ACIT 1630

Relational Database Design and SQL

Review Questions

Lesson 9

**Part A**

Answer each of the following questions labeling your answers clearly. Save your work in the Desire2Learn **Drop box** by due date / time.

1. What type of integrity is enforced when a primary key is declared?

When a primary key is created, constraints enforce entity integrity. This means that no part of the primary key can be null and must be unique.

1. Write the SQL code that will create a constraint on the BRANCH\_ID column which has a data type of INT in the BRANCH table to ensure only the values 1 through 999 are entered.

alter table BRANCH

add *Constraint* BRANCH\_ID\_RANGE

*check* (BRANCH\_ID >= 1 and BRANCH\_ID <= 999)

1. Explain why it might be more appropriate to declare an attribute that contains only digits as a character data type instead of a numeric data type.

It might be more appropriate to declare an attribute when the values do not have a significant numerical value. In other words, if the value is something like a social insurance number, it can be represented as a character value so, if theres leading 0’s the value doesn’t change. Ex: 0102851 doesn’t change to 102851.

1. What is the difference between a column constraint and a table constraint?

A table constraint is applies to any attributes in the table. A column constraints applies to only the specified attribute.

1. Write the SQL command that will create a user-defined data type called KEY\_CODE for all the primary keys containing character values with a length of 7.

Create type KEY\_CODE

from char(7) not null

1. Explain why it would be preferable to use a DATE data type to store date data instead of a character data type.

You would use date to store a data because it helps reduce incorrect inputs. For example, if a company is adding a date for an appointment, the date needs to be in the future, so it would give an error if you input a date before the present day. In other words, you can’t have an appointment in the past.

1. What is the objective of SQL?

SQL is a language that allows the user to create a database that can be modified or changed depending on the needs of the database. The databases can be modified using queries.

1. Write the SQL code that will create a constraint for the GENDERcolumnwhich has a data type of CHAR(1) in the EMPLOYEE table to ensure the only the values of ‘F’, ‘M’, or ‘U’ are entered.

alter table EMPLOYEE

add *CONSTRAINT* GENDER\_VALUE

*check* (GENDER = 'F' or GENDER = 'U' or GENDER = 'M')

1. What are “referential constraint actions”?

A referential constraint action is an insertion, update, or deletion action. It uses the CASCADE command.

1. Write the SQL command that will delete the TEMP\_1 table from the database.

drop table TEMP\_1

1. Write the SQL code that will create a default value for the **PAPERBACK** column which has a data type of CHAR(1) in the **BOOK** table to the value of ‘N’.

alter table BOOK

add *constraint* PAPERBACK\_DEFAULT

*DEFAULT*('N') for PAPERBACK

1. What is a database?

A database contains the tables used to represent, manage, and access data  
Contains a collection of tables with data, and other objects, such as views, indexes, stored procedures, and triggers.   
Supports activities performed with the data  
Data usually related to a particular subject or process

Specialized structures that allow computer-based systems to store, manage, and retrieve data quickly. Also shared, integrated, and houses a collection of related data.

1. What is a user-defined data type? Why is it used?

A data type that is derived from an existing data type.

It is used for custom data storage, enforcing data integrity, and when multiple tables store the same data type

1. Write the SQL code that will create a constraint on the column BOOK\_TYPE which has a data type of CHAR(3) in the BOOK table to ensure only the letters ‘A’ through ‘Z’ are acceptable values for each of the characters in the column.

alter table BOOK

add *CONSTRAINT* BOOK\_TYPE\_VALUE

*check* (BOOK\_TYPE in ('ABCDEFGHIJKLMNOPQRSTUVYXYZ'))

1. Within the context of a database, what are constraints?

Constraints are used to provide data integrity on a table and individual columns in a table.  
Limit the possible values a user can enter into a table or a column   
They are used in CREATE TABLE and ALTER TABLE statements.

1. If you create a database called inventory, what two files are created?

inventory\_file.mdf and inventory\_log.ldf

1. Within the context of a database, what is a table?

A table represents and contains information. A system table can describe a database.

1. Write the SQL code that will create a composite primary key with the columns EMP\_ID and DEP\_ID in the DEPENDANT table.

alter table Employees

add *constraint* PK\_Employees

primary key (Emp\_ID, DEP\_ID)

1. Write the SQL code that will add the attributes EMP\_PCT and PROJ\_NUM to the EMPLOYEE structure. The EMP\_PCT is the bonus percentage to be paid to each employee and should be a decimal data type. The new attribute characteristics are:

EMP\_PCT DECIMAL

PROJ\_NUM CHAR(3)

alter table EMPLOYEE

add EMP\_PCT decimal,

    PROJ\_NUM char(3)

1. Write the SQL code that will create a foreign key of the BRANCH\_ID column in the INVENTORY table with the BRANCH\_ID column in the BRANCH table.

alter table INVENTORY

    add *constraint* FK\_BRANCH\_ID

*foreign key(BRANCH\_ID)* *references* BRANCH

**Table Layout**

**CUSTOMER**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Column Name* | *Data Type* | *Length* |  | *Null Values* |
| **CUST\_ID (PK)** | INT |  | User-defined Data Type | No |
| CUST\_LASTNAME | VARCHAR | 30 |  | No |
| CUST\_FIRSTNAME | VARCHAR | 20 |  | No |
| CUST\_PHONE | CHAR | 10 |  | Yes |
| CUST\_BALANCE | MONEY |  |  | No |

**INVOICE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Column Name* | *Data Type* | *Length* |  | *Null Values* |
| **INV\_ID (PK)** | INT |  | User-defined Data Type | No |
| CUST\_ID (FK) | INT |  | User-defined Data Type | No |
| INV\_DATE | DATETIME |  |  | Yes |

**LINE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Column Name* | *Data Type* | *Length* |  | *Null Values* |
| **INV\_ID (PK) (FK)** | INT |  | User-defined Data Type | No |
| **LINE\_ID (PK)** | SMALLINT |  |  | No |
| PROD\_CODE (FK) | VARCHAR | 10 |  | No |
| LINE\_QUANTITY | INT |  |  | No |
| LINE\_UNIT\_PRICE | MONEY |  |  | No |

**PRODUCT**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Column Name* | *Data Type* | *Length* |  | *Null Values* |
| **PROD\_CODE (PK)** | VARCHAR | 10 |  | No |
| PROD\_DESCRIPTION | VARCHAR | 50 |  | Yes |
| PROD\_UNIT\_PRICE | MONEY |  |  | No |
| VEND\_ID (FK) | INTEGER |  | User-defined Data Type | No |

**VENDOR**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *Column Name* | *Data Type* | *Length* |  | *Null Values* |
| **VEND\_ID (PK)** | INTEGER |  | User-defined Data Type | No |
| VEND\_NAME | VARCHAR | 40 |  | No |
| VEND\_ADDRESS | VARCHAR | 30 |  | Yes |
| VEND\_CITY | VARCHAR | 20 |  | Yes |
| VEND\_PROVINCE | CHAR | 2 |  | Yes |
| VEND\_POSTAL | CHAR | 6 |  | Yes |
| VEND\_PHONE | CHAR | 10 |  | Yes |

**Part B**

Using Microsoft SQL Server, create the SQL statement for each of the questions listed below. You can complete your exercise using either Management Studio or sqlcmd.

1. Create a database called **exercise6**.

create database exercise6

go

1. Create a **user defined data type** called **KEY\_ID** for all the primary key columns containing integer values to ensure the same data type, length and null ability.

create type KEY\_ID

from int not null

1. Create the following tables (see page 3 for column information):

CUSTOMER

INVOICE

LINE

PRODUCT

VENDOR

create table Customer

(

    CUST\_ID KEY\_ID,

    CUST\_LASTNAME varchar(30) not null,

    CUST\_FIRSTNAME varchar(20) not null,

    CUST\_PHONE char(10),

    CUST\_BALANCE money not null,

)

create table Invoice

(

    INV\_ID KEY\_ID,

    CUST\_ID KEY\_ID,

    INV\_DATE datetime

)

create table Line

(

    INV\_ID KEY\_ID,

    LINE\_ID smallint not null,

    PROD\_CODE varchar(10) not null,

    LINE\_QUANTITY int not null,

    LINE\_UNIT\_PRICE money not null,

)

create table Product

(

    PROD\_CODE varchar(10) not null,

    PROD\_DESCRIPTION varchar(50),

    PROD\_UNIT\_PRICE money not null,

    VEND\_ID KEY\_ID,

)

create table Vendor

(

    VEND\_ID KEY\_ID,

    VEND\_NAME varchar(40) not null,

    VEND\_ADDRESS varchar(30),

    VEND\_CITY varchar(20),

    VEND\_PROVINCE char(2),

    VEND\_POSTAL char(6),

    VEND\_PHONE char(10),

)

1. Add all the **primary keys**.

alter table Invoice

    add *constraint* PK\_Invoice

    primary key(INV\_ID)

alter table Customer

    add *constraint* PK\_Customer

    primary key(CUST\_ID)

alter table Vendor

    add *constraint* PK\_Vendor

    primary key(VEND\_ID)

alter table Product

    add *constraint* PK\_Product

    primary key(PROD\_CODE)

alter table Line

    add *constraint* PK\_Line

    primary key(LINE\_ID, INV\_ID)

1. Add all the **foreign keys**.

alter table Invoice

    add *constraint* FK\_Invoice

*foreign key*(CUST\_ID) *references* Customer

alter table Line

    add *constraint* FK\_Line

*foreign key*(PROD\_CODE) *references* Product

alter table Line

    add *constraint* FK\_LineProduct

*foreign key*(INV\_ID) *references* Invoice

alter table Product

    add *constraint* FK\_Product

*foreign key*(VEND\_ID) *references* Vendor

1. The default value for the **INV\_DATE** column in the **INVOICE** table is **today’s date** - GETDATE().

alter table Invoice

    add *constraint* INV\_TIME

*default* (getdate()) for INV\_DATE

1. The default value for the **VEND\_PROVINCE** column in the **VENDOR** table is the value **BC**.

alter table Vendor

    add *constraint* default\_province

*default*('BC') for VEND\_PROVINCE

1. The default value for the **VEND\_CITY** column in the **VENDOR** table is the value **BURNABY**.

alter table Vendor

    add *constraint* default\_city

*default*('Burnaby') for VEND\_CITY

1. Add a check constraint to the **PROD\_UNIT\_PRICE** column in the **PRODUCT** table to ensure the entered price is less than **1000.00**.

alter table Product

    add *constraint* product\_price

*check* (PROD\_UNIT\_PRICE < 1000.00)

1. Add a check constraint to the **LINE\_QUANTITY** column in the **LINE** table to ensure the entered quantity is greater than **20.00**.

alter table Line

    add *constraint* quantity\_min

*check* (LINE\_QUANTITY > 20.00)