



Al Imam Mohammad Ibn Saud Islamic University
College of Computer and Information Sciences
Computer Science Department

Course Title:	Introduction to Databases
Course Code:	CS 370
Project:	Group-based Project
Semester:	2023-1 st semester
Marks:	15
Section No:	172 - 173

Student Name:	Student ID:
FAISAL ALAMMAR	442016051
Yazeed Abdullah Bin Shihah	441022937
Abdulelah Abdullah Bin Obaid	442018709

Instructor: Dr. Qaisar Abbas.



```
CREATE TABLE "IUSER"
(
    "USER_ID" NUMBER(20,0) GENERATED BY DEFAULT ON NULL AS
IDENTITY MINVALUE 1 MAXVALUE 99999999999999999999999999 INCREMENT BY 1
START WITH 1 CACHE 20 NOORDER NOCYCLE NOKEEP NOSCALE NOT NULL
ENABLE,
    "ROLE" VARCHAR2(50),
    "PASSWORD" NUMBER NOT NULL ENABLE,
    "USERNAME" VARCHAR2(50) NOT NULL ENABLE,
    CONSTRAINT "IUSER_PK" PRIMARY KEY ("USER_ID")
USING INDEX ENABLE
);
```

```
CREATE TABLE "PLANTS"
(
    "PLANT_ID" NUMBER(20,0) GENERATED BY DEFAULT ON NULL AS
IDENTITY MINVALUE 1 MAXVALUE 99999999999999999999999999 INCREMENT BY 1
START WITH 1 CACHE 20 NOORDER NOCYCLE NOKEEP NOSCALE NOT NULL
ENABLE,
    "PLANT_NAME" VARCHAR2(20),
    "IDEAL_MOISTURE" VARCHAR2(20),
    "IDEAL_TEMP" NUMBER,
    "IDEAL_LIGHT" NUMBER,
    "GROWTH_STAGE" VARCHAR2(20),
    CONSTRAINT "PLANTS_PK" PRIMARY KEY ("PLANT_ID")
USING INDEX ENABLE
);
```

```
CREATE TABLE "SENSOR"  
(  
    "SENSOR_ID" NUMBER GENERATED BY DEFAULT ON NULL AS IDENTITY  
MINVALUE 1 MAXVALUE 99999999999999999999 INCREMENT BY 1 START  
WITH 1 CACHE 20 NOORDER NOCYCLE NOKEEP NOSCALE NOT NULL ENABLE,  
    "LOCATION" VARCHAR2(20 CHAR),  
    "SLEEP_MODE" NUMBER,  
    "FUNCTIONAL_CATEGORY" VARCHAR2(20 CHAR),  
    "USER_ID" NUMBER,  
    CONSTRAINT "SENSOR_PK" PRIMARY KEY ("SENSOR_ID")  
USING INDEX ENABLE  
);
```

```
ALTER TABLE "SENSOR" ADD CONSTRAINT "SENSOR_CON" FOREIGN KEY
("USER ID")
```

REFERENCES "IUSER" ("USER_ID") ON DELETE SET NULL ENABLE;

```
CREATE TABLE "SENSOR DATA"
```

("S ID" NUMBER,



```
ALTER TABLE "SENSOR_DATA" ADD CONSTRAINT "SENSOR_DATA_CON"
FOREIGN KEY ("S_ID")
REFERENCES "SENSOR" ("SENSOR ID") ON DELETE SET NULL ENABLE;
```

```
ALTER TABLE "MONITOR" ADD CONSTRAINT "MONITOR_CON" FOREIGN KEY
("P_ID")
REFERENCES "PLANTS" ("PLANT_ID") ON DELETE SET NULL ENABLE;
```

```
CREATE TABLE "SENSOR_DATA"
(
    "SEN_ID" NUMBER,
    "D_ID" NUMBER,
    "TIMESTAMPDATA" DATE,
    "SENSORVALUE" NUMBER,
    CONSTRAINT "SENSOR_DATA_PK" PRIMARY KEY ("SEN_ID", "D_ID")
    USING INDEX ENABLE
);
```

```
ALTER TABLE "SENSOR_DATA" ADD CONSTRAINT "SENSOR_DATA_CON"
FOREIGN KEY ("SEN_ID")
REFERENCES "SENSOR" ("SENSOR ID") ON DELETE SET NULL ENABLE;
```



```
CREATE TABLE "HAS"
(
    "INVEN_ID" NUMBER,
    "US_ID" NUMBER,
    CONSTRAINT "HAS_PK" PRIMARY KEY ("INVEN_ID", "US_ID")
    USING INDEX ENABLE
);

ALTER TABLE "HAS" ADD CONSTRAINT "HAS_CON" FOREIGN KEY
("INVEN_ID")
REFERENCES "INVENTORY_ID" ("INVENTORY_ID") ON DELETE
CASCADE ENABLE;
ALTER TABLE "HAS" ADD CONSTRAINT "HAS_CON1" FOREIGN KEY ("US_ID")
REFERENCES "IUSER" ("USER_ID") ON DELETE SET NULL ENABLE;
```

- Database State:

```
INSERT INTO IUSER (USER_ID, ROLE, PASSWORD, USERNAME)
VALUES
(1, 'supervisor', '1234567', 'Faisal'),
(2, 'Farmer', '1234567', 'Ahmed'),
(4, 'Farmer', '1234567', 'Khaled'),
(5, 'Farmer', '1234567', 'Yazeed'),
(3, '-', '1234567', 'Ali');
```

```
INSERT INTO plants (PLANT_ID, PLANT_NAME, IDEAL_MOISTURE, IDEAL_TEMP,
IDEAL_LIGHT, GROWTH_STAGE)
VALUES
(2, 'Basil', 10, 26, 10, 'Seeding'),
(4, 'Fern', 10, 24, 3, 'Adult'),
(5, 'Sunflower', 1, 26, 3, 'Seeding'),
(1, 'Rose', 7, 23, 10, 'Seeding'),
(3, 'Orchid', 10, 23, 7, 'Mature');
```

```
INSERT INTO inventory (INVENTORY_ID, TOOLS, QUANTITY,
LASTRESTOCKEDDATA, INVENTORY_NAME)
VALUES
(1, 'Shovels', 10, '2023-10-21', 'One'),
(4, 'Wheelbarrows', 5, '2023-10-05', 'Three'),
(3, 'Rakes', 20, '2023-09-30', 'Two'),
(2, 'Hoes', 15, '2023-10-01', 'One'),
(5, 'Pruners', 12, '2023-05-10', 'Four');
```



```
INSERT INTO sensors (SENSOR_ID, LOCATION, SLEEP_MODE,  
FUNCTIONAL_CATAGORY, USER_ID)
```

```
VALUES
```

```
(1, 'West', 1, 'Soil', 2),  
(5, 'East', 0, 'Temperature', 5),  
(2, 'South', 1, 'Temperature', 2),  
(3, 'South', 0, 'Light', 2),  
(4, 'North', 0, 'pH', 3);
```

```
-- Assuming "sensor data" is the name of your table
```

```
INSERT INTO sensor data (SEN_ID, D_ID, TIMESTAMPDATA, SENSORVALUE)
```

```
VALUES
```

```
(3, 3, '2023-10-21', 19),  
(1, 1, '2023-10-26', 25),  
(2, 2, '2023-10-22', 27),  
(4, 4, '2023-10-15', 16);
```

- Table ScreenShot:

IUSER				
Columns Data Indexes Constraints Grants Statistics Triggers Dependencies DDL Sample Queries				
+ Insert Row Columns... Filter... Count Rows Load Data Download Refresh				
	USER_ID	ROLE	PASSWORD	USERNAME
	1	supervisor	1234567	Faisal
	2	Farmer	1234567	Ahmed
	4	Farmer	1234567	Khaled
	5	Farmer	1234567	Yazeed
	3		1234567	Ali

IUSER TABLE



INVENTORY_ID

Columns

Data

Indexes

Constraints

Grants

Statistics

Triggers

Dependencies

DDL

Sample Queries

+ Insert Row

Columns...

Filter...

Count Rows

Load Data

Download

Refresh

	INVENTORY_ID	TOOLS	QUANTITY	LASTRESOTKEDDATA	INVENTORY_NAME
<div></div>	1	Shovels	10	10/21/2023	One
<div></div>	4	Wheelbarrows	5	10/05/2023	Three
<div></div>	3	Rakes	20	09/30/2023	Two
<div></div>	2	Hoes	15	10/01/2023	One
<div></div>	5	Pruners	12	05/10/2023	Four

Inventory Table

PLANTS

Columns

Data

Indexes

Constraints

Grants

Statistics

Triggers

Dependencies

DDL

Sample Queries

+ Insert Row

Columns...

Filter...

Count Rows

Load Data

Download

Refresh

	PLANT_ID	PLANT_NAME	IDEAL_MOISTURE	IDEAL_TEMP	IDEAL_LIGHT	GROWTH_STAGE
<div></div>	2	Basil	10	26	10	Seeding
<div></div>	4	Fern	10	24	3	Adult
<div></div>	5	Sunflower	1	26	3	Seeding
<div></div>	1	Rose	7	23	10	Seeding
<div></div>	3	Orchid	10	23	7	Mature

PLANTS Table

SENSOR

Columns

Data

Indexes

Constraints

Grants

Statistics

Triggers

Dependencies

DDL

Sample Queries

+ Insert Row

Columns...

Filter...

Count Rows

Load Data

Download

Refresh

	SENSOR_ID	LOCATION	SLEEP_MODE	FUNCIONAL_CATAGORY	USER_ID
<div></div>	1	West	1	Soil	2
<div></div>	5	East	0	Temperature	5
<div></div>	2	South	1	Temperature	2
<div></div>	3	South	0	Light	2
<div></div>	4	North	0	pH	3

Sensor Table



SENSOR_DATA					
Columns Data Indexes Constraints Grants Statistics Triggers Dependencies DDL Sample Queries					
+ Insert Row Columns... Filter... Count Rows Load Data Download Refresh					
	SEN_ID	D_ID	TIMESTAMPDATA	SENSORVALUE	
	3	3	10/21/2023	19	
	1	1	10/26/2023	25	
	2	2	10/22/2023	27	
	4	4	10/15/2023	16	

Sensor_Data Table

- Query Implementation:

Views list:

- 1- **NonSupervisorUsersView:** This view lists the usernames of users who are not supervisors (excluding users with the 'supervisor' role).

```
CREATE VIEW NonSupervisorUsersView AS
SELECT "USERNAME"
FROM "IUSER"
WHERE "ROLE" <> 'supervisor';
```

- 2- This view displays plants with their ideal temperature and light conditions.

```
CREATE VIEW PlantIdealConditionsView AS
SELECT PLANT_NAME, IDEAL_TEMP, IDEAL_LIGHT
FROM PLANTS;
```

- 3- This view lists inventory items that have not been restocked.

```
CREATE VIEW InventoryRestockStatusView AS
SELECT INVENTORY_NAME, LASTRESOTKEDDATA
FROM INVENTORY_ID
WHERE LASTRESOTKEDDATA IS NULL;
```



4- This view lists all active sensors (those with SLEEP_MODE = 0).

```
CREATE VIEW ActiveSensorsView AS
SELECT SENSOR_ID, LOCATION, FUNCATIONAL_CATAGORY
FROM SENSOR
WHERE SLEEP_MODE = 0;
```

Queries list:

1- Retrieve the users who have added sensors and the number of sensors they added

```
SELECT U.USERNAME, COUNT(S.SENSOR_ID) AS NUM_SENSORS
FROM IUSER U
LEFT JOIN SENSOR S ON U.USER_ID = S.USER_ID
GROUP BY U.USERNAME;
```

2- Find the plants that require an ideal temperature of 25 or higher:

```
SELECT "PLANT_NAME", "IDEAL_TEMP"
FROM "PLANTS"
WHERE "IDEAL_TEMP" >= 25;
```

3- Find the total quantity of each tool in the inventory:

```
SELECT "TOOLS", SUM("QUANTITY") AS "TOTAL_QUANTITY"
FROM "INVENTORY_ID"
GROUP BY "TOOLS";
```

4- Retrieve the user information for a specific user by their username (e.g., 'Ahmed'):

```
SELECT * FROM "IUSER" WHERE "USERNAME" = 'Ahmed';
```

5- Find the plants that are not in the 'Mature' growth stage:

```
SELECT "PLANT_NAME", "GROWTH_STAGE"
FROM "PLANTS"
```




WHERE "GROWTH_STAGE" <> 'Mature';

6- Find the plants with an ideal light level less than 5:

```
SELECT "PLANT_NAME", "IDEAL_LIGHT"
```

```
FROM "PLANTS"
```

```
WHERE "IDEAL_LIGHT" < 5;
```

7- Calculate the average ideal temperature for all plants:

```
SELECT  
    AVG("IDEAL_TEMP") AS "AverageIdealTemperature"
```

8- Find the plants with an ideal moisture level greater than 5 and an ideal temperature between 20 and 30:

```
SELECT "PLANT_NAME", "IDEAL_MOISTURE", "IDEAL_TEMP"
```

```
FROM "PLANTS"
```

```
WHERE "IDEAL_MOISTURE" > 5 AND "IDEAL_TEMP" BETWEEN 20 AND  
30;
```

9- Calculate the total quantity of items in inventory:

```
SELECT SUM("QUANTITY") AS "TotalQuantity"
```

```
FROM "INVENTORY_ID";
```

10- List the usernames of users who are not supervisors (excluding users with 'supervisor' role):

```
SELECT "USERNAME"
```

```
FROM "IUSER"
```

```
WHERE "ROLE" <> 'supervisor';
```



Result:

Views:

- Result from View number 1

SENSOR_ID	LOCATION	FUNCTIONAL_CATEGORY
1	West	Soil
5	East	Temperature
2	South	Temperature
3	South	Light
4	North	pH

- Result from View number 2

PLANT_NAME	IDEAL_TEMP	IDEAL_LIGHT
Basil	26	10
Fern	24	3
Sunflower	26	3
Rose	23	10
Orchid	23	7

Query:

- Result from query number 2

PLANT_NAME	IDEAL_TEMP
Basil	26
Sunflower	26

- Result from query number 3

TOOLS	TOTAL_QUANTITY
Shovels	10
Hoes	15
Pruners	12
Rakes	20
Wheelbarrows	5

- Result from query number 4

USER_ID	ROLE	PASSWORD	USERNAME
2	Farmer	1234567	Ahmed

- Result from query number 5

PLANT_NAME	GROWTH_STAGE
Basil	Seeding
Fern	Adult
Sunflower	Seeding
Rose	Seeding



- Result from query number 6

PLANT_NAME	IDEAL_LIGHT
Fern	3
Sunflower	3

- Result from query number 9

TotalQuantity
62

- Result from query number 10

USERNAME
Faisal
Ahmed
Khaled
Yazeed
Ali

- Result from query number 1

USERNAME	NUM_SENSORS
Yazeed	1
Ahmed	3
Khaled	0
Ali	1
Faisal	0