UNIVERSITY OF CALGARY
Department of Computer Science
CPSC 471 Database Management Systems

Winter 2021 **Quiz#3** **Duration**: 90 Minutes

(10 pts) Q1. Assume the following tables are stored in XML document "qz3.XML". The document/database contains information (all stored as names) about persons having friends and visiting theatres, movies played by theatres, movies liked by persons, and players who star in movies. A person may have many friends, where a friend is a person, and the database does not include redundancy, that is, if "Friend" contains (X, Y) as two friends then (Y, X) is not in "Friend" because it is inspired. A person can like several movies; a movie can be liked by many persons. A person can go to several theatres, and a theatre is visited by many persons. A theatre can play many different movies, and a movie can be played by several theatres. A player may star in several movies and a movie may involve many players, further a player is a person, that is, some persons are players.

Please note that in all the queries ***some*** *means* ***at least one***

Goes(person, theatre) **Friend**(person_1, person_2) **Plays**(theatre, movie)
Likes(person, movie) **Stars**(movie, player)

Code (a, b) in XQuery:

(05) **a)** Find every person who goes only to all theatres that do not play any of the movies he/she likes?

(05) **b)** Find every theatre visited by at least one player who has a friend who stars in at least one movie

(20 pts) Q2. Consider the following relation and corresponding set of functional dependencies:

$$R(S_1,S_2, S_3, S_4,S_5,S_6,S_7,S_8,S_9,S_{10},S_{11},S_{12},S_{13},S_{14})$$

$$F = \{ S_1S_5 \rightarrow S_8S_{14},\ S_4S_6 \rightarrow S_1S_2S_5,\ S_2 \rightarrow S_7S_8,\ S_2S_{12} \rightarrow S_3S_9,\ S_8S_{13} \rightarrow S_7S_9S_{10},\ S_6S_9 \rightarrow S_3S_5S_{11} \}$$

(05) **a)** Find all possible candidate key(s) of R? Justify your answer.
(listing key(s) without justification has no value)

(05) **b)** Find F minimal? Show all steps of your work

(05) **c)** Is R in third normal form (3NF)? Justify your answer; only Yes/No answer has no value.
If **YES** then show why; and if **NO** then only find one example which violates 3NF.

(05) **d)** Is the following decomposition of R lossless join decomposition? Justify your answer by showing all steps of your work.

$R_1(S_1, S_2, S_5, S_7, S_8, S_9, S_{10}, S_{12}, S_{14})$,
$R_2(S_1, S_2, S_3, S_4, S_5, S_{10}, S_{11}, S_{13})$,
$R_1(S_1, S_2, S_5, S_7, S_6, S_{10}, S_{11}, S_{13})$