CSCI 403 - Database Management
Sample Quiz 3

Instructions:

Circle **one** answer for each question.

Questions:

These questions concern the relation schema and functional dependencies described below.

Relation schema `fruit:`

Attributes: {apple, banana, cherry, date, elderberry, fig}

Key: {apple, banana}

Functional dependencies:
{apple, banana} → {cherry, date, elderberry, fig}
{apple} → {cherry}
{apple} → {date}
{date} → {elderberry}
{fig} → {date}

1. This relation schema is:

   (a) In Boyce-Codd Normal Form (BCNF).

   (b) Is not in BCNF because it has a composite key.

   (c) Is not in BCNF because it has a functional dependency {apple} → {cherry}, and {apple} is not a superkey.

   (d) Is not in BCNF because it has a functional dependency {apple} → {cherry}, and {cherry} is not a superkey.

2. The set {apple, banana, cherry}:

   (a) Is a superkey.

   (b) Is functionally determined by {apple, banana}.

   (c) Functionally determines {fig}.

   (d) All of the above.

3. Which of these are functional dependencies that can be inferred from the functional dependencies provided?

   (a) {apple} → {elderberry}.

   (b) {date} → {fig}.

   (c) {banana} → {cherry, date}.

   (d) All of the above.

4. What is the closure of {apple}?

   (a) {apple, cherry, date}.

   (b) {apple, cherry, date, elderberry}.

   (c) {apple, banana, cherry, date, elderberry}.

   (d) {apple, banana, cherry, date, elderberry, fig}.

5. Which of these functional dependencies violate BCNF?

   (a) {apple, banana} → {cherry, date, elderberry, fig}.

   (b) {apple} → {cherry}.

   (c) {date} → {elderberry}.

   (d) Both (b) and (c).

6. Which of the following would be a decomposition of `fruit` that moves the schema closer to BCNF?

   (a) R1 = {apple, cherry, date, fig}, R2 = {apple, banana, date, fig}.

   (b) R1 = {apple, banana}, R2 = {cherry, date, elderberry, fig}.

   (c) R1 = {date, fig}, R2 = {apple, banana, cherry, elderberry, fig}.

   (d) R1 = {apple, banana, cherry, date}, R2 = {apple, banana, elderberry, fig}.