**CS 157A Spring 2020 Homework 5**

Point: 10

Questions 1-3 are 2 points

Questions 4-7 are 1 point

1. Do you think this schema is in BCNF? Identify functional dependencies and explain why you think the schema is, or is not, in BCNF.

order(CustID, CustName, ItemNum, Date)

NO because CustID → CustName is non-trivial

And the left side is not a super key because all the underlined are minimal superkey being all the underlined, CustID alone is not a super key

1. If you think question 1 was not in BCNF, try to decompose the table to achieve BCNF.

{CustID,CustName} {ItemNum,Date,CustID}

1. Here is a schema for orders in an online retail business:

order(customer\_id, first\_name, last\_name, street, city, state, zip,

phone, order\_id, order\_date, item\_number, price, has\_shipped)

Do you think the schema has any problems?

1. There is a problem with redundancy. Zip code will always tell you what state you are in so zip -> state, therefore it is easy to introduce inconsistencies if accidentally put wrong state for zip
2. Deleting records and removing all customer\_ids associated with zip will lose the information about zip -> state
3. If a zip code changes state, it must be updated in multiple places

How would you modify the schema to improve it?

By using normalization and reducing redundancy. If you achieve BCNF, you can remove redundancies based on functional dependencies. If necessary, the schema should be split to achieve 3NF or BCNF {zip, state} should be split.

1. In an ER model, would it be possible for the same two entity sets to participate in two

different relationship sets? (yes/no) YES

1. It is possible for a attribute to be multivalued in a ER MODEL but not a relational schema (Fill in the blanks to get the best possible answer that can be formed using the terms ‘ER model’, ‘relational schema’)
2. (yes/no) If ‘ID → name’ and ‘name → salary’ are FDs of a schema, then is ‘ID → salary’ also a FD of the schema? YES
3. (yes/no) If a relation schema has a functional dependency, does that mean that instances of the schema definitely have redundancy? No, only potential source of redundancy