# COSC 3318 - Database Management Systems

# (Assignment 5)

**Assigned on November 3, 2017. Hardcopy due at the start of class on November 17, 2017.**

1. (20 points) Consider a relation about people in the United States, including their name, Social Security number, street address, city, state, ZIP code, area code, and phone number (the last 7 digits). What FD’s would you expect to hold? What are the keys for the relation?
   1. FD:

Ssn: name

Area code: state

State,city,street: zip

* 1. Keys:

ssn, street address, city, state, area code, phone

1. (20 points) Consider a relation with schema R(A, B, C, D) and FD’s AB → C, C → D, and D → A.
2. Identify and proof whether the following FDs follow from the given FDS.

AC → D, CD → A.

----> C→a, ab→d, ac→d, bc →a, bc→d, bd→a, bd→c, cd→a, abc→d, abd→c, bcd→a

1. What are the keys of R?

----> ab, bc, bd

1. What are the superkeys for R that are not keys?

----->superkeys : abcd, abc, abd, bcd

1. (20 points) Suppose we have relation R(A, B, C, D, E), with some set of FD’s. Compute the attribute closure for each of the following cases:
2. AB → DE, C → E, D → C, and E → A. Compute .
   1. Bc = abcde
3. A → D, BD → E, AC → E, and DE → B. Compute .
   1. Ab = abde
4. (20 points) For each of the following relation schemas and sets of FD’s:
5. R(A, B, C, D) with FD’s AB → C, C → D, and D → A.
6. R(A, B, C, D, E) with FD’s AB → C, C → D, D → B, and D → E.

Decompose the relations, as necessary, into collections of relations that are in BCNF. Do not forget to consider FD’s that are not in the given set, but follow from them.

BCNF: ab→d, ab→c, ac→d, abc→d, and→c, bcd→d, bc→d, bd→a, bd→c, c→a, c→d, cd→a

Violations: c→a, c→d, ac→d, cd →a

the 3 relations of the decomposition are: bc, ad, cd

1. (20 points) For each of the relation schemas and sets of FD’s of Question 4. Decompose the relations, as necessary, into collections of relations that are in 3NF.

ab→c, ab→d, ab→e, ac→bb, ac→d, ac→e, aad→b, ad→c, ad→e, bc→d, bc→e, bd→e,c→b, c→d, c→e cd→b, cd→e, ce→b, ce→d, d→b, d→e, de→b, abc→d, abc→e, abd→c, abd→e, abe→c, abe→d, acd→b, acd→e, ace→b, ace→d, ade→c, bcd→e, bce→d, cde→b, abcd→e, abce→d, abde→c, acde→b

keys: ab, ac,ad