case when eventtype='B' then 1 when eventtype='R' then -1 end) cnt from libevent where eventtype not in ('N','X') group by pid), maxcnt as (select max(cnt) mc from allcnts) select a.pid from allcnts a inner join maxcnt b on a.cnt=b.mc;
- (d) with allcnts as (select pid,count(case when eventtype='B' then 1 when eventtype='R' then -1 end) cnt from libevent where eventtype not in ('N','X') group by pid), maxcnt as (select sum(cnt) mc from allcnts) select a.pid from allcnts a inner join maxcnt b on a.cnt=b.mc;
- (e) Other:

19. Is there a copy of 'CATCH 22' available to borrow right now?

- (a) select case when sum(case when eventtype='RETURNED' then -1 when eventtype='BORROWED' then 1 end) > 0 then 'AVAILABLE' else 'NOT AVAILABLE' end from libevent a where upper(a.title)='CATCH 22';
- (d) select case when sum(case when eventtype in ('B') then -1 when eventtype in ('N') then 1 end) > 0 then 'AVAILABLE' else 'NOT AVAILABLE' end from libevent a inner join book b on a.isbn=b.isbn where upper(b.title)='CATCH 22';
- (c) select count(available) from libevent where upper(b.title)='CATCH 22';
- (d) select case when sum(case when eventtype in ('B','X') then -1 when eventtype in ('R','N') then 1 end) > 0 then 'AVAILABLE' else 'NOT AVAILABLE' end from libevent a inner join book b on a.isbn=b.isbn where upper(b.title)='CATCH 22';
- (e) Other:

20. Who has 'CATCH 22' borrowed right now?

- (a) select a.pid from libevent a inner join book b on a.isbn=b.isbn where upper(b.title)='CATCH 22' group by a.isbn,a.pid having sum(case when eventtype='B' then 1 when eventtype='R' then -1 end) != 0;
- (b) select a.pid from libevent a where upper(a.title)='CATCH 22';
- (c) select a.pid from libevent a inner join book b on a.isbn=b.isbn where upper(b.title)='CATCH 22';
- (d) select a.pid from libevent a inner join book b on a.isbn=b.isbn where upper(b.title)='CATCH 22' group by a.isbn,a.pid having count(*) == 0;
- (e) Other: