Answer Key

CSC336 : John Connor — Quiz 4 This quiz is worth a total of **100 points**.

For the following relations and set of FDs:

1. give a key for the relation;
2. state whether the relation is in BCNF, and if it is not state why;
3. give a set of relations in 3NF equivalent to the original relation.

1. (33 points) What is the closure of $\{A, B\}$ with respect to $R(A, B, C, D, E, F, G)$ if R has the following functional dependencies?

   (a) $G \to CDE \quad A \to F \quad BF \to ABC \quad FC \to G$

   (b) $D \to A \quad C \to D \quad A \to B \quad AB \to C$

2. (33 points) For each of the following questions, if the schema $R(A, B, C, D, E)$ is in BCNF or 3NF with respect to the given the functional dependencies, draw a circle around BCNF or 3NF (or both) as appropriate. Show your work!

   (a) BCNF 3NF $AB \to C \quad A \to B \quad A \to DE \quad C \to D$

   (b) BCNF 3NF $E \to BCD \quad D \to AE \quad B \to CD$

3. (34 points) Use the algorithm given in class to compute the 3NF for $R(A, B, C, D, E)$ with the following FDs.

(a) $A \to BC \qquad B \to C \qquad E \to D$

(b) $A \to BC \qquad E \to BCD \qquad B \to CD$