

Subqueries, CTEs and Temporary Tables



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Subqueries

Query Manipulation On Multiple Levels

Subqueries

- Use a query's result as data for another query



Employees

Query

EmployeeID	Salary
59	19,000
71	43,300
...	...



WHERE DepartmentID **IN**



Subquery

DepartmentID	Name
10	Finance

```
SELECT FROM Employees AS e
WHERE e.DepartmentID IN
(
  SELECT d.DepartmentID
    FROM Departments AS d
   WHERE d.Name = 'Finance'
)
```

Table Departments

Subquery

Problem: Min Average Salary

- Display **lowest average salary** of **all departments**.
 - Calculate average salary for each department.
 - Then show the value of smallest one.

	MinAverageSalary
1	10866.6666

Solution: Min Average Salary

```
SELECT
  MIN(a.AverageSalary) AS MinAverageSalary
FROM
  (
    SELECT e.DepartmentID,
           AVG(e.Salary) AS AverageSalary
    FROM Employees AS e
    GROUP BY e.DepartmentID
  ) AS a
```

Subquery

Table Employees



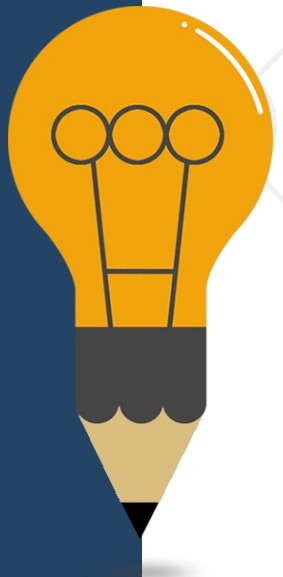
Common Table Expressions

Reusable Subqueries

- **Common Table Expressions (CTE)** can be considered as "**named subqueries**"
- They could be used to improve code **readability** and code **reuse**
- Usually they are positioned in the beginning of the query

```
WITH CTE_Name (ColumnA, ColumnB...)
AS
(
  -- Insert subquery here.
)
```

Common Table Expressions Syntax



```
WITH Employees_CTE
    (FirstName, LastName, DepartmentName)
AS
(
    SELECT e.FirstName, e.LastName, d.Name
    FROM Employees AS e
    LEFT JOIN Departments AS d ON
        d.DepartmentID = e.DepartmentID
)

SELECT FirstName, LastName, DepartmentName
FROM Employees_CTE
```



Temporary Tables

- **Temporary tables** are stored in **tempdb**
- Automatically deleted when they are **no longer used**

```
CREATE TABLE #TempTable  
(  
    -- Add columns here.  
)  
  
SELECT * FROM #TempTable
```

Temporary Table Syntax

```
CREATE TABLE #Employees
```

```
(
```

```
    Id INT PRIMARY KEY,
```

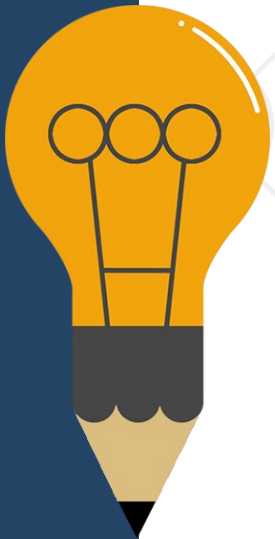
```
    FirstName VARCHAR(50) NOT NULL,
```

```
    LastName VARCHAR(50),
```

```
    Address VARCHAR(50)
```

```
)
```

```
SELECT * FROM #Employees
```



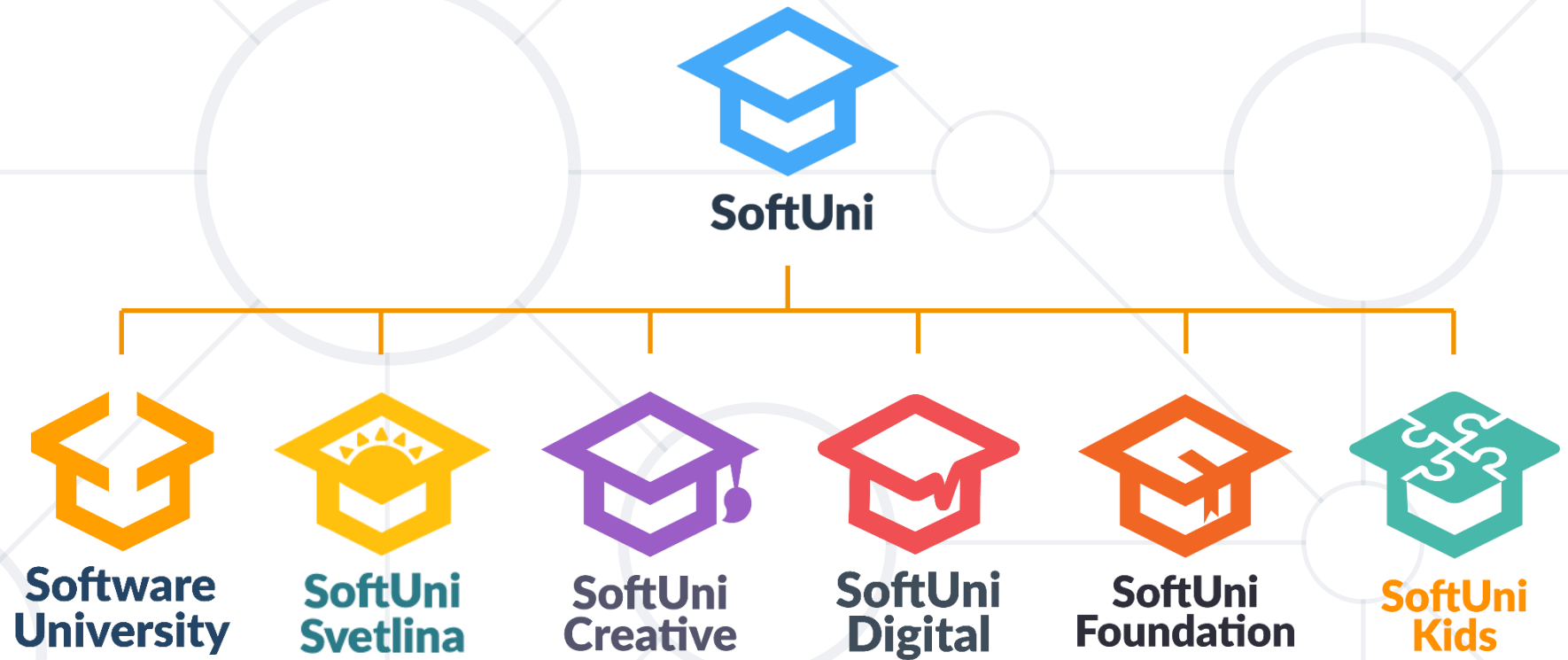
Types of Temporary Tables

- **Table variables** (DECLARE @t TABLE)
 - Visible only to the connection that creates it
- **Local temporary tables** (CREATE TABLE #t)
 - Visible only to the connection that creates it
- **Global temporary tables** (CREATE TABLE ##t)
 - Visible to everyone
 - Deleted when all connections that have referenced them have closed
- **Tempdb permanent tables** (USE tempdb CREATE TABLE t)
 - Visible to everyone. Deleted when the server is restarted

1. **Subqueries** are used to nest queries.
2. **CTE's** improve code reuse and readability.
3. **Indices** improve SQL search performance if used properly.



Questions?



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