

# Exercise Session: 2

16 November 2017

## 1 Functional dependencies and normal forms (4 parts, 10p)

Suppose we have relation

$R(A, B, C, D, E, F, G)$

and functional dependencies

$BC \rightarrow D, DE \rightarrow F, FA \rightarrow B, BC \rightarrow G.$

**2a.** Relation R has three keys. State, with reasons, which two of the following are not keys of R:

- $\{A, B, C, D\}$
- $\{A, B, C, E\}$
- $\{A, C, D, E\}$
- $\{A, C, D, E, G\}$
- $\{A, C, E, F\}$

(2p)

**2b.** Decompose relation R to BCNF. Show each step in the normalisation process, and at each step indicate which functional dependency is being used. (3p)

**2c.** State, with reasons, which FD(s) of relation R violate Third Normal Form (3NF). (2p)

**2d.** Decompose relation R to 3NF. (3p)