UMB Database Analyst Test

This test comprises running queries and manipulating data using Microsoft SQL Server and Microsoft Excel. Installation instructions, table descriptions and the database diagram can be found in this document.

Answer the following questions. Submit the result sets along with the SQL scripts and Pivot table created.

1. Select details of all patients aged less than 18 years on the visit date who were seen in more than one department in calendar year 2017. The result set should have ONLY one record for each patient and department combination.

   Output fields:

PATIENT_ID	PATIENT_NAME	BIRTH_DATE	DEPARTMENT_NAME	VISIT_COUNT

2. Select details of all patients with outstanding balance (CHARGES > INSURANCE_PAYMENT + PATIENT_PAYMENT) in each department, sorted DESCENDING by outstanding balance. Display Insurance as 'SELF-PAY' where INSURANCE_ID is blank.

   Output fields:

DEPT_NAME	PATIENT_ID	PATIENT_NAME	INSURANCE_NAME	OUTSTANDING_BALANCE

3. Select all transactions with visit dates in calendar year 2016 and 2017. Display Insurance as 'SELF-PAY' where INSURANCE_ID is blank. Present the information in a pivot table organized by visit month and financial class. Display the total payment (Insurance Payment + Patient Payment) values in the pivot table.

4. Write a brief summary analyzing the information you see in the pivot table created in question 3. Identify any anomalies and find the TX_IDs that are causing these.

Computer Requirements and Installation

***Computer Requirements**

Feature-Type	Minimum SQL Server 2017 Windows System Requirements
Memory	512 MB for Express, 1 GB for Standard, Developer & Enterprise
File System	NTFS or ReFS (other file systems, such as **FAT32**, are unsupported)
Disk space	Minimum of 6 GB
Processor speed	Clockspeed of 2 GHz or more. 1.4 GHz minimum
Processor cores	2 cores (Virtual or Physical)
Processor type	64 bit x64-compatible AMD or Intel CPU only

***You also need to have Microsoft Excel to create a Pivot table.**

***You need to have Administrator rights on your machine.**

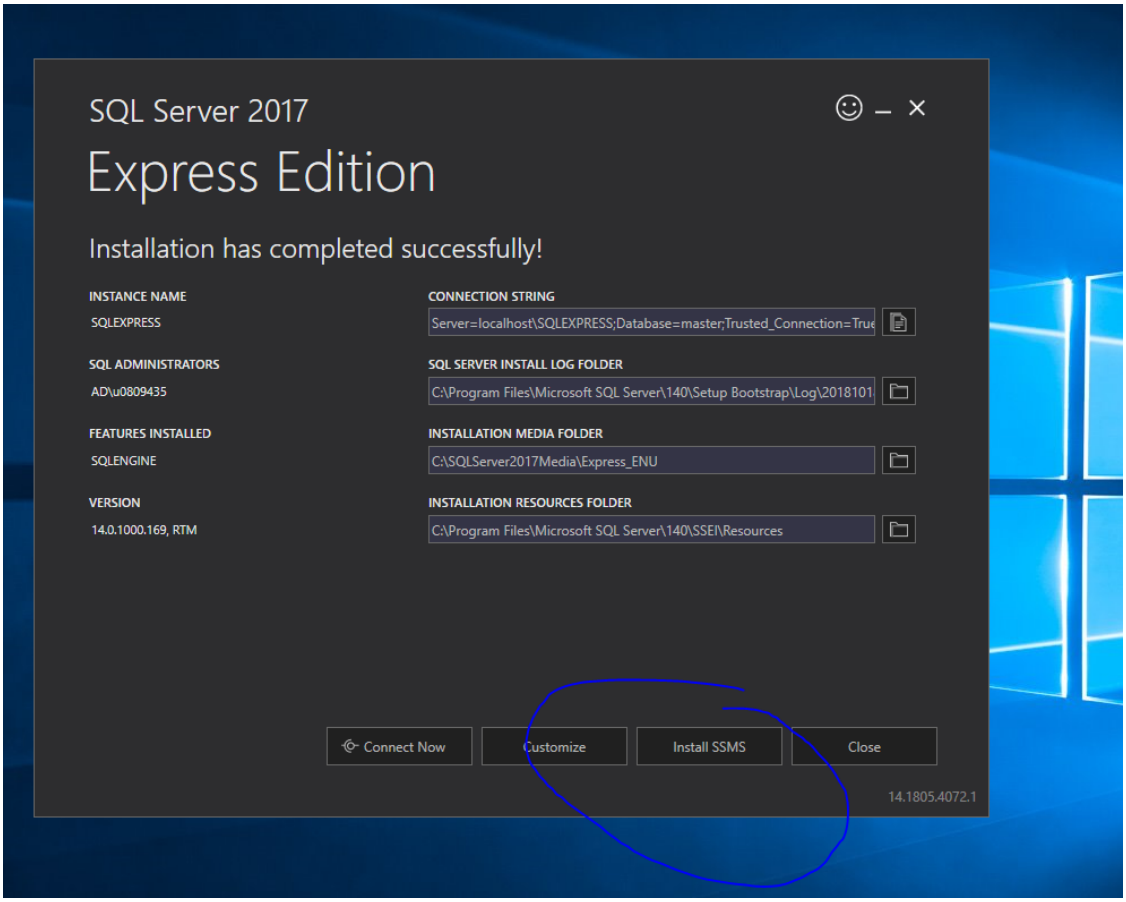
In order to answer the questions you need to install the following applications:

SQL Server Express Edition 2017

https://www.microsoft.com/en-us/sql-server/sql-server-editions-express

The Express version is free to install and use. Please install it by creating the default instance, rather than a named instance.

Once the installation is complete you will see this screen:



Now Install SQL Server Management Studio (SSMS) either by clicking 'Install SSMS' button as shown above or downloading it as a standalone application using the link below.

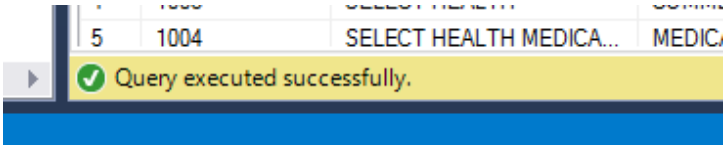
SQL Server Management Studio 2017 (SSMS)

https://docs.microsoft.com/en-us/sql/ssms/download-sql-server-management-studio-ssms?view=sql-server-2017

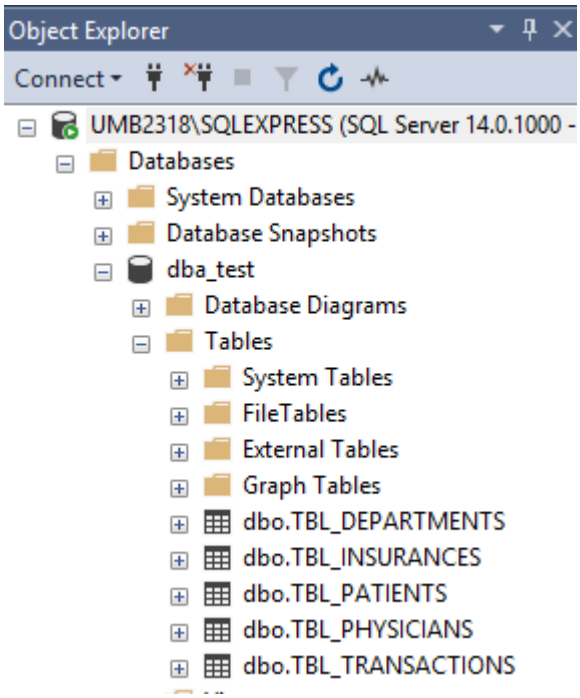
After the installation is complete

Open the SQL script file “Table_Creation.sql” (attached to the e-mail) in SQL Server Management Studio. Click “Execute” or press “F5” to create the tables.

If successful, you will see:



You can see the tables by expanding the ‘Databases’ node as shown below:



Press ‘Ctrl – N’ to launch a New ‘Query with the Current Connection’.

At this point, you can begin writing your SQL.

Table Descriptions

Note: *All names and dates in the sample data are fictional.*

1. Table Name: TBL_DEPARTMENTS

Description	Stores the names of departments
Identity Column	None

Attributes/ Fields:

#	Primary Key	Column Name	Data Type	Size	Can be Null	Unique	Check
1	Yes	DEPT_ID	VARCHAR	10	No	Yes	Should begin with 'D'
2		DEPT_NAME	VARCHAR	100	No	Yes	

2. Table Name: TBL_PHYSICIANS

Description	Stores the names and departments of physicians
Identity Column	PHYSICIAN_ID, begins with 500 and auto increment by 1

Attributes/ Fields:

#	Primary Key	Column Name	Data Type	Size	Can be Null	Unique	Check
1	Yes	PHYSICIAN_ID	INTEGER		No	Yes	
2		PHYSICIAN_NAME	VARCHAR	100	No		
3		DEPT_ID	VARCHAR	10	No		

Foreign Keys:

#	Referenced Table	Key Column	Foreign Key Column
1	TBL_DEPARTMENTS	DEPT_ID	DEPT_ID

3. Table Name: TBL_INSURANCES

Description	Stores the names of the insurance companies
Identity Column	INSURANCE_ID, begins with 1000 and auto increment by 1

Attributes/ Fields:

#	Primary Key	Column Name	Data Type	Size	Can be Null	Unique	Check
1	Yes	INSURANCE_ID	INTEGER		No	Yes	
2		INSURANCE_NAME	VARCHAR	50	No	Yes	
3		FINANCIAL_CLASS	VARCHAR	20	No		Should be either 'COMMERCIAL', 'MEDICAID' OR 'MEDICARE'

4. **Table Name: TBL_PATIENTS**

Description	Stores the details of patients
Identity Column	PATIENT_ID, begins with 200 and auto increment by 1

Attributes/ Fields:

#	Primary Key	Column Name	Data Type	Size	Can be Null	Unique	Check
1	Yes	PATIENT_ID	INTEGER		No	Yes	
2		PATIENT_NAME	VARCHAR	100	No		
3		BIRTH_DATE	DATE		No		Should be less than or equal to current date
4		INSURANCE_ID	INTEGER		Yes		

Foreign Keys:

#	Referenced Table	Key Column	Foreign Key Column
1	TBL_INSURANCES	INSURANCE_ID	INSURANCE_ID

5. **Table Name: TBL_TRANSACTIONS**

Description	Stores the details of all transactions associated with patient visits
Identity Column	TX_ID, begins with 1 and auto increment by 1

Attributes/ Fields:

#	Primary Key	Column Name	Data Type	Size	Can be Null	Unique	Check
1	Yes	TX_ID	INTEGER		No	Yes	
2		VISIT_DATE	DATE		No		Should be less than or equal to current date
3		PATIENT_ID	INTEGER		No		
4		PHYSICIAN_ID	INTEGER		No		
5		CHARGES	MONEY		No		Should be greater than zero
6		INSURANCE_PAYMENT	MONEY		Yes		
7		PATIENT_PAYMENT	MONEY		Yes		

Foreign Keys:

#	Referenced Table	Key Column	Foreign Key Column
1	TBL_PATIENTS	PATIENT_ID	PATIENT_ID
2	TBL_PHYSICIANS	PHYSICIAN_ID	PHYSICIAN_ID

Database Diagram