

1.1. Create a table `soil_sensors` if it does not exist with the following columns:

- `sensor_id` (INT, Primary Key)
- `moisture_level` (INT)
- `recorded_time` (DATETIME)

```
9 • CREATE TABLE IF NOT EXISTS soil_sensors (  
10     sensor_id INT NOT NULL,  
11     moisture_level INT,  
12     recorded_time DATETIME,  
13     PRIMARY KEY (sensor_id)  
14 );  
15  
16 • INSERT INTO soil_sensors (sensor_id, moisture_level, recorded_time) VALUES  
17     (1, 30, '2026-1-1'),  
18     (2, 55, '2026-1-2'),  
19     (3, 20, '2026-1-3'),  
20     (4, 75, '2026-1-4'),  
21     (5, 40, '2026-1-5');
```

	sensor_id	moisture_level	recorded_time
▶	1	30	2026-01-01 00:00:00
	2	55	2026-01-02 00:00:00
	3	20	2026-01-03 00:00:00
	4	75	2026-01-04 00:00:00
	5	40	2026-01-05 00:00:00

soil_sensors 1 ×

1.2. Then Create a stored procedure `GetDryFields` that:

- Accepts a moisture threshold as an input parameter
- Displays all sensor records where `moisture_level` is below the given threshold.

```

24 -- 1.2. Then Create a stored procedure GetDryFields that:
25 -- • Accepts a moisture threshold as an input parameter
26 -- • Displays all sensor records where moisture_level is |
27 -- DROP PROCEDURE GetDryFields;
28 DELIMITER $$
29 • CREATE PROCEDURE GetDryFields(IN moisture_threshold INT)
30 BEGIN
31     SELECT sensor_id, moisture_level, recorded_time
32     FROM soil_sensors
33     WHERE moisture_level < moisture_threshold;
34 END$$
35 DELIMITER ;
36
37 • CALL GetDryFields(50);

```

37 • `CALL GetDryFields(50);`

Result Grid | Filter Rows: | Export

	sensor_id	moisture_level	recorded_time
▶	1	30	2026-01-01 00:00:00
	3	20	2026-01-03 00:00:00
	5	40	2026-01-05 00:00:00

38 • `CALL GetDryFields(70);`

Result Grid | Filter Rows: | Exp

	sensor_id	moisture_level	recorded_time
▶	1	30	2026-01-01 00:00:00
	2	55	2026-01-02 00:00:00
	3	20	2026-01-03 00:00:00
	5	40	2026-01-05 00:00:00

Result 3 ×

2.1. Create a table fields if it does not exist with the following columns:

- field_id (INT, Primary Key)
- area_sq_meters (INT)
- crop_type (VARCHAR(50))

```

45 • CREATE TABLE IF NOT EXISTS fields (
46     field_id INT NOT NULL,
47     area_sq_meters INT,
48     crop_type VARCHAR(50),
49     PRIMARY KEY (field_id)
50 );
51
52 • INSERT INTO fields (field_id, area_sq_meters, crop_type) VALUES
53     (1, 100, 'Rice'),
54     (2, 200, 'Corn'),
55     (3, 300, 'Lettuce'),
56     (4, 400, 'Wheat'),
57     (5, 500, 'Eggplant');
58 • select * from fields;

```

	field_id	area_sq_meters	crop_type
▶	1	100	Rice
	2	200	Corn
	3	300	Lettuce
	4	400	Wheat
	5	500	Lettuce

fields 4 x

2.2. Create a stored function CalculateWaterRequirement that:

- Accepts area_sq_meters as input
- Returns the total water required per irrigation cycle
- Assume 5 liters of water per square meter

```

58 • select * from fields;
59 -- 2.2. Create a stored function CalculateWaterRequirement that:
60 -- • Accepts area_sq_meters as input
61 -- • Returns the total water required per irrigation cycle
62 -- • Assume 5 liters of water per square meter
63 DELIMITER $$
64 • CREATE FUNCTION CalculateWaterRequirement(area_sq_meters INT)
65 RETURNS INT DETERMINISTIC
66 BEGIN
67     DECLARE total_water INT;
68     SET total_water = area_sq_meters * 5;
69     return total_water;
70 END$$
71 DELIMITER ;
72
73 • SELECT CalculateWaterRequirement(1000) AS water_required;
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```

76  -- calculate water for each field
77  • SELECT field_id, area_sq_meters,
78      CalculateWaterRequirement(area_sq_meters) AS water_for_fields
79  FROM fields;

```

Result Grid			
	field_id	area_sq_meters	water_for_fields
▶	1	100	500
	2	200	1000
	3	300	1500
	4	400	2000
	5	500	2500

3.1. Create a table irrigation_logs if it does not exist with the following columns:

- log_id (INT, Primary Key)
- field_id (INT)
- water_used_liters (DECIMAL(10,2))
- irrigation_date (DATE)

```

87  • CREATE TABLE IF NOT EXISTS irrigation_logs (
88      log_id INT NOT NULL,
89      field_id INT,
90      water_used_liters DECIMAL(10,2),
91      irrigation_date DATE,
92      PRIMARY KEY (log_id)
93  );
94
95  • INSERT INTO irrigation_logs (log_id, field_id, water_used_liters, irrigation_date) VALUES
96      (1, 1, 100, '2026-01-01'),
97      (2, 2, 200, '2026-01-01'),
98      (3, 3, 300, '2026-01-02'),
99      (4, 4, 400, '2026-01-02'),
100     (5, 1, 500, '2026-01-03'),
101     (6, 5, 600, '2026-01-04');
102  • select * from irrigation_logs;

```

```

101      (0, 0, 000, 2020-01-04 );
102 • select * from irrigation_logs;

```

Result Grid Filter Rows: <input type="text"/> E				
	log_id	field_id	water_used_liters	irrigation_date
▶	1	1	100.00	2026-01-01
	2	2	200.00	2026-01-01
	3	3	300.00	2026-01-02
	4	4	400.00	2026-01-02
	5	1	500.00	2026-01-03

3.2. Create a stored procedure GetTotalWaterUsage that:

- Accepts a date as an input parameter
- Returns the total water used on that date using an OUT parameter.

```

108 DELIMITER $$
109 • CREATE PROCEDURE GetTotalWaterUsage(IN p_irrigation_date DATE, OUT total_water_used DECIMAL(10,2)
110 )
111 • BEGIN
112     SELECT IFNULL(SUM(water_used_liters), 0)
113     INTO total_water_used
114     FROM irrigation_logs
115     WHERE irrigation_date = p_irrigation_date;
116 END$$
117 DELIMITER ;
118
119 • CALL GetTotalWaterUsage('2026-01-01', @total);
120 • SELECT @total AS total_water_used_liters;
121

```

```

119 • CALL GetTotalWaterUsage('2026-01-01', @total);
120 • SELECT @total AS total_water_used_liters;

```

Result Grid Filter Rows: <input type="text"/> Export: Wrap	
	total_water_used_liters
▶	300.00

```

122 • CALL GetTotalWaterUsage('2026-01-02', @total);
123 • SELECT @total AS total_water_used_liters;

```

Result Grid Filter Rows: <input type="text"/> Export: Wrap	
	total_water_used_liters
▶	700.00

4.1. Create a table field_status if it does not exist with the following columns:

- field_id (INT, Primary Key)
- moisture_level (INT)

```
128 -- drop table field_status;
129 • CREATE TABLE IF NOT EXISTS field_status (
130     field_id INT NOT NULL,
131     moisture_level INT,
132     PRIMARY KEY (field_id)
133 );
134
135 • INSERT INTO field_status (field_id, moisture_level) VALUES
136     (1, 45),
137     (2, 25),
138     (3, 60),
139     (4, 15),
140     (5, 30),
141     (6, 10);
142 • select * from field_status;
```

	field_id	moisture_level
▶	1	45
	2	25
	3	60
	4	15
	5	30

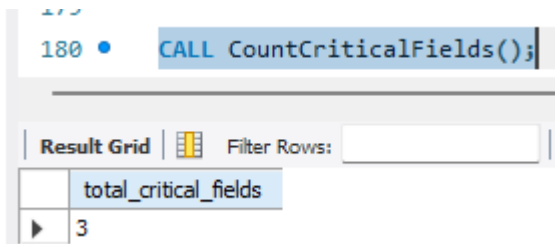
4.2. Create a stored procedure CountCriticalFields that:

- Uses a cursor
- Iterates through all records
- Counts how many fields have a moisture level below 30
- Displays the total count

```

148      -- • Displays the total count
149      DELIMITER $$
150 • CREATE PROCEDURE CountCriticalFields()
151 BEGIN
152     DECLARE done INT DEFAULT 0;
153     DECLARE v_moisture INT;
154     DECLARE critical_count INT DEFAULT 0;
155     -- Cursor declaration
156     DECLARE field_cursor CURSOR FOR
157         SELECT moisture_level FROM field_status;
158     -- Handle cursor end
159     DECLARE CONTINUE HANDLER FOR NOT FOUND SET done = 1;
160     OPEN field_cursor;
161     count_loop: LOOP
162         FETCH field_cursor INTO v_moisture;
163
164         IF done = 1 THEN
165             LEAVE count_loop;
166
167         IF v_moisture < 30 THEN
168             SET critical_count = critical_count + 1;
169         END IF;
170     END LOOP;
171     CLOSE field_cursor;
172
173     -- Display total count
174     SELECT critical_count AS total_critical_fields;
175 END$$
176 DELIMITER ;
177
178 • CALL CountCriticalFields();
179
180

```



5.1. Create a table `irrigation_schedule` if it does not exist with the following columns:

- `schedule_id` (INT, Primary Key)
- `field_id` (INT)
- `irrigation_duration` (INT) (in minutes)

```

187 • CREATE TABLE IF NOT EXISTS irrigation_schedule (
188     schedule_id INT NOT NULL,
189     field_id INT,
190     irrigation_duration INT,
191     PRIMARY KEY (schedule_id)
192 );
193
194 • INSERT INTO irrigation_schedule (schedule_id, field_id, irrigation_duration) VALUES
195     (1, 1, 30),
196     (2, 2, 40),
197     (3, 3, 50),
198     (4, 4, 60),
199     (5, 5, 70);
200 • select * from irrigation_schedule;

```

	schedule_id	field_id	irrigation_duration
▶	1	1	30
	2	2	40
	3	3	50
	4	4	60
	5	5	70

5.2. Create a stored procedure `AdjustIrrigationDuration` that:



- Uses a cursor
- Increases irrigation duration by 20%
- Updates each row individually

```



205     -- • Updates each row individually
206     DELIMITER $$
207 •   CREATE PROCEDURE AdjustIrrigationDuration()
208     BEGIN
209         DECLARE done INT DEFAULT 0;
210         DECLARE v_schedule_id INT;
211         DECLARE v_duration INT;
212
213         -- Declare cursor
214         DECLARE schedule_cursor CURSOR FOR
215             SELECT schedule_id, irrigation_duration
216             FROM irrigation_schedule;
217
218         -- handle cursor end
219         DECLARE CONTINUE HANDLER FOR NOT FOUND SET done = 1;
220         OPEN schedule_cursor;
221     duration_loop: LOOP
222         FETCH schedule_cursor INTO v_schedule_id, v_duration;
223
224         IF done = 1 THEN
225             LEAVE duration_loop;
226         END IF;
227
228         -- Duration increase 20%
229         UPDATE irrigation_schedule
230             SET irrigation_duration = irrigation_duration * 1.20
231             WHERE schedule_id = v_schedule_id;
232     END LOOP;
233     CLOSE schedule_cursor;
234 END$$
235 DELIMITER ;
236
237 •   CALL AdjustIrrigationDuration();
238 •   SELECT * FROM irrigation_schedule;
239

```

```
237 • CALL AdjustIrrigationDuration();
238 • SELECT * FROM irrigation_schedule;
239
```



Result Grid   Filter Rows: <input type="text"/> Edit			
	schedule_id	field_id	irrigation_duration
▶	1	1	36
	2	2	48
	3	3	60
	4	4	72
	5	5	84

```
237 • CALL AdjustIrrigationDuration();
238 • SELECT * FROM irrigation_schedule;
```

Result Grid   Filter Rows: <input type="text"/> Edit			
	schedule_id	field_id	irrigation_duration
▶	1	1	43
	2	2	58
	3	3	72
	4	4	86
	5	5	101

irrigation_schedule 17 ×
236

```
237 • CALL AdjustIrrigationDuration();
238 • SELECT * FROM irrigation_schedule;
```

Result Grid   Filter Rows: <input type="text"/> Edit:			
	schedule_id	field_id	irrigation_duration
▶	1	1	52
	2	2	70
	3	3	86
	4	4	103
	5	5	121

irrigation_schedule 18 ×