INFS1200/7900 Module 2 Case Study 1

Focus

Purpose: The purpose of this task is to develop experience in analysing database operations from a real-world scenario. This case study will provide you with experience identifying integrity constraint violations from a sample schema.

Outline

The following provides a brief description of the content of this practical and some contextual information which will assist you in completing the task.

Context: Peter has requested some help to debug another database system that *Dirt Road Driving* operates. This system is used for managing internal HR records in the company.

Correspondence: The first section of this practical contains an email between Elaine and Peter.

Correspondence 1: Peter emails Elaine regarding some separate and unrelated issues surrounding their HR database system.

Task: After reading the correspondences between Elaine and Peter, you are required to complete questions which will test your ability to evaluate database operations.

CORRESPONDENCES START ON NEXT PAGE

Correspondence

Correspondence 1:

From: peter@dirtroaddriving.com.au
To: INFS1200_7900@uq.edu.au
Date: 15/4/2020 08:09 PM
Subject: RE: Student Support for Industry Project

Hi Elaine,

I hope you are having a nice week! I just wanted to discuss the possibility of receiving some student support for another database related project our company is undertaking.

In order to streamline our payroll system, last year we hired an external developer to produce an independent payroll system for our company. Recently, however, we have been experiencing issues with the backend of the system and would like some help. Below is a basic schema of the system and a sample of some of the data. In addition to this, I thought I'd just mention that in accordance with company policy, the system does not allow administration staff to be project leaders.

Employee [id, firstName, lastName, role]
Project [name, description, funding, projectLeader]
TimeLog [employeeID, projectName, date, hoursWorked, approved]

Project.projectLeader references Employee.id
TimeLog.employeeID references Employee.id
TimeLog.projectName references Project.name

Employee			
id	**firstName**	**lastName**	**role**
1919	Diluen	Smith	Developer
2014	Daniel	Johnson	Administration
2019	Annie	Fang	Developer
2020	Russell	Turner	Manager

Project			
name	**description**	**funding**	**projectLeader**
Website Setup	Get a functional website setup	12000	2019
2020 Marketing	Develop a marketing plan for 2020	40000	2020

TimeLog				
employeeID	**projectName**	**date**	**hoursWorked**	**approved**
1919	Website Setup	2/1/2020	5	true
2014	Website Setup	1/1/2020	1	true
1919	Website Setup	2/2/2020	8	true
2019	Website Setup	2/2/2020	6	false
2020	2020 Marketing	2/1/2020	5	true

SEE NEXT PAGE FOR CONTINUED CORRESPONDENCE

We have recently been having some issues with our UI system which allows us to interact with the database. The following commands have been returning errors; however, we are unsure whether the issue exists with the UI system or if the commands themselves are incorrect.

- Update the tuple (“Website Setup”, “Get a functional website setup”, 12000, 2019) to (“Website Setup”, “Get a functional website setup”, 20000, 1919) in the relation “Project”

- Insert the tuple (2014, “Rebecca”, “Zhang”, “Administration”) in the relation “Employee”

- Update the tuple (2020, “2020 Marketing”, 2/1/2020, 5, true) to (1919, “Overall Marketing”, 2/1/2020, 5, true) in the relation “TimeLog”

- Insert the tuple (, “Test”, “Test”, “Test”) in the relation “Employee”

- Delete the tuple (2014, “Daniel”, “Johnson”, “Administration”) in the relation “Employee”

- Insert the tuple (“Talent Recruitment Initiative”, “Get the best and brightest UQ graduates to work for us!”, 10000, 2014) in the relation “Project”

Would you please be able to help us determine if these operations should be being processed by the backend system and if not, what the error is?

Thank you again for your help on this project! We really appreciate it!

Kind regards,
Peter Thompson
Director of Innovation | Dirt Road Driving

Section A – Relational Model and Database Systems

Please read Correspondence 1 before attempting this section.
In Correspondence 1, Peter introduced the relational schema for the backend system being used to manage Dirt Road Driving's payroll. **Using the schema and sample data provided** in that email please answer the following questions.

1) Identifying Keys

Fill in the table below.

Attribute Type	**Answer (Please use format Table.attribute)**
A minimal key	
A foreign key	

2) Integrity Constraints

Peter indicated they have been experiencing some issues with the backend of the payroll system. However, they are unsure whether the issue exists with the UI system or if the operations themselves are incorrect. For each database operation please answer the following:

a. Does this operation violate an integrity constraint? (Y / N)
b. If yes, state the type of constraint violated
c. If yes, briefly describe how the constraint was violated (this must not exceed 100 words)

Operation 1		
Operation		Update the tuple ("Website Setup", "Get a functional website setup", 12000, 2019) to ("Website Setup", "Get a functional website setup", 20000, 1919) in the relation "Project"
Integrity constraint violated? (Write either "yes" or "no")		
IF YES	**Type of constraint violated**	
	Description of violation	

C.2 CONTINUES ON NEXT PAGE

Operation 2		
Operation		Insert the tuple (2014, “Rebecca”, “Zhang”, “Administration”) in the relation “Employee”
Integrity constraint violated? (Write either “yes” or “no”)		
IF YES	**Type of constraint violated**	
	Description of violation	
Operation 3		
Operation		Update the tuple (2020, “2020 Marketing”, 2/1/2020, 5, true) to (1919, “Overall Marketing”, 2/1/2020, 5, true) in the relation “TimeLog”
Integrity constraint violated? (Write either “yes” or “no”)		
IF YES	**Type of constraint violated**	
	Description of violation	
Operation 4		
Operation		Insert the tuple (, “Test”, “Test”, “Test”) in the relation “Employee”
Integrity constraint violated? (Write either “yes” or “no”)		
IF YES	**Type of constraint violated**	
	Description of violation	
Operation 5		
Operation		Delete the tuple (2014, “Daniel”, “Johnson”, “Administration”) in the relation “Employee”
Integrity constraint violated? (Write either “yes” or “no”)		
IF YES	**Type of constraint violated**	
	Description of violation	

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Operation 6		
Operation		Insert the tuple (“Talent Recruitment Initiative”, “Get the best and brightest UQ graduates to work for us!”, 10000, 2014) in the relation “Project”
Integrity constraint violated? (Write either “yes” or “no”)		
IF YES	**Type of constraint violated**	
	Description of violation	

3) Integrity Constraints - Extension

Give an example of a database operations which:

a. Would result in a domain constraint violation
b. Would result in a referential integrity constraint violation

Please record your answers in the following table. **Note: You must provide original examples, not copied identically from the case study.**

Operation Requirements	Answer
Would result in a domain constraint violation	
Would result in a referential integrity constraint violation	