UNIVERSITY OF MPUMALANGA

School of Computing and Mathematical Sciences

Advanced Diploma in Information and Communication Technology

DICT322: Information Systems 322

ASSIGNMENT 1: Transaction Management and Concurrency Control

Due date: 20th September 2024, 23:59

1. Suppose that you are a manufacturer of product ABC, which is composed of parts A, B and C. Each time a new product ABC is created, it must be added to the product inventory, using the PROD_QOH in a table named PRODUCT. Also, each time the product is created, the parts inventory, using PART_QOH in a table named PART, must be reduced by one each of parts A, B, and C. The sample database contents are shown in the table below.

Table Name: Product	
PROD_CODE	PROD_QOH
ABC	1,205

Table Name: Part	
PART_CODE	PART_QOH
A	567
B	98
C	549

Given the preceding information, answer Questions a through c.

a) How many database requests can you identify for an inventory update for both PRODUCT and PART? [2]

b) Using SQL, write each database request you identified in Step a. [12]

c) Write the complete transaction(s). [4]

2. Examine the following Tables 1, 2 and 3, showing 2 transactions taking place concurrently with no concurrency control. Describe the concurrency control problem that each table represents. After the description of each problem, refer to the transactions and the data in the table to specifically highlight the problem. [12]

Table 1

Time	T_1	T_2	bal_X	Sum
t_1	sum=0		17	0
t_2	read(bal_X)	read(bal_X)	17	0
t_3	sum = sum + bal_X	bal_X = bal_X - 7	17	17
t_4		write(bal_X)	10	17

Table 2

Time	T_1	T_2	bal_X
t_1	read(bal_X)		12
t_2	$bal_X = bal_X + 12$	read(bal_X)	12
t_3	write(bal_X)	$bal_X = bal_X - 3$	24
t_4		write(bal_X)	9

Table 3

Time	T_1	T_2	bal_X
t_1	read(bal_X)		23
t_2	$bal_X = bal_X + 27$		23
t_3	write(bal_X)		50
t_4		read(bal_X)	50
t_5	rollback	$bal_X = bal_X - 27$	23