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Day 2 Exercises

25 Marks

First Name: Geoff

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| **Submission Details:** | Please upload this document with your answers to the appropriate drop box. |
| **Late Penalty:** | **10% deducted each day this assignment is late so you can still submit late and get a decent mark within a reasonable time frame**. |

Relational Database Development

Exercise 1 (1 mark)

Write an SQL statement to create a new database named MyBank:

Place your SQL command in the box below:

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| CREATE DATABASE MyBank |

Place a screenshot of your new database listed in the Object Explorer in the box below:

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Exercise 2 (3 marks)

Write an SQL statement to create a new table called Client inside the MyBank database. The table structure is as follows:

* pkClientId: Is an integer type and is the primary key. Have the value generated

automatically, starting at 123 and incrementing by 1.

* lName: Is a character string with a variable length of 30 characters.
* fName: Is a character string with a variable length of 30 characters.
* province: Is a character string with a fixed length of 2 characters.

Place your SQL command in the box below:

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| CREATE TABLE Client (  pkClientId INT PRIMARY KEY IDENTITY(123,1),  lName VARCHAR(30),  fName VARCHAR(30),  province CHAR(2)  ); |

In the box below, place a screenshot of your newly created Client table listed in the Object Explorer:

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Exercise 3 (4 marks)

Write an SQL statement to create a new table called Mortgage. The table structure is as follows:

* pkMortgageId: Has an integer type and is the primary key. Have the value generated

automatically, starting at 11,100 and incrementing by 100.

* startBalance: Is a money type.
* interestRate: Is a decimal type with an overall length of 5 with 3 decimal places.
* fkClientId: Is an integer type and is a foreign key to Client table.

Place your SQL command in the box below:

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| CREATE TABLE Mortgage (  pkMortgageId INT PRIMARY KEY IDENTITY(11100, 100),  startBalance MONEY,  interestRate DECIMAL(5,3),  fkClientId INT  FOREIGN KEY(fkClientId) REFERENCES Client(pkClientId)  ); |

In the box below, place a screenshot of your newly created Mortgage table listed in the Object Explorer:

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Exercise 4 (3 marks)

Now that you've successfully created the Client table, it's time to populate it. Write SQL statements to insert the following three records into the Client table:

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| --- | --- | --- | --- |
| pkClientId | lName | fName | province |
| 123 | Smith | John | BC |
| 124 | Doe | Jane | AB |
| 125 | Williams | William | ON |

**Tips:** 1. Remember to specify column names in your INSERT statement. This ensures that you're

inserting data into the correct columns, especially if the table structure changes in the future.

2. The primary key is automatically generated so it should not be included in the insert

statement.

3. Use single quotes (') around string values.

Place your SQL command in the box below:

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| --- |
| INSERT INTO Client(lName, fName, province) VALUES  ('Smith', 'John', 'BC'),  ('Doe', 'Jane', 'AB'),  ('Williams', 'William', 'ON'); |

Write a select statement to return all columns and rows from the Client table. In the box below, paste a screenshot of the results from your query on the Client table.

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Exercise 5 (3 marks)

Having populated the Client table, let's now add some mortgage details for these clients. Write SQL statements to insert the following three records into the Mortgage table:

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| --- | --- | --- | --- |
| pkMortgageId | startBalance | interestRate | fkClientId |
| 11100 | 250077.09 | 0.025 | 123 |
| 11200 | 320230.17 | 0.030 | 123 |
| 11300 | 180110.10 | 0.027 | 125 |

**Tips:** 1. The primary key is automatically generated so it should not be included in the insert

statement.

2. Ensure that the fkClientId references the correct pkClientId from the Client table as given in the data table.

3. The interestRate is in decimal form, where 0.025 represents a 2.5% interest rate.

Place your SQL command in the box below:

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| --- |
| INSERT INTO Mortgage(startBalance, interestRate, fkClientId) VALUES  (250077.09, 0.025, 123),  (320230.17, 0.030, 123),  (180110.10, 0.027, 125); |

Write a select statement to return all columns and rows from the Mortgage table. In the box below, paste a screenshot of the results from your query on the Mortgage table.

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Exercise 6 (2 marks)

Currently, when inserting a record into the Client table, you can omit the first name and last name, resulting in these columns storing null values.

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| |  | | --- | | A screenshot of a computer  Description automatically generated | | In the table structure illustrated here, both columns are set to allow null values. |

Please ensure that each client record includes both a first name (fName) and a last name (lName). Modify the Client table to enforce a NOT NULL constraint on these columns.

**Tip:** Use the ALTER TABLE command to achieve this.

Place your SQL command in the box below:

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| ALTER TABLE Client  ALTER COLUMN lName VARCHAR(30) NOT NULL;  ALTER TABLE Client  ALTER COLUMN fName VARCHAR(30) NOT NULL; |

In the box below, place a screenshot of your modified Client table structure displayed in the Object Explorer:

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Exercise 7 (1 mark)

A foreign key constraint is established between the Mortgage and Client tables on the fkClientId and pkClientId respectively.

Try inserting a new mortgage record with a fkClientId that doesn't exist in the Client table. What error do you receive?

Place your SQL command in the box below:

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| --- |
| INSERT INTO Mortgage(startBalance, interestRate, fkClientId) VALUES  (50000, 0.015, 150); |

In the box below, place a screenshot of the error you received:

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Exercise 8 (4 marks)

The bank has decided to restructure its database. Before they do that, they want to drop the primary key on the Client table. Write the SQL command to drop the primary key constraint from the Client table.

Place your SQL command in the box below:

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| //Rename PK and FK for ease of access  ALTER TABLE Client  ADD CONSTRAINT ClientPK PRIMARY KEY(pkClientId)  ALTER TABLE Mortgage  ADD CONSTRAINT MortgageFK FOREIGN KEY(fkClientId) REFERENCES Client(pkClientId)  //Remove FK link  ALTER TABLE Mortgage  DROP CONSTRAINT MortgageFK;  //Remove PK  ALTER TABLE Client  DROP CONSTRAINT ClientPK; |

In the box below, place a screenshot of your modified Client table structure displayed in the Object Explorer:

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Exercise 9 (4 marks)

After some internal discussion, the bank has decided to re-establish the constraints you removed in the previous exercise.

1. Restore the primary key constraint to the Client table.

Place your SQL commands in the box below:

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In the box below, place a screenshot of your modified Client table structure displayed in the Object Explorer:

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