Quiz 4 Solution
1. Suppose a new table called CustomerBill has been added to the Library database. The create table statement for the table is shown below.

```
create table CustomerBill(billNum serial primary key, amount money, billDate date, cid int not null, foreign key(cid) references Customer(cid))
```

Write a stored procedure called makeBill that is passed a customer id, a start date and an end date. The procedure calculates the total fines the customer owes between the start date and the end date inclusive and generates a new CustomerBill row for that customer. The billDate value for the new row is the current date. For example if a call to makeBill is passed customer id 10 and the dates 2021-02-01 (February 1, 2021) and 2021-02-28 and customer 10 has fines of $1.00, $0.75 and $2.25 for books returned on 2021-02-01, 2021-02-12 and 2021-02-28 respectively then the procedure inserts a row into the CustomerBill table containing the values (4.00, 2021-03-05, 10) (assuming March 5, 2021 is the current date). Remember since billNum is of type serial a value will be assigned to the billNum attribute of the new row by the database.
create or replace procedure makeBill(custId integer, startDate Date, endDate Date) AS $$
Declare
    f money;
    total money;
Begin
    total = 0.0;
    for f in select fine from Loan where ret >= startDate and ret <= endDate and cid = custId loop
        total = total + f;
    end loop;
    insert into CustomerBill (amount, billDate, cid) values (total, current_date, custId);
End;
$$ Language plpgsql;
2. Let the Universal table be \( R = \{A, B, C, D, E, F, G, H\} \)
Let \( FD = \{AE \rightarrow B, B \rightarrow C, C \rightarrow D, CF \rightarrow DE, CH \rightarrow D, D \rightarrow E, DE \rightarrow F, EFG \rightarrow D, F \rightarrow G, FH \rightarrow C\} \) be the functional dependency set

A. What is the closure of \( ABH \)?
   \( ABH^+ = ABH C D E F G \)

B. Is \( ABH \) a super key?
   Yes, the closure of \( ABH \) includes all the attributes in \( R \)

C. Is \( ABH \) a key? Why?
   Yes, because no subset of \( ABH \) is a super key.
Quiz 3 Comments

• No OLD in trigger on insert

• Queries that return multiple rows need to be handled differently than queries which return 0 rows or 1 row. Use the for loop.

• Record data type
select cnum, year, semester, grade from enroll
order by cnum ASC,
    year DESC,
    case semester
        when 'Spring' then 1
        when 'Summer' then 2
        when 'Fall' then 3
    end DESC;