CSCI 403 - Database Management
Sample Quiz 1

Instructions: Circle **one** answer for each question.

Questions:

These questions concern the air travel database relational schema shown in figure 1.

1. Which constraint would be violated if we inserted the tuple ('Knuth, Donald', 111222333) into the `customer` relation?

   (a) Primary key on the `customer` relation.

   (b) Primary key on the `airline_customer` relation.

   (c) Foreign key on the `airline_customer` relation referencing `customer(name)`.

   (d) No constraints would be violated.

2. Which constraint would be violated if we updated the tuple (1337, 'Delta', 3333) in the `trip_flight` relation to be (1337, 'Delta', 2222)?

   (a) Primary key on the `trip_flight` relation.

   (b) Primary key on the `flight` relation.

   (c) Foreign key on the `trip_flight` relation referencing `flight(airline, flight_no)`.

   (d) No constraints would be violated.

3. Which constraints on the `airline_customer` relation would be violated if we inserted the tuple ('American', NULL, NULL) into it?

   (a) Primary key.

   (b) Primary and both foreign keys.

   (c) Primary key and foreign key referencing `customer(name)`.

   (d) No constraints would be violated.

4. In general, what kind of constraints can we violate by deleting a tuple?

   (a) Primary keys only.

   (b) Foreign keys only.

   (c) Both primary and foreign keys.

5. Which query would best answer the question, "What flights can I take out of Chicago?"

   (a) `SELECT * FROM flight;`

   (b) `SELECT * FROM flight WHERE dep_airport = 'CHI';`

   (c) `SELECT dep_airport FROM flight WHERE dep_airport = 'CHI';`

   (d) `SELECT * FROM flight WHERE fare < 300;`

6. Which query would best answer the question, "What kind of airplane might you take from Chicago (CHI) to Los Angeles (LAX) if you flew Delta?"

   (a)
   ```
   SELECT airplane FROM flight
   WHERE airline = 'Delta', dep_airport = 'CHI', arr_airport = 'LAX';
   ```

   (b)
   ```
   SELECT airplane FROM flight
   WHERE airline = 'Delta' OR dep_airport = 'CHI' OR arr_airport = 'LAX';
   ```

   (c)
   ```
   SELECT airplane FROM flight
   WHERE flight_no = 3333;
   ```

   (d)
   ```
   SELECT airplane FROM flight
   WHERE airline = 'Delta' AND dep_airport = 'CHI' AND arr_airport = 'LAX';
   ```

7. How can I find out about the trips taken by the Delta customer whose frequent flier ID number is 272100-442?

   (a)
   ```
   SELECT * FROM trip, airline_customer
   WHERE freq_flier_id = '272100-442';
   ```

   (b)
   ```
   SELECT * FROM trip
   WHERE trip.customer = airline_customer.customer
   AND airline_customer.freq_flier_id = '272100-442';
   ```

   (c)
   ```
   SELECT t.* FROM trip AS t, airline_customer AS ac
   WHERE t.customer = ac.customer
   AND ac.freq_flier_id = '272100-442';
   ```

   (d)
   ```
   SELECT * FROM trip
   WHERE customer IN (SELECT customer FROM airline_customer)
   AND freq_flier_id = '272100-442';
   ```

8. How might I best find the cheapest fares leaving Denver?

   (a) `SELECT * FROM flight WHERE dep_airport = 'DEN' ORDER BY fare;`

   (b) `SELECT * FROM flight GROUP BY fare HAVING dep_airport = 'DEN';`

   (c) `SELECT * FROM flight WHERE fare = MIN(fare);`

   (d) `SELECT * FROM flight ORDER BY fare WHERE dep_airport = 'DEN';`

9. What query would best discover the names and passport numbers of everyone with the last name "Turing"?

   (a) `SELECT * FROM customer WHERE name = 'Turing';`

   (b) `SELECT * FROM customer WHERE 'Turing' IN name;`

   (c) `SELECT * FROM customer WHERE 'Turing' IS NOT NULL;`

   (d) `SELECT * FROM customer WHERE name LIKE 'Turing,%';`

10. Edsger Dijkstra became very angry on a flight on Southwest when the pilot announced "This flight will GOTO New York." As a result, Southwest is dropping him as a customer. What is the best way to update our database?

    (a) `DELETE FROM airline_customer WHERE customer = 'Dijkstra, Edsger';`

    (b)
    ```
    DELETE FROM airline_customer
    WHERE airline = 'Southwest' AND customer = 'Dijkstra, Edsger';
    ```

    (c)
    ```
    UPDATE airline_customer SET customer = NULL
    WHERE airline = 'Southwest' AND customer = 'Dijkstra, Edsger';
    ```

    (d) `DROP TABLE airline_customer;`

11. Alan Turing wants to take a trip from Los Angeles to Chicago. He plans to leave on October 12, but he doesn't yet know his return trip date. Assuming the trip_id column in the trip table is auto-generated (via a DEFAULT setting using a sequence), how might we get things started for Turing?

    (a)
    ```
    INSERT INTO trip WHERE customer = 'Turing, Alan' AND from_city = 'Los Angeles'
    AND to_city = 'Chicago' AND departure_date = '2018-10-12';
    ```

    (b) `INSERT INTO trip VALUES ('Turing, Alan', 'Los Angeles', 'Chicago', '2018-10-12');`

    (c)
    ```
    INSERT INTO trip (customer, from_city, to_city, departure_date)
    VALUES ('Turing, Alan', 'Los Angeles', 'Chicago', '2018-10-12');
    ```

    (d)
    ```
    INSERT INTO trip
    VALUES (NULL, 'Turing, Alan', 'Los Angeles', 'Chicago', '2018-10-12', NULL);
    ```

12. Delta is increasing all of its fares by $25! How should we modify the database?

    (a) `UPDATE flight SET fare = fare + 25;`

    (b) `UPDATE flight SET fare = fare + 25 WHERE airline = 'Delta';`

    (c) `INSERT INTO flight (fare) SELECT fare + 25 FROM flight WHERE airline = 'Delta';`

    (d) `UPDATE flight (fare) VALUES (fare + 25) WHERE airline = 'Delta';`

13. Which best describes the output of the SQL query below?
    `SELECT airline, airplane, COUNT(*) FROM flight GROUP BY airplane;`

    (a) Report on how many airplane types there are.

    (b) Report on how many airline and airplane pairings there are.

    (c) Report on how many flights on each airline use each type of airplane each day.

    (d) None of the above, query is invalid.

14. Which SQL query would be used to answer the question, "When will Dijkstra land in Denver?"

    (a)
    ```
    SELECT DISTINCT flight.arr_time
    FROM flight, trip, trip_flight
    WHERE trip.customer = 'Dijkstra, Edsger'
    AND flight.arr_airport = 'DEN';
    ```

    (b)
    ```
    SELECT flight.arr_time
    FROM flight, trip, trip_flight AS tf
    WHERE flight.flight_no = tf.flight_no
    AND flight.airline = tf.airline
    AND tf.trip_id = trip.trip_id
    AND trip.customer = 'Dijkstra, Edsger'
    AND flight.arr_airport = 'DEN';
    ```

    (c)
    ```
    SELECT flight.arr_time
    FROM flight, trip, trip_flight AS tf
    WHERE flight.flight_no = tf.flight_no
    AND flight.airline = tf.airline
    AND tf.trip_id = trip.trip_id
    AND trip.customer = 'Dijkstra, Edsger';
    ```

    (d) Any of the above.

15. Which of the following SQL queries is equivalent to the query below?
    ```
    SELECT website FROM airline WHERE name IN (SELECT airline FROM flight WHERE fare < 300);
    ```

    (a)
    ```
    SELECT website FROM airline WHERE name NOT IN
    (SELECT airline FROM flight WHERE fare >= 300);
    ```

    (b)
    ```
    SELECT website FROM airline, flight WHERE name = airline AND fare < 300;
    ```

    (c)
    ```
    SELECT website FROM airline WHERE name =
    (SELECT airline FROM flight WHERE fare < 300);
    ```

    (d) None of the above.

16. It turns out that the passport information for Alan Turing is incorrect, and must be corrected. Why would it be a poor solution to delete Turing's record from the `customer` table and then insert a corrected record?

    (a) The operations are in the incorrect order; the insertion should come before the deletion.

    (b) The deletion would either cause a key constraint violation, or worse (if the key was set up this way), would silently delete Turing's frequent flier information from `airline_customer`.

    (c) Both (a) and (b).

    (d) None of the above, it is a brilliant solution.

flight: Primary Key (airline, flight_no), Foreign Key (airline) on airline(name)

airline	flight_no	dep_airport	arr_airport	dep_time	arr_time	fare	airplane
Southwest	473	DEN	RDU	10:10	14:35	270	B737
Southwest	474	RDU	DEN	15:45	17:15	295	B737
Delta	1010	LAX	CHI	6:45	13:05	310	A320
Delta	3333	CHI	LAX	12:50	16:15	355	B777
Delta	702	CHI	JFK	16:00	20:20	260	RJ145
Delta	910	JFK	CHI	8:35	11:20	260	RJ145

airline: Primary Key (name)

name	website
Southwest	southwest.com
Delta	delta.com
American	aa.com

customer: Primary Key (name)

name	passport_no
Turing, Alan	273001431
Hopper, Grace	300420023
Dijkstra, Edsger	918340799

trip: Primary Key (trip_id), Foreign Key (customer) on customer(name)

trip_id	customer	from_city	to_city	departure_date	return_date
1337	Hopper, Grace	New York	Los Angeles	2018-10-26	2018-11-4
1338	Dijkstra, Edsger	Raleigh/Durham	Denver	2018-10-26	2018-11-2

airline_customer:
Primary Key (airline, customer),
Foreign Key (airline) on airline(name),
Foreign Key (customer) on customer(name)

airline	customer	freq_flier_id
Southwest	Hopper, Grace	10001
Southwest	Dijkstra, Edsger	71042
American	Turing, Alan	10393992
Delta	Hopper, Grace	272100-442

trip_flight:
Primary Key (trip_id, airline, flight_no),
Foreign Key (trip_id) on trip(trip_id),
Foreign Key (airline, flight_no) on flight(airline, flight_no)

trip_id	airline	flight_no
1337	Delta	910
1337	Delta	3333
1337	Delta	1010
1337	Delta	702
1338	Southwest	474
1338	Southwest	473

Figure 1: Relational schema and sample tuples for a (vastly simplified) air travel database