Botswana Accountancy College

School of Computing and Information Systems

PROGRAMME: BIDA, CSE & ABC

CSE 201 - Database Design and Development Assignment Year 2 Semester 1

Assignment

Issue date: 24 September 2021
Due Date: 24 November 2021
Total Marks: 100

Instructions to candidates

1. Candidates must attempt all tasks.
2. Candidates attempting to gain unfair advantage or colluding in any way whatsoever are liable to be disqualified.
3. The assignment is to be submitted through TurnitIn by 24 November 2021
4. It is a student's responsibility to ensure that the similarity index is within an acceptable level of not more than 30%.

Task One: Database Analysis & Design (Helping-Hand case study) – 50 marks

Narrative: You have been hired as a data analyst/DBA at the helping-hand charities. You discover that the organization uses excel files to store and manage their data. The organization director has asked you to gather requirements and business rules for the database, design and construct a database to manage the charity organization.

Scenario: Helping-hand charities is one of the largest non-governmental organizations that provides tutoring services to children between the ages of 12 and 18. The organizations has 3 branches in Botswana: Gaborone, Francistown and Maun. The charity organization needs a database that will store data about the students using their tutoring services, their demographic location and the subjects they are taking. Additionally, they need to track tutors and the sessions they are tutoring. Tutors teach on a part time basis based on their schedules. A tutor must schedule their availability every week. Tutors can teach many subjects and each subject is taught by many tutors. Students have to register in those subjects to get tutoring and they allowed to register for a maximum of 3 subjects. Each tutor is paid according to how many hours they worked. Currently, the rate is P50.00/hr.

Each tutor is limited to a maximum of 10 hours per week and may not work for more than 40 hours a month. The Tutor administrator manages tutors and their sessions by adding or removing tutors. Tutoring sessions are 30 minutes long, each session must have the date, start time. end time, the subject code and the tutor tutoring. Students may register for more than 1 sessions.

As a data analyst heading the project, your first task is to develop of a database system to meet the needs of helping-hand charities. Write a report that addresses the following:

a) Using the Database Life Cycle (DBLC), explain the work you would carry out at each phase of the DBLC for this project. [12]

b) Draft a statement of work. This should include a brief history, scope, objectives and a project timeline. [8]

c) Identify the main entities [6]

d) List the attributes, foreign keys, primary keys for each one of the entities. [10]

e) Draw an ERD to model the database for helping-hand charities [14]

Note: Please ensure your design will allow you to answer Task two and three.

Task Two: Database Implementation (Helping-hand charities) - 50 marks

a) Provide SQL code snippets that will run in oracle to implement the design from **task one** (c and d). Ensure your code runs without errors i.e., it should create the tables and inserts sufficient sample data. [6]

b) Explain the approach you will take to enforce the following constraints for helping-hand charities. (Please support your answer with draft Oracle SQL code snippets)

i. Cell numbers must not be null and must follow the following format:
   - Must have 8 numbers
   - The first number must be a 7
   - The second number must range between 1 and 7
   - The last 6 number should range between 0 and 9 [4]

ii. Only students between the ages of 12 and 18 are allowed to register [2]

iii. Email addresses must be unique [1]

c) Draft SQL statements to achieve the following (Your SQL statements should be provided in the form of a single oracle script with clear label to indicating the question being answered)

i. Count the number of sessions each tutor had scheduled [2]

ii. List the names of tutors that have less than 4 sessions scheduled [2]

iii. Count the number of students per demographic location. [2]

iv. Give the average ages for students [2]

v. Give the names of students who have registered for exactly 2 subjects [2]

d) Write PL/SQL code to do the following

i. A procedure to list all students and the total hours of sessions they attended per month [3]

ii. No tutor is allowed to work for more than 40 hours in a month therefore tutors must not be allowed to enter or update a session if the total hours exceed 40. Create a trigger that effects this rule. [7]

e) Draft relational algebraic expressions to do the following:

i. For every tutor located in 'Gaborone', list their first names, their administrator's full names and contact number. [5]

ii. Give the names and salaries of all tutors for the month of January 2021 [5]

f) Write a PL/SQL program with cursors to print a report that includes branch name and number of tutors working in each branch [7]

Student Marks Allocation Guide

Item	Description	Total
Task 1	**(a)** Phases of DBLC **1 mark each. Max 6 marks** Valid work explained **1 mark each. Max 6 marks**	**12 Marks**
	(b) History, scope, objectives, reasonable timeline. **2 marks each**	**8 marks**
	(c) Valid entities. **1 mark for each entity. 6 marks max**	**6 marks**
	(d) 1 mark for valid attribute per entity, 3 marks max 1 mark for PK, 3 marks max 1 mark for each foreign key, 4 marks max	**10 marks**
	(e) ERD 1 mark for each correct relationship, 8 marks max 2 marks for each join table, 4 marks max 2 marks for optionality, 2 marks max	**14 marks**
Task 2	**(a)** ***3 marks*** *for table creation statement****. 3 marks max*** ***3 marks*** *for inserting records****. 3 marks max***	**6 marks**
	(b) **i.** **1 mark** for correct use of check constraint **1 mark** for enforcing 8 numbers rule **1 mark** for the first number **1 mark** for second number	**7 marks**

	ii. **1 mark** for correct use of check constraint **1 mark** for age range iii. **1 mark** for correct query	
	(c) **i.** **2 marks** for table and attribute **1 mark** for count function **ii.** **1** mark per line. 2 marks max **iii.** **max 2 marks** **iv.** **1 mark** for correct function **1 mark** for correct table name **v.** **Max 2 marks**	**4 marks**
	(d) **i. 3 marks max** for correct code **ii. 7 marks max** for correct code	**10 marks**
	(e) **i. 5 marks max** for correct code **ii. 5 marks max** for correct code	**10 marks**
	(f) Correct program with PL/SQL blocks and cursor(s) **Max 7 marks**	**7 marks**
Total Marks		**100 Marks**