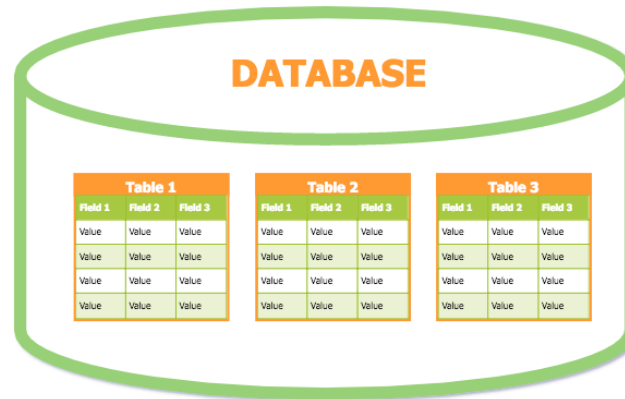


ISAD253SL - Databases

Lesson 6

SQL Constraints



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SQL Constraints

- Used to specify rules for the data in a table.
- Used to limit or validate the type of data that is entered to a table.
- Ensures the accuracy and reliability of the data in the table.
- Constraints can be specified when:
 - creating a table (inside the CREATE TABLE statement)
 - or
 - after creating a table (inside the ALTER TABLE statement)

SQL Constraints

- **NOT NULL**
 - Indicate that a field cannot store NULL values.
- **UNIQUE**
 - Ensure that each record for a field must have a unique value.
- **DEFAULT**
 - Add a default value to all new records when no specific value is entered to that field.
- **CHECK**
 - Ensure that the value in a field meets a specific condition.
 - Used to limit the value range that can be placed in a column.

SQL Constraints

- **PRIMARY KEY**

- A combination of a NOT NULL and UNIQUE.
- Ensures that a field (or combination fields) has a unique identity which helps to find a particular record in a table more easily and quickly.

- **FOREIGN KEY**

- Ensure the referential integrity of data in one table to match values in another table.

NULL Value Concept

- When a variable has no value, it is considered to be null.
- Having a null value is different than having a value of 0.
- Setting a Null value is appropriate when the actual value is unknown or when a value is meaningless.
- When a column is defined as NOT NULL then that is a mandatory column. User is forced to enter data into that column.

SQL Constraints

```
CREATE TABLE Persons
```

```
(
```

```
    PersonID int PRIMARY KEY,
```

```
    LastName varchar(25) NOT NULL,
```




















```
    FirstName varchar(15),
```

```
    Address varchar(255),
```

```
    NIC varchar(10) UNIQUE,
```

```
    City varchar(25)
```

```
)
```

- [-]  dbo.Persons
 - [-]  Columns
 -  PersonID (PK, int, not null)
 -  LastName (varchar(25), not null)
 -  FirstName (varchar(15), null)
 -  Address (varchar(255), null)
 -  NIC (varchar(10), null)
 -  City (varchar(25), null)
 - [-]  Keys
 -  PK_Persons_AA2FFB853F58E490
 -  UQ_Persons_C7DEC33322E5CB5B
 -  Constraints
 -  Triggers
 - [-]  Indexes
 -  PK_Persons_AA2FFB853F58E490 (Clustered)
 -  UQ_Persons_C7DEC33322E5CB5B (Unique, Non-Clustered)
 - [-]  Statistics
 -  PK_Persons_AA2FFB853F58E490
 -  UQ_Persons_C7DEC33322E5CB5B

```
CREATE TABLE Persons
```

```
(
```

```
    PersonID int,
```

```
    LastName varchar(25) NOT NULL ,
```

```
    FirstName varchar(15),
```

```
    Address varchar(255),
```




















```
    NIC varchar(10),
```

```
    City varchar(25)
```

```
    PRIMARY KEY (PersonID),
```

```
    UNIQUE (NIC)
```

```
)
```


- [-]  dbo.Persons
 - [-]  Columns
 -  PersonID (PK, int, not null)
 -  LastName (varchar(25), not null)
 -  FirstName (varchar(15), null)
 -  Address (varchar(255), null)
 -  NIC (varchar(10), null)
 -  City (varchar(25), null)
 - [-]  Keys
 -  PK_Persons_AA2FFB85087BE558
 -  UQ_Persons_C7DEC3337FD46DA1
 -  Constraints
 -  Triggers
 - [-]  Indexes
 -  PK_Persons_AA2FFB85087BE558 (Clustered)
 -  UQ_Persons_C7DEC3337FD46DA1 (Unique, Non-Clustered)
 - [-]  Statistics
 -  PK_Persons_AA2FFB85087BE558
 -  UQ_Persons_C7DEC3337FD46DA1

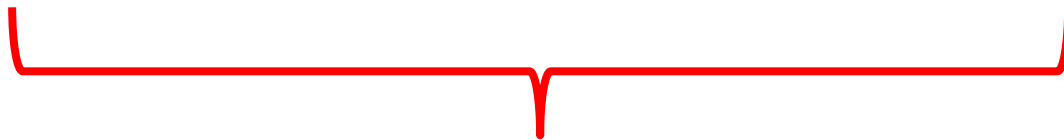
Alter Constraints - NOT NULL

- ALTER TABLE Persons
ALTER COLUMN LastName NOT NULL
- To remove NOT NULL constraint:

ALTER TABLE Persons
ALTER COLUMN LastName NULL

Alter Constraints - PK

























- ALTER TABLE Persons
ADD PRIMARY KEY (PersonID)
- ALTER TABLE Persons
DROP PK__Persons__AA2FFB85E4ADBBA2



Constraint Name

Giving Constraint Names

```
CREATE TABLE Persons (  
    PersonID int,  
    LastName varchar(25) NOT NULL,  
    FirstName varchar(15),  
    Address varchar(255),  
    NIC varchar(10),  
    City varchar(25)  
    CONSTRAINT pk_PersonID PRIMARY KEY (PersonID),  
    CONSTRAINT uq_NIC UNIQUE (NIC) )
```

-   **dbo.Persons**
 -   **Columns**
 -  **PersonID** (PK, int, not null)
 -  **LastName** (varchar(25), not null)
 -  **FirstName** (varchar(15), null)
 -  **Address** (varchar(255), null)
 -  **NIC** (varchar(10), null)
 -  **City** (varchar(25), null)
 -   **Keys**
 -  **pk_PersonID**
 -  **uq_NIC**
 -  **Constraints**
 -  **Triggers**
 -   **Indexes**
 -  **pk_PersonID** (Clustered)
 -  **uq_NIC** (Unique, Non-Clustered)
 -   **Statistics**
 -  **pk_PersonID**
 -  **uq_NIC**

Alter Constraints - Unique



















- ALTER TABLE Persons
ADD UNIQUE (NIC)
- ALTER TABLE Persons
ADD CONSTRAINT UC_Person UNIQUE (NIC)
- ALTER TABLE Persons
DROP CONSTRAINT UC_Person

Alter Constraints - PK

- ALTER TABLE Persons
ADD CONSTRAINT pk_PersonID PRIMARY KEY
(PersonID)
- ALTER TABLE Persons
DROP CONSTRAINT pk_PersonID



















Composite Primary Key

```
CREATE TABLE Payment (  
    PersonID int,  
    PayDate DATE,  
    Amount MONEY,  
    PRIMARY KEY (PersonID, PayDate)  
)
```


-   **dbo.Payment**
 -   **Columns**
 -  PersonID (PK, int, not null)
 -  PayDate (PK, date, not null)
 -  Amount (money, null)
 -   **Keys**
 -  PK_Payment_B307F2B07CF16B45
 -  **Constraints**
 -  **Triggers**
 -   **Indexes**
 -  PK_Payment_B307F2B07CF16B45 (Clustered)
 -   **Statistics**
 -  PK_Payment_B307F2B07CF16B45















Composite Primary Key

```
CREATE TABLE Payment (  
    PersonID int,  
    PayDate DATE,  
    Amount MONEY,  
    CONSTRAINT pk_Payment PRIMARY KEY  
        (PersonID , PayDate)  
)
```

-   **dbo.Payment**
 -   Columns
 -  PersonID (PK, int, not null)
 -  PayDate (PK, date, not null)
 -  Amount (money, null)
 -   Keys
 -  pk_Payment
 -  Constraints
 -  Triggers
 -   Indexes
 -  pk_Payment (Clustered)
 -   Statistics
 -  pk_Payment




















FOREIGN KEY

```
CREATE TABLE Orders (  
    OrdID int PRIMARY KEY,  
    OrdDate date NOT NULL,  
    PersonID int FOREIGN KEY REFERENCES  
        Persons (PersonID)  
)
```

- [-]  **dbo.Orders**
 - [-]  **Columns**
 -  **OrdID (PK, int, not null)**
 -  **OrdDate (date, not null)**
 -  **PersonID (FK, int, null)**
 - [-]  **Keys**
 -  **PK__Orders__67A283165F176A01**
 -  **FK__Orders__PersonID__6FE99F9F**
 -  **Constraints**
 -  **Triggers**
 - [-]  **Indexes**
 -  **PK__Orders__67A283165F176A01 (Clustered)**
 - [-]  **Statistics**
 -  **PK__Orders__67A283165F176A01**

FOREIGN KEY

```
CREATE TABLE Orders (  
    OrdID int,  
    OrdDate date NOT NULL,  
    PersonID int,  
    CONSTRAINT pk_OrdID PRIMARY KEY (OrdID),  
    CONSTRAINT fk_PersonID FOREIGN KEY  
        (PersonID) REFERENCES Persons(PersonID)  
)
```

-   **dbo.Orders**
 -   **Columns**
 -  **OrdID** (PK, int, not null)
 -  **OrdDate** (date, not null)
 -  **PersonID** (FK, int, null)
 -   **Keys**
 -  **pk_OrdID**
 -  **fk_PersonID**
 -  **Constraints**
 -  **Triggers**
 -   **Indexes**
 -  **pk_OrdID** (Clustered)
 -   **Statistics**
 -  **pk_OrdID**

Alter Constraints - FK

- ALTER TABLE Orders
ADD FOREIGN KEY (PersonID) REFERENCES Persons
(PersonID)
- ALTER TABLE Orders
ADD CONSTRAINT FK_PersonOrder
FOREIGN KEY (PersonID) REFERENCES Persons (PersonID)
- ALTER TABLE Orders
DROP CONSTRAINT FK_PersonOrder;

Default Constraint

```
CREATE TABLE Persons
```

```
(
```

```
    PersonID int PRIMARY KEY,
```

```
    LastName varchar(25) NOT NULL,
```





















```
    FirstName varchar(15),
```

```
    Address varchar(255),
```

```
    NIC varchar(10) UNIQUE,
```

```
    City varchar(20) DEFAULT ('Colombo')
```

```
)
```

- [-]  dbo.PPersons
 - [-]  Columns
 -  PersonID (PK, int, not null)
 -  LastName (varchar(25), not null)
 -  FirstName (varchar(15), null)
 -  Address (varchar(255), null)
 -  NIC (varchar(10), null)
 -  City (varchar(20), null)
 - [-]  Keys
 -  PK_Persons_AA2FFB85A6236293
 -  UQ_Persons_C7DEC33326CACCC73
 - [-]  Constraints
 -  DF_Persons_City_76969D2E
 -  Triggers
 - [-]  Indexes
 -  PK_Persons_AA2FFB85A6236293 (Clustered)
 -  UQ_Persons_C7DEC33326CACCC73 (Unique, Non-Clustered)
 - [-]  Statistics
 -  PK_Persons_AA2FFB85A6236293
 -  UQ_Persons_C7DEC33326CACCC73

Default Constraint

```
CREATE TABLE Orders
```

```
(
```

```
    OrderID int NOT NULL,
```

```
    OrderNumber int NOT NULL,
```

```
    OrderDate date DEFAULT GETDATE()
```

```
)
```

Alter Constraints - Default

- ALTER TABLE Persons
ALTER COLUMN City SET DEFAULT 'Colombo'
- ALTER TABLE Persons
ALTER COLUMN City DROP DEFAULT

CHECK Constraints

```
CREATE TABLE Persons
```

```
(
```

```
    PersonID int CHECK (PersonID>0) PRIMARY KEY,
```

```
    LastName varchar(25) NOT NULL,
```

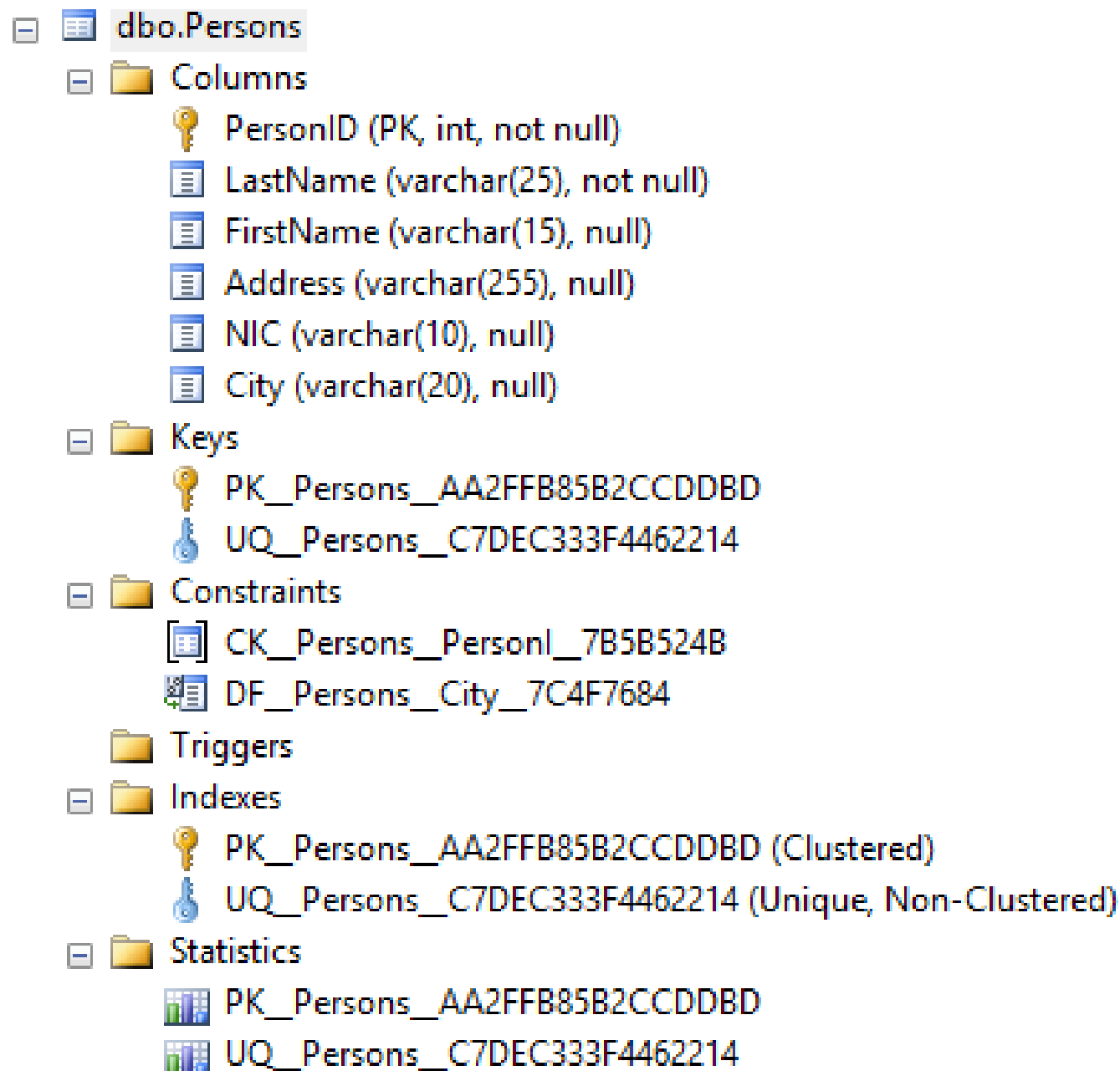
```
    FirstName varchar(15),
```

```
    Address varchar(255),
```

















```
    NIC varchar(10) UNIQUE,
```

```
    City varchar(20) DEFAULT ('Colombo')
```

```
)
```



```
CREATE TABLE Persons (  
    PersonID int NOT NULL,  
    LastName varchar(255) NOT NULL,  
    FirstName varchar(255),  
    Address varchar(255),  
    City varchar(255),  
    CONSTRAINT pk_PersonID PRIMARY KEY  
        (PersonID),  
    CONSTRAINT chk_Person CHECK  
        (PersonID>0 AND City='Colombo'))
```

- [-]  dbo.Persons
 - [-]  Columns
 -  PersonID (PK, int, not null)
 -  LastName (varchar(255), not null)
 -  FirstName (varchar(255), null)
 -  Address (varchar(255), null)
 -  City (varchar(255), null)
 - [-]  Keys
 -  pk_PersonID
 - [-]  Constraints
 -  chk_Person
 -  Triggers
 - [-]  Indexes
 -  pk_PersonID (Clustered)
 - [-]  Statistics
 -  pk_PersonID

Alter Constraints - Check

- ALTER TABLE Persons
ADD COLUMN Age int CHECK (Age>=18)
- ALTER TABLE Persons
ADD CONSTRAINT chk_Person CHECK
(Age >= 18 AND City = 'Colombo')
- ALTER TABLE Persons
DROP CONSTRAINT chk_Person

Thank You