1. **Find most common crops grown in a district**

```
SELECT crop_id
FROM Produces
WHERE district_no = '01' and state_no='01'
GROUP BY crop_id
HAVING COUNT(DISTINCT village_no) = (
    SELECT MAX(village_count)
    FROM (
        SELECT crop_id, COUNT(DISTINCT village_no) AS village_count
        FROM Produces
        WHERE district_no = '01' and state_no='01'
        GROUP BY crop_id
    ) AS VillageCounts
);
```

	crop_id text
1	Barley
2	Potato
3	Rice
4	Soybean

2. Details of all people related to farming in a village

```
SELECT b.buyer_name AS person_name, b.buyer_contact_no AS contact_no,
'Buyer' AS role
FROM Buyer AS b
JOIN Village AS v
ON (b.village_no = v.village_no
AND b.district_no = v.district_no
AND b.state_no = v.state_no)
WHERE v.village_name = 'Kakori'

UNION

SELECT l.landlord_name AS person_name, l.landlord_contact_no AS contact_no,
'Landlord' AS role
FROM Landlord AS l
JOIN Village AS v
ON (l.village_no = v.village_no
AND l.district_no = v.district_no
```

```
AND l.state_no = v.state_no)
WHERE v.village_name = 'Kakori'

UNION

SELECT lb.labour_name AS person_name, lb.contact_no AS contact_no, 'Labour'
AS role
FROM Labour AS lb
JOIN Village AS v
ON (lb.work_in_village = v.village_no
AND lb.work_in_district = v.district_no
AND lb.work_in_state = v.state_no)
WHERE v.village_name = 'Kakori'
```

	person_name text	contact_no numeric (10)	role text
1	Gursharan Singh	9876543335	Landlord
2	Kumar Sinha	1000000029	Labour
3	Kamal Singh	1000000026	Labour
4	Kavish Agarwal	1000000058	Labour
5	Kanishk Goel	1000000059	Labour
6	Kalpesh Mehta	1000000030	Labour
7	Ankit Verma	9876500001	Buyer
8	Kriti Rani	1000000039	Labour

3.Target production of all the crops grown in a district

```
SELECT c.crop_name, SUM(t.quantity) AS total_target_quantity
FROM TARGET AS t
JOIN CROP AS c ON (t.crop_id = c.crop_name)
JOIN DISTRICT AS d ON (t.district_no = d.district_no
        AND t.state_no = d.state_no)
WHERE d.district_name = 'Lucknow'
GROUP BY c.crop_name;
```

	crop_name [PK] text	total_target_quantity bigint
1	Barley	750
2	Cotton	445
3	Maize	640
4	Potato	750
5	Rice	800
6	Soybean	380
7	Sugarcane	550
8	Wheat	250

4. Target production of all crops grown across all the districts of a state

```
SELECT c.crop_name, d.district_name, SUM(t.quantity) AS total_target_quantity
FROM TARGET AS t
JOIN CROP AS c ON (t.crop_id = c.crop_name)
JOIN DISTRICT AS d ON (t.district_no = d.district_no
        AND t.state_no = d.state_no)
JOIN STATE_ AS s ON d.state_no = s.state_no
WHERE s.state_name = 'Gujarat'
GROUP BY c.crop_name, d.district_name
```

	crop_name text	district_name text	total_target_quantity bigint
1	Barley	Ahmedabad	450
2	Barley	Rajkot	450
3	Barley	Surat	599
4	Barley	Vadodara	350
5	Cotton	Ahmedabad	560
6	Cotton	Rajkot	490
7	Cotton	Surat	520
8	Cotton	Vadodara	415

5. Find the total number of tenants and landlords in each village

```
SELECT
   V.village_name,
   D.district_name,
   S.state_name,
   (SELECT COUNT(*) FROM Tenant T WHERE T.village_no = V.village_no and
T.district_no=V.district_no and T.state_no=V.state_no) AS tenant_count,
   (SELECT COUNT(*) FROM Landlord L WHERE L.village_no = V.village_no and
L.district_no=V.district_no and L.state_no=V.state_no) AS landlord_count
FROM
   Village V
JOIN
   District D ON (V.district_no = D.district_no AND V.state_no = D.state_no)
JOIN
   State_ S ON (V.state_no = S.state_no);
```

	village_name text	district_name text	state_name text	tenant_count bigint	landlord_count bigint
1	Kakori	Lucknow	Uttar Pradesh	1	7
2	Mohanlalganj	Lucknow	Uttar Pradesh	1	9
3	Malihabad	Lucknow	Uttar Pradesh	1	7
4	Gosainganj	Lucknow	Uttar Pradesh	1	9
5	Patti	Lucknow	Uttar Pradesh	1	4
6	Bithoor	Kanpur	Uttar Pradesh	1	6
7	Mandhana	Kanpur	Uttar Pradesh	1	5
8	Choubepur	Kanpur	Uttar Pradesh	1	4

6. There is a need for laborers in the village ‘Kakori’. Find laborers who are not hired and can grow crops that are grown in the village ‘Kakori’. Also, laborers should not be from the village ‘Kakori’.

```
SELECT DISTINCT l.labour_name, l.contact_no
FROM Labour AS l
JOIN Can_grow AS cg ON l.contact_no = cg.labour_id
JOIN Produces AS p ON p.crop_id = cg.crop_id
JOIN Village AS v ON (p.village_no = v.village_no
                  AND p.district_no = v.district_no
                  AND p.state_no = v.state_no)
WHERE v.village_name = 'Kakori'
AND l.contact_no NOT IN (
   SELECT lh.labour
   FROM Landlord_hires_labour AS lh
   UNION
   SELECT th.labour
   FROM Tenant_hires_labour AS th
)
EXCEPT
SELECT l.labour_name, l.contact_no
FROM Labour AS l
```

```
JOIN Village AS v2 ON (l.work_in_village = v2.village_no
                    AND l.work_in_district = v2.district_no
                    AND l.work_in_state = v2.state_no)
WHERE v2.village_name = 'Kakori';
```

	labour_name text	contact_no numeric (10)
1	Sumit Joshi	4343434343
2	Anjali Sharma	4242424242
3	Neelam Joshi	3030303031
4	Suman Singh	1313131313
5	Bharat Singh	8080808080
6	Komal Verma	4040404040
7	Dinesh Patil	3939393939
8	Alok Kumar	3535353535

7. Find laborers who can handle machinery and can work for 28 hours per week in the village ‘Kakori’

```
SELECT
   ftable.labour_name,
   ftable.labour_contact_no
FROM
   (
      SELECT
         rll.labour_name AS labour_name,
         rll.labour_contact_no AS labour_contact_no,
         rll.specification AS specification,
         rll.work_hours_under_landlord AS work_hours_under_landlord,
         SUM(COALESCE(THL.work_hour_per_week, 0)) AS
work_hours_under_tenant,
         rll.working_hours AS working_hours
      FROM
         (
            SELECT
               L.labour_name AS labour_name,
```

```
            L.contact_no AS labour_contact_no,
            LS.specification AS specification,
            SUM(COALESCE(LHL.work_hour_per_week, 0)) AS
work_hours_under_landlord,
            L.working_hours AS working_hours
        FROM
            Labour AS L
        JOIN
            Labour_Specification AS LS ON L.contact_no = LS.Labour_id
        JOIN
            Village AS V ON (L.work_in_village = V.village_no
                    AND L.work_in_district = V.district_no
                    AND L.work_in_state = V.state_no)
        LEFT JOIN
            Landlord_hires_labour AS LHL ON L.contact_no = LHL.labour
        WHERE
            V.village_name = 'Kakori'
            AND LS.specification = 'machine manage'
        GROUP BY
            L.labour_name, L.contact_no, LS.specification, L.working_hours
    ) AS rll
    LEFT JOIN
        Tenant_hires_labour AS THL ON rll.labour_contact_no = THL.labour
    GROUP BY
        rll.labour_name,
        rll.labour_contact_no,
        rll.specification,
        rll.work_hours_under_landlord,
        rll.working_hours
) AS ftable
WHERE
    working_hours - (work_hours_under_landlord + work_hours_under_tenant) >= 28;
```

	labour_name text	labour_contact_no numeric (10)
1	Kartik Choudhary	3737373737
2	Krishna Yadav	1000000004
3	Mohan Verma	1717171717
4	Kunal Verma	1000000003

8. Let's say a farmer wants to grow 'Cotton' on his land but if the district wise production of 'Rice' has exceeded 70% of its target then list all the crops that can be grown on his land along with its percentage of target achieved district wise in order to avoid overproduction of a particular crop.

```
SELECT DISTINCT
   g.crop_id,
   (dp.quantity * 100.0) / dt.tquantity AS percent_target_reached
FROM
   Land l
JOIN
   Grows_on g ON l.soil_type = g.soil_id
JOIN
   district_production dp ON dp.district_no = l.district_no
                        AND dp.state_no = l.state_no
                         AND dp.crop_id = g.crop_id
JOIN
   (SELECT district_no, state_no, crop_id, SUM(quantity) AS tquantity
    FROM TARGET
    GROUP BY district_no, state_no, crop_id) dt
   on dp.district_no = dt.district_no
   AND dp.state_no = dt.state_no
   AND dp.crop_id = dt.crop_id
WHERE
   l.land_no = '03'
   AND l.village_no = '01'
   AND l.district_no = '01'
   AND l.state_no = '01'
   AND g.crop_id != 'Cotton'
   AND 'Cotton' IN (
               SELECT dp.crop_id
                   FROM District_production AS dp
                   JOIN (
           SELECT district_no, state_no, crop_id, SUM(quantity) AS district_target
                    FROM Target
                     GROUP BY district_no, state_no, crop_id
                     ) AS dt ON dp.district_no = dt.district_no
                                 AND dp.state_no = dt.state_no
                                       AND dp.crop_id = dt.crop_id
                           WHERE (dp.quantity * 100) / dt.district_target >=70
   )
ORDER BY
   percent_target_reached DESC;
```

	crop_id text	percent_target_reached numeric
1	Potato	71.2000000000000000
2	Sugarcane	67.2727272727272727

9. Find the landlord name and contact number who owns land in more than one village.

```
SELECT
   Ld.landlord_name,
   Ld.landlord_contact_no,
   COUNT(DISTINCT L.village_no) AS village_count
FROM
   Landlord AS Ld
JOIN
   Land AS L ON Ld.landlord_contact_no = L.landlord
GROUP BY
   Ld.landlord_name, Ld.landlord_contact_no
HAVING
   COUNT(DISTINCT L.village_no) > 1;
```

	landlord_name text	landlord_contact_no [PK] numeric (10)	village_count bigint
1	Girish Kumar	4321098765	3
2	Geetanjali Verma	5432109876	3
3	Gyanendra Singh	6543210987	3
4	Gaurishankar Patel	7654321098	3
5	Gopika Reddy	8765432101	3
6	Gursharan Singh	9876543335	3
7	Gunjan Sharma	9876543336	3
8	Gaurishankar Patel	9876543337	3

10. Find All Buyers for Land Owned by a Specific Landlord

```
SELECT b.buyer_name, b.buyer_contact_no, v.village_name
FROM Buyer b
JOIN Village v on b.village_no = v.village_no and  b.district_no = v.district_no and
b.state_no=v.state_no
```

```
JOIN Wants w ON b.buyer_contact_no = w.buyer_contact_no
JOIN Land l ON w.land_no = l.land_no AND w.village_no = l.village_no
        AND w.district_no = l.district_no AND w.state_no = l.state_no
WHERE l.landlord = '9876543910';
```

	buyer_name text	buyer_contact_no numeric (10)	village_name text
1	Ramesh Kumar	9876500003	Sabour
2	Neha Sharma	9876500004	Chhoti Sadri
3	Prakash Patel	9876500013	Daudnagar
4	Harish Mehta	9876500015	Bihta
5	Karan Singh	9876500023	Mandhana
6	Ritu Kumari	9876500024	Bilara
7	Priya Kumari	9876500033	Gangapur
8	Vijay Yadav	9876500034	Obra

11. Give the landlord name, number and address of land which satisfies a buyer's requirement.

First you need to register the buyer,

```
SELECT LD.landlord_name, LD.landlord_contact_no, V.village_name
FROM Land AS L
JOIN Wants AS W ON (L.land_no = W.land_no
                AND L.village_no = W.village_no
                AND L.district_no = W.district_no
                AND L.state_no = W.state_no)
JOIN Landlord AS LD ON (LD.landlord_contact_no = L.landlord)
JOIN Village AS V ON (V.village_no = LD.village_no
                  AND V.district_no = LD.district_no
                  AND V.state_no = LD.state_no)
WHERE W.buyer_contact_no = '9876500001';
```

	landlord_name text	landlord_contact_no numeric (10)	village_name text
1	Gaurav Sharma	9876543910	Kakori
2	Gaurav Sharma	9876543910	Kakori
3	Gopika Reddy	8765432101	Mohanlalganj
4	Gopika Reddy	8765432101	Mohanlalganj
5	Gaurishankar Patel	7654321098	Malihabad
6	Gaurishankar Patel	7654321098	Malihabad
7	Gyanendra Singh	6543210987	Gosainganj
8	Gyanendra Singh	6543210987	Gosainganj

12. Top 3 Most Popular Crop Requirements among Buyers across all the districts of the state ‘Uttar Pradesh’.

```
SELECT BC.crops_offered, COUNT(BC.buyer_contact_no) AS total_demand
FROM Buyer_crops AS BC
JOIN Buyer AS B ON BC.buyer_contact_no = B.buyer_contact_no
WHERE B.state_no = '01'
GROUP BY BC.crops_offered
ORDER BY total_demand DESC
LIMIT 3
```

	crops_offered text	total_demand bigint
1	Wheat	4
2	Maize	3
3	Sugarcane	3

;

13. Give contribution of different villages of the districts of ’Uttar Pradesh’ in a production of a crop say , ‘Rice’.

```
SELECT vp.village_no, vp.district_no, vp.state_no, vp.crop_id, v.village_name AS
village,
        (vp.quantity * 100.0 / dt.district_quantity) AS contribution_percentage
   FROM village_production AS vp
   JOIN (
      SELECT quantity AS district_quantity
```

```
    FROM district_production
    WHERE  crop_id = 'Rice'
                AND district_no = '01'
                 AND state_no = '01'
) AS dt ON vp.district_no = '01'
        AND vp.state_no = '01'
        AND vp.crop_id = 'Rice'
JOIN Village AS v ON v.village_no = vp.village_no
                AND v.district_no = vp.district_no
                AND v.state_no = vp.state_no
```

	village_no character	district_no character	state_no character	crop_id text	village text	contribution_percentage numeric
1	01	01	01	Rice	Kakori	37.3665480427046263
2	02	01	01	Rice	Mohanlalganj	32.0284697508896797
3	03	01	01	Rice	Malihabad	26.6903914590747331
4	05	01	01	Rice	Patti	3.9145907473309609

14. Find all crops produced in the village Kakori of district lucknow and state uttar pradesh, with their respective quantity produced.

```
select village_name, district_name, state_name, crop_id,vp.quantity from
village_production as vp
join village as v on vp.village_no=v.village_no
                                and vp.district_no = v.district_no
                                and vp.state_no = v.state_no
join district as d on  vp.district_no = d.district_no
                                and vp.state_no = d.state_no
join state_ as s on vp.state_no = s.state_no
where state_name = 'Uttar Pradesh' and district_name='Lucknow' and
village_name='Kakori'
```

	village_name text	district_name text	state_name text	crop_id text	quantity integer
1	Kakori	Lucknow	Uttar Pradesh	Cotton	230
2	Kakori	Lucknow	Uttar Pradesh	Rice	210
3	Kakori	Lucknow	Uttar Pradesh	Potato	60
4	Kakori	Lucknow	Uttar Pradesh	Soybean	200
5	Kakori	Lucknow	Uttar Pradesh	Barley	150
6	Kakori	Lucknow	Uttar Pradesh	Sugarcane	100

15. Find landlord who are still hiring labours in a village

```
SELECT LD.landlord_name, LD.landlord_contact_no,
      (SUM(L.need_staff) - COALESCE(LH.hired_labour_count, 0)) AS still_required
FROM Land AS L
JOIN Landlord AS LD ON L.landlord = LD.landlord_contact_no
LEFT JOIN (
   SELECT head_farmer, COUNT(*) AS hired_labour_count
   FROM Landlord_hires_labour
   GROUP BY head_farmer
) AS LH ON LD.landlord_contact_no = LH.head_farmer
WHERE L.village_no = '01'
   AND L.district_no = '01'
   AND L.state_no = '01'
GROUP BY LD.landlord_name, LD.landlord_contact_no, LH.hired_labour_count
HAVING (SUM(L.need_staff) - COALESCE(LH.hired_labour_count, 0)) > 0;
```

	landlord_name text	landlord_contact_no [PK] numeric (10)	still_required bigint
1	Geetanjali Verma	5432109876	8
2	Gyanendra Singh	6543210987	6
3	Gaurishankar Patel	7654321098	3

16. Find buyer who are interested in buying land of village(04,03,01) with landlord contact given as 9991234601

```
SELECT b.buyer_name, b.buyer_contact_no, b.occupation
FROM wants AS w
JOIN buyer AS b ON b.buyer_contact_no = w.buyer_contact_no
JOIN land AS l ON l.land_no = w.land_no
            AND l.village_no = w.village_no
            AND l.district_no = w.district_no
            AND l.state_no = w.state_no
WHERE l.landlord = 9991234601
   AND (l.village_no = '04' AND l.district_no = '03' AND l.state_no = '01')
   AND (b.village_no != '03' AND b.district_no != '01' AND b.state_no != '01');
```

	buyer_name text	buyer_contact_no [PK] numeric (10)	occupation text
1	Amit Patel	9876500005	Farmer
2	Suresh Yadav	9876500006	Businessman
3	Kavita Singh	9876500018	Professor
4	Sanjay Kumar	9876500020	Teacher
5	Sunil Yadav	9876500025	Graphic Designer
6	Nisha Gupta	9876500026	Data Analyst
7	Rani Mehta	9876500028	IT Consultant
8	Gaurav Sharma	9876500030	Actor

17. Landlord has a fertilizer urea and he wants to know whether it can be used for other crops that can be grown on his land. If yes then return crop names.

```
SELECT DISTINCT g.crop_id
FROM Land AS L
JOIN Grows_on AS g ON L.soil_type = g.soil_id
JOIN Requires AS R ON g.crop_id = R.crop_id
WHERE L.landlord = 6543210987
   AND R.fertilizer_id = 'Urea'
   AND L.soil_type = R.soil_id
   AND (L.village_no='01' and L.district_no='01' and L.state_no='01')
```

	crop_id text
1	Soybean

18. Find number of crops each soil support

```
SELECT soil_id, COUNT(DISTINCT crop_id) AS crop_count
FROM grows_on
GROUP BY soil_id
ORDER BY crop_count DESC
```

	soil_id text	crop_count bigint
1	loamy	3
2	slity	3
3	chalky	2
4	clay	2
5	peaty	2
6	sandy	2

19. Find percentage of target that has been achieved by each crop of district (01,01) ,i.e, display (produced*100)/target for each crop of a given district.

```
SELECT dp.crop_id,
       (dp.quantity * 100.0 / dwt.district_target) AS percentage_target_reached
FROM district_production AS dp
JOIN (
    SELECT district_no, state_no, crop_id, SUM(quantity) AS district_target
    FROM TARGET
    GROUP BY district_no, state_no, crop_id
) AS dwt
ON dp.district_no = dwt.district_no
   AND dp.state_no = dwt.state_no
   AND dwt.crop_id = dp.crop_id
  AND dp.district_no = '01'
  AND dp.state_no = '01';
```

	crop_id text	percentage_target_reached numeric
1	Potato	71.2000000000000000
2	Wheat	72.0000000000000000
3	Rice	70.2500000000000000
4	Soybean	125.0000000000000000
5	Cotton	191.0112359550561798
6	Maize	44.6875000000000000
7	Barley	51.3333333333333333

20. I want to know the number of laborers involved in production of each crop grown in a district.

```
SELECT
   p.crop_id,
   COUNT(lhl.labour) + COUNT(thl.labour) AS total_labour
FROM
   land AS lnd
JOIN
   produces AS p ON lnd.land_no = p.land_no
                AND lnd.village_no = p.village_no
                AND lnd.district_no = p.district_no
                AND lnd.state_no = p.state_no
LEFT JOIN
   landlord_hires_labour AS lhl ON lnd.landlord = lhl.head_farmer AND
lnd.temporary_landlord IS NULL
LEFT JOIN
   tenant_hires_labour AS thl ON thl.head_farmer = lnd.temporary_landlord
WHERE
   lnd.district_no = '01' AND lnd.state_no = '01'
GROUP BY
   p.crop_id
ORDER BY total_labour;
```

	crop_id text	total_labour bigint
1	Wheat	4
2	Maize	9
3	Barley	17
4	Soybean	18
5	Sugarcane	18
6	Potato	21
7	Rice	23

21. Find fertilizers that can be used for each crop that can be grown on ‘clay’ soil

```
SELECT c.crop_name, f.fertilizer_name
FROM Crop AS c
JOIN Requires AS r ON c.crop_name = r.crop_id
JOIN Fertilizer AS f ON r.fertilizer_id = f.fertilizer_name
WHERE r.soil_id = 'clay'
```

```
ORDER BY c.crop_name;
```

	crop_name text	fertilizer_name text
1	Barley	Single Super Phosphate
2	Barley	Zinc Sulfate
3	Barley	Monoammonium Phosphate
4	Cotton	Rock Phosphate
5	Cotton	Calcium Ammonium Nitrate
6	Maize	Zinc Sulfate
7	Maize	Diammonium Phosphate (DAP)

22. Find pesticide used to treat a specific symptom in a crop.

```
SELECT c.crop_name, p.pesticide_name, t.symptoms
FROM Crop AS c
JOIN Treats AS t ON c.crop_name = t.crop_id
JOIN Pesticide AS p ON t.pesticide_id = p.pesticide_name
WHERE t.symptoms LIKE '%weeds%'
ORDER BY c.crop_name;
```

	crop_name text	pesticide_name text	symptoms text
1	Cotton	2,4-D	broadleaf weeds
2	Cotton	Glyphosate	weeds and grasses
3	Rice	Glyphosate	weeds and grasses
4	Soybean	2,4-D	broadleaf weeds
5	Soybean	Glyphosate	weeds and grasses
6	Sugarcane	Glyphosate	weeds and grasses
7	Sugarcane	Atrazine	broadleaf and grassy weeds