Experiment 2

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Subject Name: ADBMS

Subject Code: 23CSP-333

MEDIUM - LEVEL

1. Problem Title:Organizational Hierarchy Explorer
2. Problem Description:You are a Database Engineer at TalentTree Inc., an enterpriseHRanalyticsplatform that stores employee data, including their reportingrelationships.The company maintains a centralized Employee relation that holds:

   Each employee'sID,name, department, and manager ID (who is also an employeeinthesametable).Your task is to generate a report that maps employeestotheirrespective managers, showing:

   a. Theemployee'sname and department

   b. Theirmanager'sname and department (if applicable)

   c. ThiswillheptheHR department visualize the internal reporting hierarchy.
3. SQL Commands:

   a. Createthedatabase and useit:

```
createdatabase AIT_1A;
use AIT_1A;
```

   b. CreatetablesEmployee andadding Foreign key:

```
CREATETABLE Employee (
    EmpID INT PRIMARY KEY,
    EmpName VARCHAR(50) NOT NULL,
    Department VARCHAR(50) NOT NULL,
```

```
        ManagerID INT NULL);
ALTER TABLE Employee ADD CONSTRAINT FK_EMPLOYEE
FOREIGN KEY (ManagerID)
references Employee(EmpID);
```

c. Insert the values in the tables:

```
INSERT INTO Employee (EmpID, EmpName, Department, ManagerID)
VALUES
(1, 'Alice', 'HR', NULL),
(2, 'Bob', 'Finance', 1),
(3, 'Charlie', 'IT', 1),

(4, 'David', 'Finance', 2),
(5, 'Eve', 'IT', 3),
(6, 'Frank', 'HR', 1);
```

d. SelectingtheEmployeewiththeirrespectivemanagers:

```
SELECT E1.EmpName [Employee Name], E2.EmpName [Manager Name],
E1.Department [Emp_dept],
E1.Department [Manager_dept]
from Employee as E1
    leftouter join Employee as E2 on E1.ManagerID =E2.EmpID;
```

4. Output:

	Name	Owner	Type	Created_datetime
1	Employee	dbo	user table	2025-07-30 10:17:25.060

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	EmpID	int	no	4	10	0	no	(n/a)	(n/a)	NULL
2	EmpName	varchar	no	50			no	no	no	SQL_Latin1_General_CP1_CI_AS
3	Department	varchar	no	50			no	no	no	SQL_Latin1_General_CP1_CI_AS
4	ManagerID	int	no	4	10	0	yes	(n/a)	(n/a)	NULL

Figure 1 Employee Table Description

	Employee Name	Manager Name	Emp_dept	Manager_dept
1	Alice	NULL	HR	HR
2	Bob	Alice	Finance	Finance
3	Charlie	Alice	IT	IT
4	David	Bob	Finance	Finance
5	Eve	Charlie	IT	IT
6	Frank	Alice	HR	HR

Figure ٢ Output of the Select Query

5. Learning Outcome:

a. I learnt howtolink and add constraints like primary key after the table creation.

b. I learnt aboutdifferent types of joints.

c. I learnt how to use LEFT OUTER JOIN to retrieve combined data from related tables.

HARD - LEVEL

1. ProblemTitle:FinancialForecastMatchingwithFallback Strategy
2. ProblemDescription:YouareaDataEngineeratFinSight Corp, a company that modelsNetPresentValue(NPV)projectionsforinvestment decisions. Your systemmaintainstwokeydatasets:
   Year_tbl:ActualrecordedNPV'sofvariousfinancialinstruments over different years:
   ID: Unique Financial instrument identifier.
   YEAR:Yearofrecord
   NPV:NetPresentValueinthatyear
   Queries_tbl:Alistofinstrument-yearpairsforwhichstakeholders are requesting NPV values:
   ID:Financialinstrumentidentifier
   YEAR: Year of interest.
   Find theNPVofeachqueryfromtheQueriestable.Return the output order by ID andYearinthesortedform.However,notallID-YEAR combinations in the QueriestablearepresentintheYear_tbl.IfanNPVismissing for a requested combination,assumeittobe0tomaintainaconsistentfinancial report.
3. SQL Commands:
   a. Createthetables.

```
CREATETABLE Year_tbl (
    IDINT,
    YEARINT,
    NPV INT
);

-- Create Queries table (requested values)
CREATE TABLE Queries (
    ID INT,
    YEAR INT
);
```

   b. Insertthe values.

```
INSERT INTO Year_tbl (ID, YEAR, NPV) VALUES
(1, 2018, 100), (7, 2020, 30),
(13, 2019, 40),
(1, 2019, 113),
(2, 2008, 121),
(3, 2009, 12),
```

```
    (11, 2020, 99
    (7, 2019, 0);
                )

INSERT INTO Queries (ID, YEAR) VALUES
(1, 2019),
(2, 2008),
(3, 2009),
(7, 2018),
(7, 2019),


(7, 2020),
(13, 2019);
```

c. Useasubquerytocountthenumberofcoursesundereachdepartment.

```
select q.id, q.year, Isnull(y.NPV, 0) [NPV]
from Queries as q
left outer join Year_tbl as y on q.id = y.id and q.YEAR = y.YEAR
    order by q.id;
```

4. Output:

	Name	Owner	Type	Created_datetime
1	Year_tbl	dbo	user table	2025-07-30 10:28:07.473

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	ID	int	no	4	10	0	yes	(n/a)	(n/a)	NULL
2	YEAR	int	no	4	10	0	yes	(n/a)	(n/a)	NULL
3	NPV	int	no	4	10	0	yes	(n/a)	(n/a)	NULL

Figure ١ Year_tbl description

	Name	Owner	Type	Created_datetime
1	Queries	dbo	user table	2025-07-30 10:28:12.023

	Column_name	Type	Computed	Length	Prec	Scale	Nullable	TrimTrailingBlanks	FixedLenNullInSource	Collation
1	ID	int	no	4	10	0	yes	(n/a)	(n/a)	NULL
2	YEAR	int	no	4	10	0	yes	(n/a)	(n/a)	NULL

Figure ٢ Queries table description

	id	year	NPV
1	1	2019	113
2	2	2008	121
3	3	2009	12
4	7	2018	0
5	7	2019	0
6	7	2020	30
7	13	2019	40

Figure 3 Select Query

5. Learning Outcomes:

a. I learned howtoperform left join and understand the table.
b. I learned someofthe build functions of the Microsoft SQL server.
c. I learned aboutaliases in the SQL queries.