CIS560

Introduction to Tables & Constraints

Topics

- Introduction to Table Structure
- Introduction to Constraints
  - NOT NULL
  - Primary Key
  - Unique
  - Check
  - Foreign Key
  - Default

Table Structure

- Physical form of a relation
- A table contains one or more columns.
- Columns are:
  - Physical form of attributes
  - Are a set, not a list
- All columns must have a:
  - Unique name
  - Data type
  - Nullability

Constraints

- Constraints are declarative rules
- The DBMS will check every time:
  - New data will be added
  - Data is modified
  - In some cases, when data is deleted
- Any operation that violates a constraint fails and returns an error

NOT NULL

- Simple indication that the value is mandatory
- A value is anything fitting the domain that is not NULL

Primary Key Constraints

- The value is mandatory.
- The value is unique - duplicates are not allowed.
- Each table can have no more than one primary key constraint.

Unique Constraints

- Enforces uniqueness like a PRIMARY KEY
- Unlike a PRIMARY KEY:
  - Can have more than one UNIQUE constraint
  - Will allow nulls

Check Constraints

- Can force domain ranges (0 to 100)
- Can check for discrete values (“Yes”, “No”, “Maybe”)
- Comparison between two columns: EndDate >= StartDate
- Any predicate using the columns of the table.

Default Constraints

- Defines a default value for a column
- Used on inserts when an explicit value is not provided
- You can provide a value for a column with a default constraint
- IDENTITY property provides similar behavior
  - However, not supposed to provide values
  - Requires some special work
- Sequence objects can also be used as default constraints

Foreign Key Constraints

- Enforces referential integrity
- Rules
  - The referenced columns must be either the PRIMARY KEY or any UNIQUE KEY.
  - The referencing columns must match the type of the referenced columns.
- The constraint works both directions.
  - Referencing table is checked when foreign key value is inserted.
  - Referencing table is checked when foreign key value is updated.
  - The referenced table is checked when a value is deleted.

Example with Identity Property

```
CREATE TABLE Demo.School
(
   SchoolId INT NOT NULL IDENTITY(1, 1) PRIMARY KEY,
   [Name] NVARCHAR(64) NOT NULL UNIQUE,
   YearEstablished SMALLINT NOT NULL
      CHECK(YearEstablished BETWEEN 1000 AND 9999),
   Nickname NVARCHAR(32) NOT NULL,
   Conference NVARCHAR(32) NOT NULL
      FOREIGN KEY REFERENCES Demo.Conference(Nickname),
   CreatedOn DATETIMEOFFSET NOT NUL
      DEFAULT(SYSDATETIMEOFFSET())
);
```

Example with Sequence Object

```
CREATE TABLE Demo.School
(
   SchoolId INT NOT NULL PRIMARY KEY
      DEFAULT(NEXT VALUE FOR Demo.SchoolId),
   [Name] NVARCHAR(64) NOT NULL UNIQUE,
   YearEstablished SMALLINT NOT NULL
      CHECK(YearEstablished BETWEEN 1000 AND 9999),
   Nickname NVARCHAR(32) NOT NULL,
   Conference NVARCHAR(32) NOT NULL
      FOREIGN KEY REFERENCES Demo.Conference(Nickname),
   CreatedOn DATETIMEOFFSET NOT NUL
      DEFAULT(SYSDATETIMEOFFSET())
);
```