problem - 3 Scenario

India is leading country in producing renewable solar energy. There are two types of solar panels available in India namely, monocrystalline and polycrystalline solar panel which are installed on the roof. Both the type of panel is available for demestric and commercial usage. The The installallation charges for monocrystalline panels are around 40,000 and polycrystalline panels around 60,000 The warranty of monocrystalline and polycrystalline panels is 15 years and 25 years respectively from the data of installation each panel is identified by a unique photovoltaic module (PV module). These panels are installed for both domestic (houses) and commercial (office, hotels, hostels etc) usage. The installations are done by authorised vendors who also are the distributors of the panels. The vendors or distributors are identified by their unique TIN number, name, address, contact details. The usess are identified by their House/office numbers, addres, The capacity of the panels depends on the number of member in the installed place. So, there can be mieltiple installation of panels from different vendors in the same place.

① list the vendors with most installations in demestric places.

② list the place name with highest capacity panel installed.

③ Display the area where monocrystalline panel are installed.

④ List the place where both type of panels are installed and calculate the installation charges.

⑤ List the details of vendor and panel that is the oldest installation.

⑥ Find the average sales of both type of panels in only commerical places.

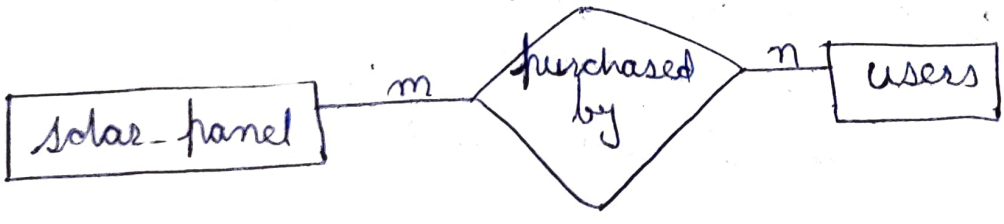
* Identification of entity:-

① solar panel
② Distributor
③ user

* Relationships and cardinalities:

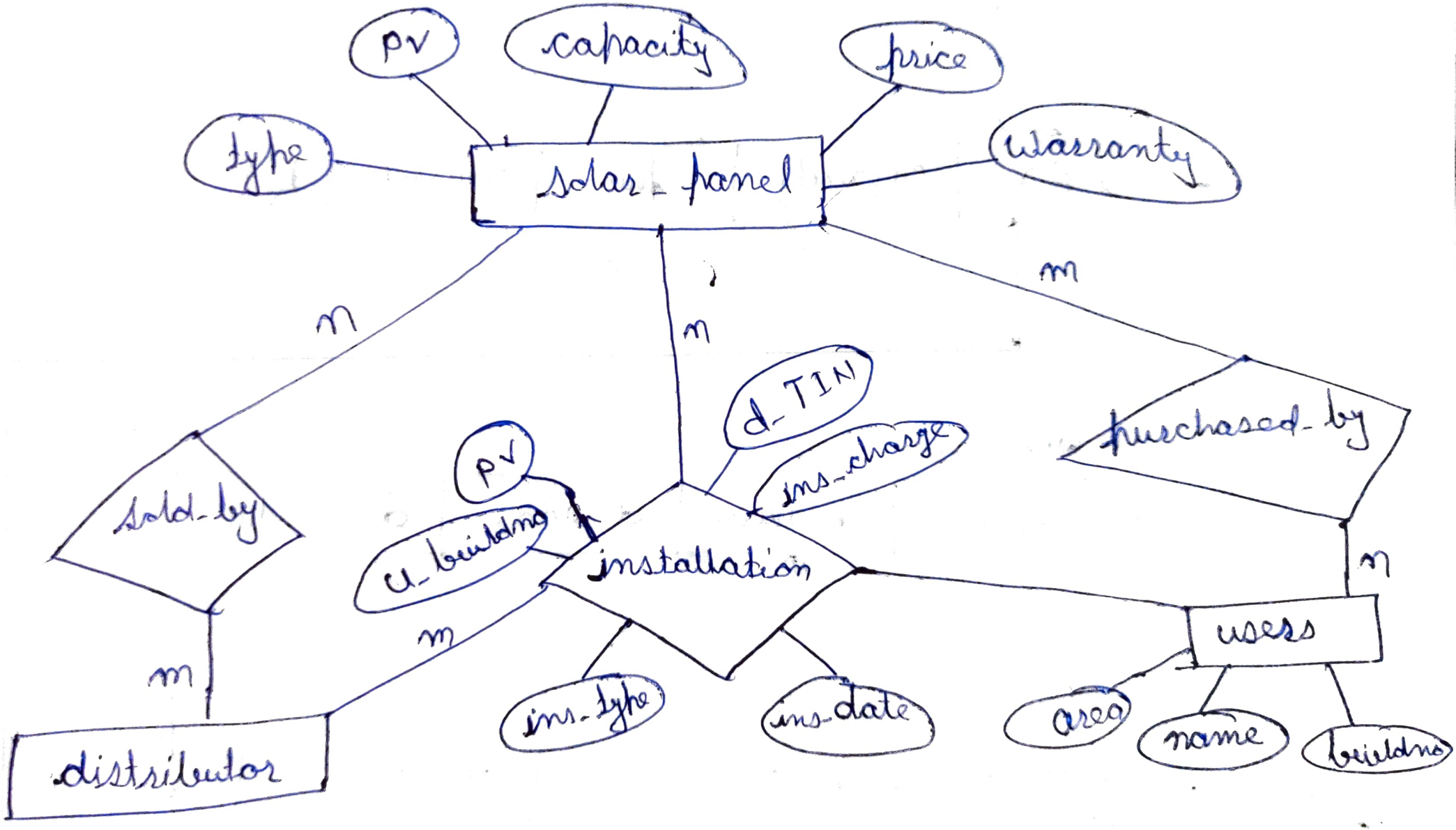
① solarpanel — Sold-by — Distributors

②

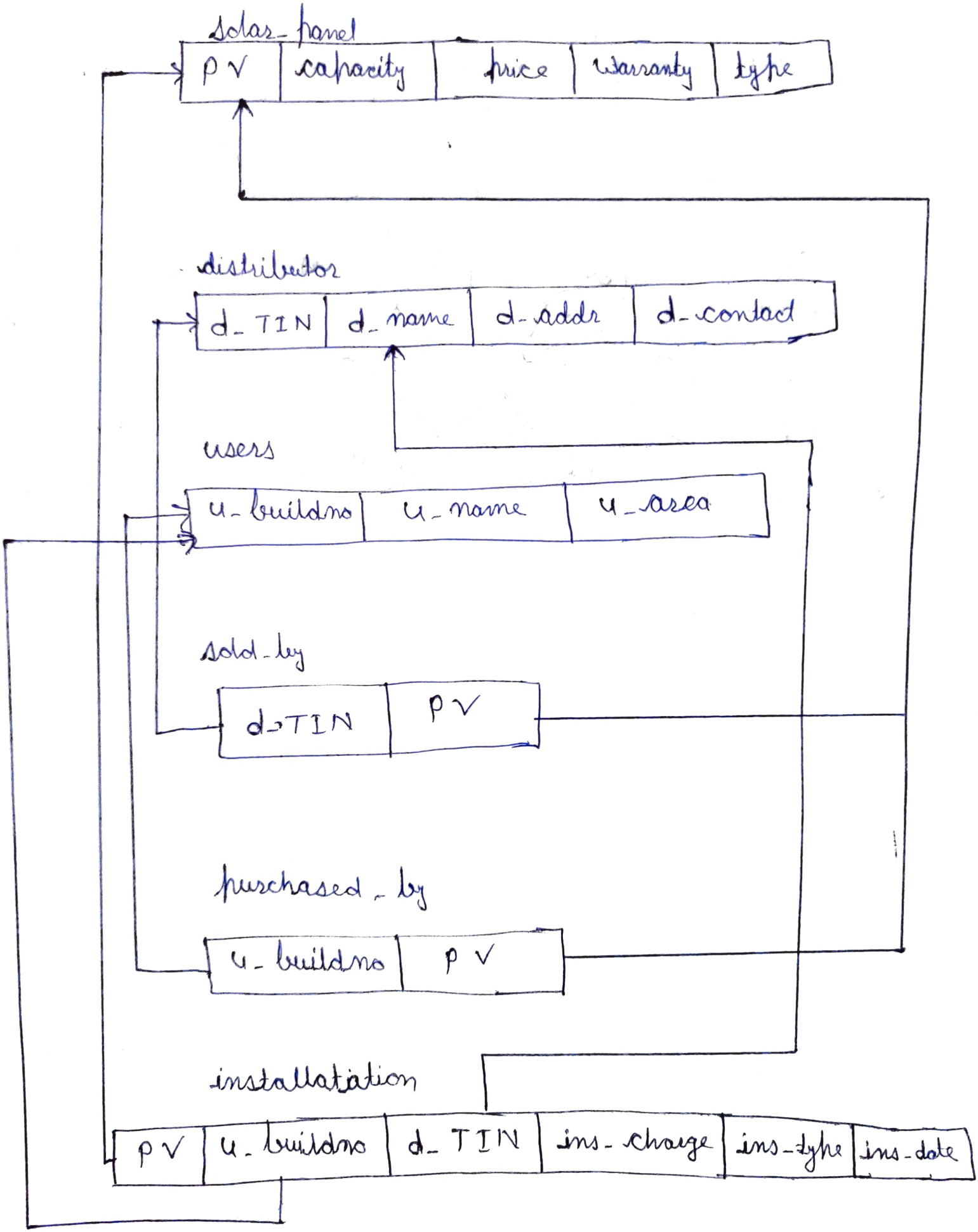


③

ER- Diagram


pv
capacity
price
type
solar_panel
warranty
m
n
n
d_TIN
pv
ins_charge
purchased_by
sold_by
u_buildno
installation
n
m
m
users
ins_type
ins_date
area
name
buildno
distributor

* Schema - diagram:



mysql>create database lab3;

mysql>use lab3;

Tables Creation:-

mysql> CREATE TABLE solar_panel (PV VARCHAR(25),capacity INT,price INT,warranty INT);
Query OK, 0 rows affected (1.37 sec)

Data Insertion:-

mysql> insert into solar_panel values("pv_5",5,4000,7,"polycystalline");
Query OK, 1 row affected (0.06 sec)

Question Answer:-

1)list the vendors with most installation in domestic places
sql>select d.d_name,count(d.d_TIN) from distributor d,installation i where i.d_TIN=d.d_TIN and i.ins_type="non-commercial" group by d.d_TIN;

2)list the place name with highest capacity panel installed
sql> select u.u_area from users u,solar_panel p,installation i where u.u_buildno=i.u_buildno and p.pv=i.pv and p.capacity=(select max(capacity) from solar_panel);

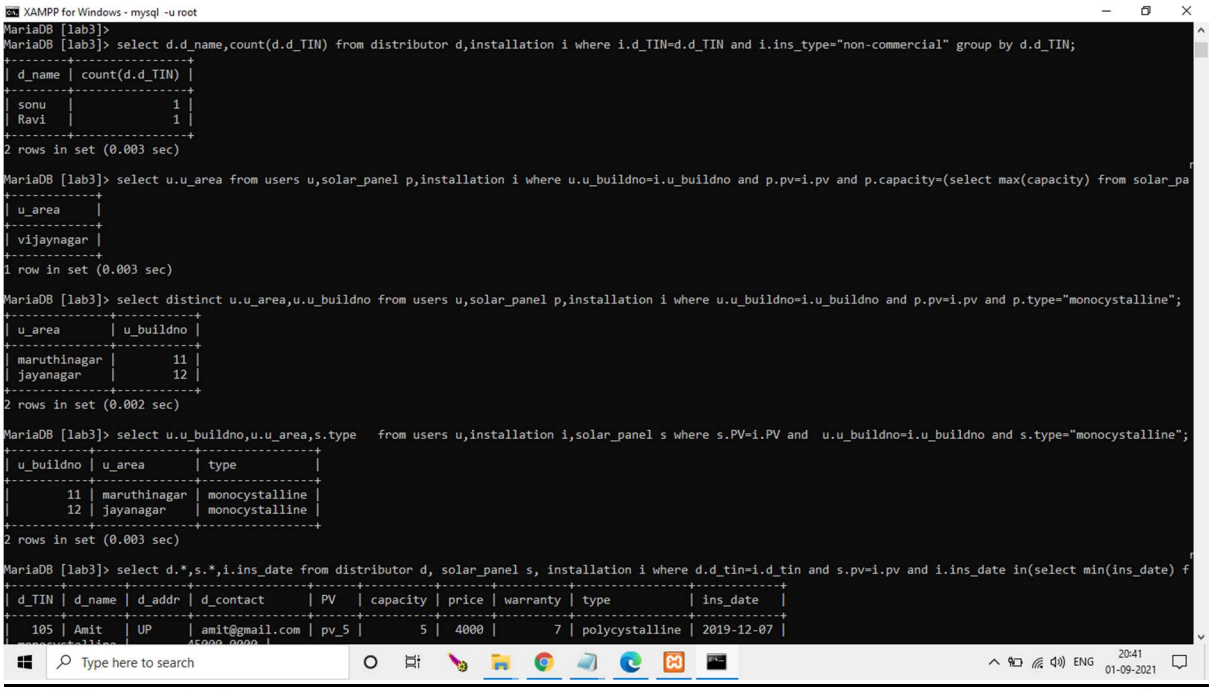
3)display the area where monocrystalline pannelsa are installed
sql> select distinct u.u_area,u.u_buildno from users u,solar_panel p,installation i where u.u_buildno=i.u_buildno and p.pv=i.pv and p.type="monocystalline";

4)List the place where both type of panels are installed and calculate the installation charges.
sql>select u.u_buildno,u.u_area,s.type from users u,installation i,solar_panel s where s.PV=i.PV and u.u_buildno=i.u_buildno and s.type="monocystalline";

5)list the details of vendor and panel that is the oldest installation
sql> select d.*,s.*,i.ins_date from distributor d, solar_panel s, installation i where d.d_tin=i.d_tin and s.pv=i.pv and i.ins_date in(select min(ins_date) from installation);

6)find the average sales of both type of panels in only commercial places
sql> select d.type,avg(d.ins_charge) from (select a.*,b.capacity,c.u_area,b.type from installation a inner join solar_panel b on a.pv=b.pv inner join users c on c.u_buildno=a.u_buildno where a.ins_type="commercial")as d GROUP by d.type;

Screenshot of Question Answer:-



```
XAMPP for Windows - mysql  -u root
MariaDB [lab3]>
MariaDB [lab3]> select d.d_name,count(d.d_TIN) from distributor d,installation i where i.d_TIN=d.d_TIN and i.ins_type="non-commercial" group by d.d_TIN;
+--------+----------------+
| d_name | count(d.d_TIN) |
+--------+----------------+
| sonu   |              1 |
| Ravi   |              1 |
+--------+----------------+
2 rows in set (0.003 sec)

MariaDB [lab3]> select u.u_area from users u,solar_panel p,installation i where u.u_buildno=i.u_buildno and p.pv=i.pv and p.capacity=(select max(capacity) from solar_pa
+------------+
| u_area     |
+------------+
| vijaynagar |
+------------+
1 row in set (0.003 sec)

MariaDB [lab3]> select distinct u.u_area,u.u_buildno from users u,solar_panel p,installation i where u.u_buildno=i.u_buildno and p.pv=i.pv and p.type="monocystalline";
+--------------+-----------+
| u_area       | u_buildno |
+--------------+-----------+
| maruthinagar |        11 |
| jayanagar    |        12 |
+--------------+-----------+
2 rows in set (0.002 sec)

MariaDB [lab3]> select u.u_buildno,u.u_area,s.type   from users u,installation i,solar_panel s where s.PV=i.PV and  u.u_buildno=i.u_buildno and s.type="monocystalline";
+-----------+--------------+----------------+
| u_buildno | u_area       | type           |
+-----------+--------------+----------------+
|        11 | maruthinagar | monocystalline |
|        12 | jayanagar    | monocystalline |
+-----------+--------------+----------------+
2 rows in set (0.003 sec)

MariaDB [lab3]> select d.*,s.*,i.ins_date from distributor d, solar_panel s, installation i where d.d_tin=i.d_tin and s.pv=i.pv and i.ins_date in(select min(ins_date) f
+-------+--------+--------+---------------+------+----------+-------+----------+----------------+------------+
| d_TIN | d_name | d_addr | d_contact     | PV   | capacity | price | warranty | type           | ins_date   |
+-------+--------+--------+---------------+------+----------+-------+----------+----------------+------------+
|   105 | Amit   | UP     | amit@gmail.com | pv_5 |        5 |  4000 |        7 | polycystalline | 2019-12-07 |
```

Type here to search

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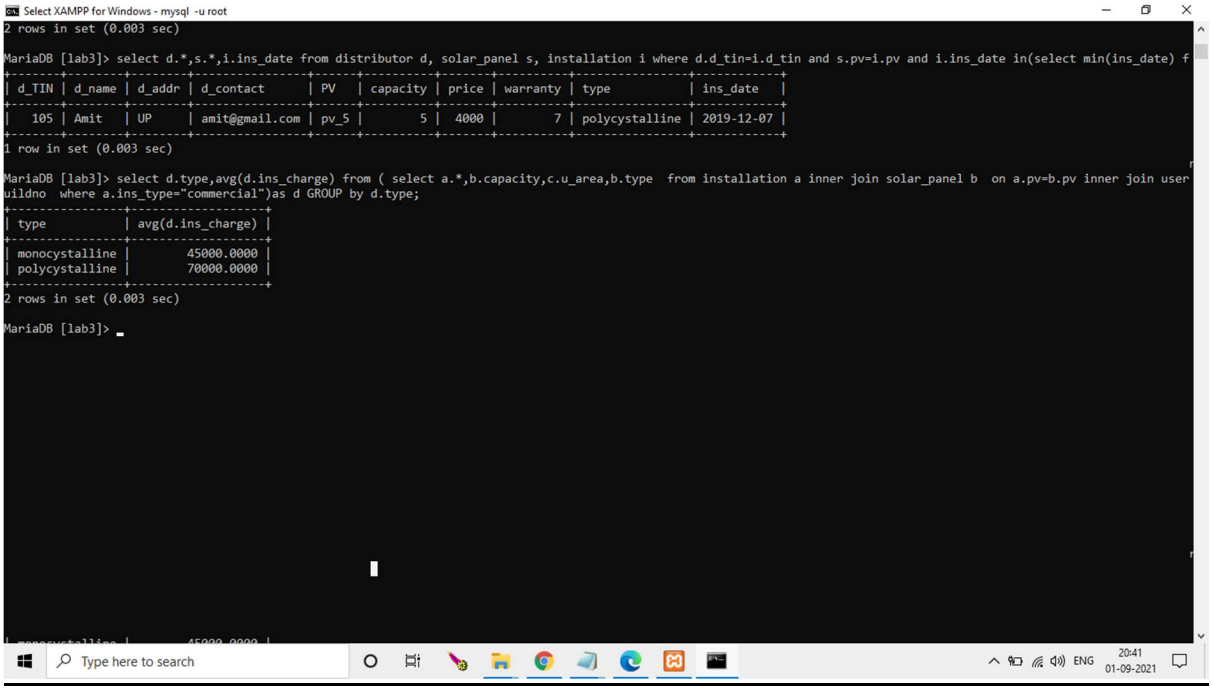

```
Select XAMPP for Windows - mysql  -u root
2 rows in set (0.003 sec)

MariaDB [lab3]> select d.*,s.*,i.ins_date from distributor d, solar_panel s, installation i where d.d_tin=i.d_tin and s.pv=i.pv and i.ins_date in(select min(ins_date) f
+-------+--------+--------+---------------+------+----------+-------+----------+----------------+------------+
| d_TIN | d_name | d_addr | d_contact     | PV   | capacity | price | warranty | type           | ins_date   |
+-------+--------+--------+---------------+------+----------+-------+----------+----------------+------------+
|   105 | Amit   | UP     | amit@gmail.com | pv_5 |        5 |  4000 |        7 | polycystalline | 2019-12-07 |
+-------+--------+--------+---------------+------+----------+-------+----------+----------------+------------+
1 row in set (0.003 sec)

MariaDB [lab3]> select d.type,avg(d.ins_charge) from ( select a.*,b.capacity,c.u_area,b.type  from installation a inner join solar_panel b  on a.pv=b.pv inner join user
uildno  where a.ins_type="commercial")as d GROUP by d.type;
+----------------+-------------------+
| type           | avg(d.ins_charge) |
+----------------+-------------------+
| monocystalline |        45000.0000 |
| polycystalline |        70000.0000 |
+----------------+-------------------+
2 rows in set (0.003 sec)

MariaDB [lab3]>
```

Type here to search

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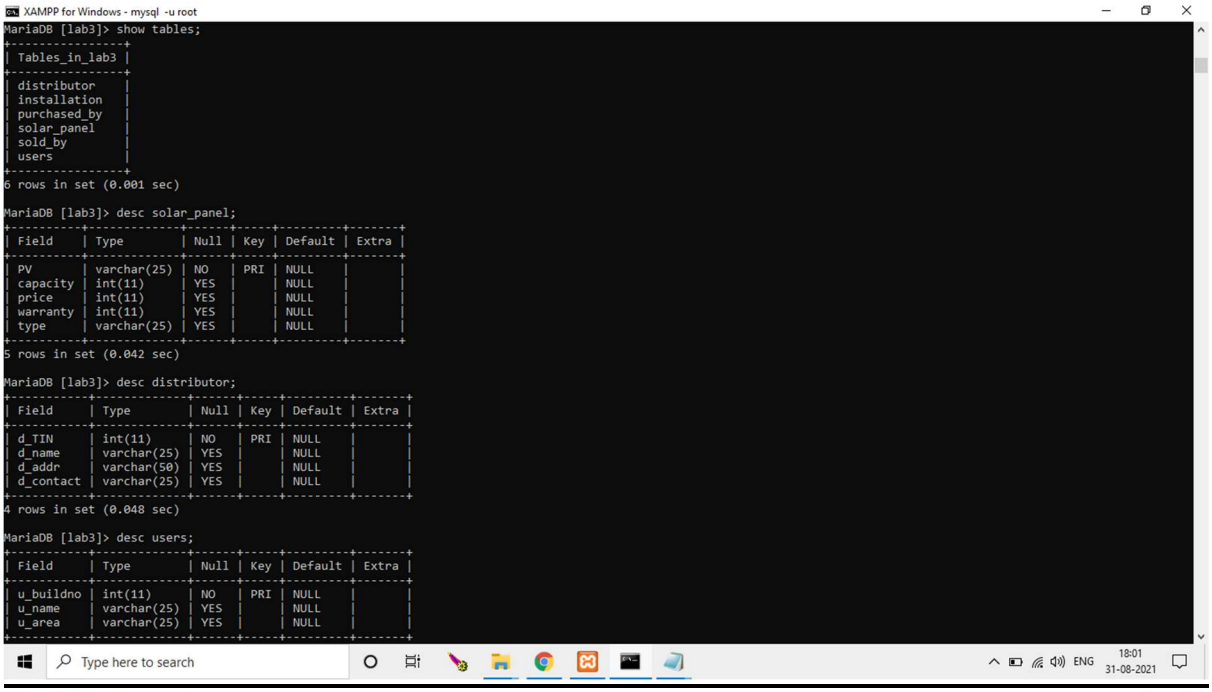
Describe of a table:-

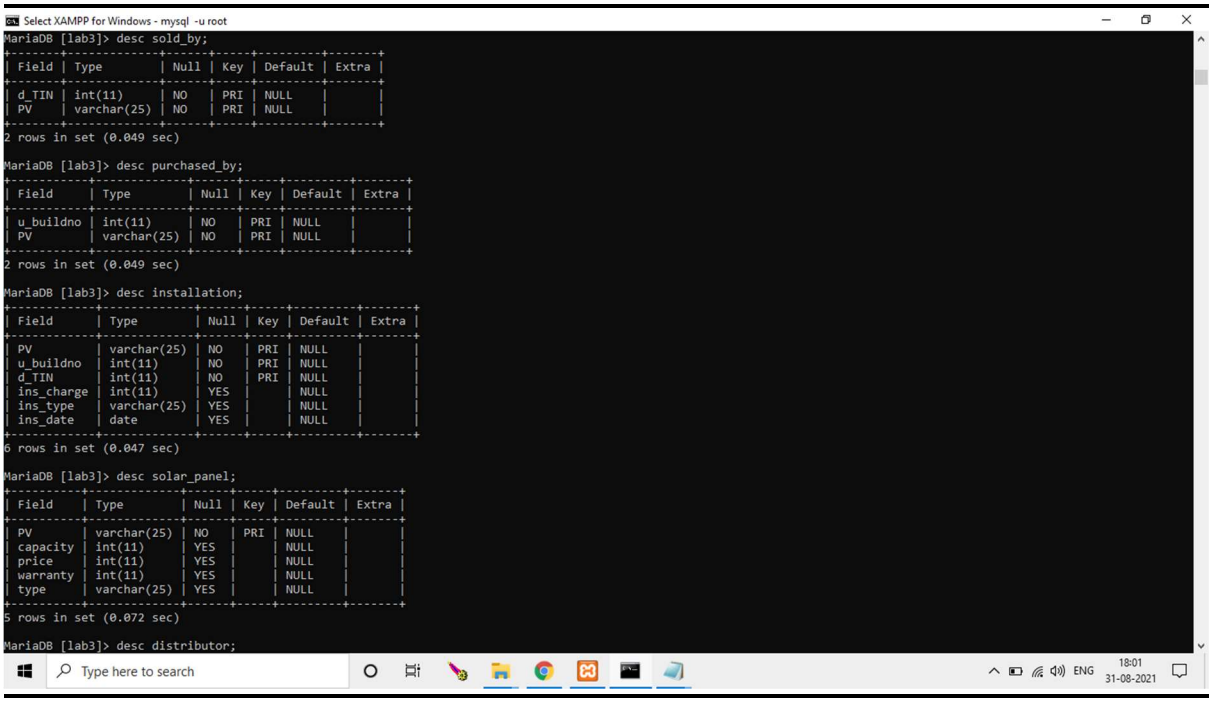


```
XAMPP for Windows - mysql  -u root
MariaDB [lab3]> show tables;
+----------------+
| Tables_in_lab3 |
+----------------+
| distributor    |
| installation   |
| purchased_by   |
| solar_panel    |
| sold_by        |
| users          |
+----------------+
6 rows in set (0.001 sec)

MariaDB [lab3]> desc solar_panel;
+----------+-------------+------+-----+---------+-------+
| Field    | Type        | Null | Key | Default | Extra |
+----------+-------------+------+-----+---------+-------+
| PV       | varchar(25) | NO   | PRI | NULL    |       |
| capacity | int(11)     | YES  |     | NULL    |       |
| price    | int(11)     | YES  |     | NULL    |       |
| warranty | int(11)     | YES  |     | NULL    |       |
| type     | varchar(25) | YES  |     | NULL    |       |
+----------+-------------+------+-----+---------+-------+
5 rows in set (0.042 sec)

MariaDB [lab3]> desc distributor;
+-----------+-------------+------+-----+---------+-------+
| Field     | Type        | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
| d_TIN     | int(11)     | NO   | PRI | NULL    |       |
| d_name    | varchar(25) | YES  |     | NULL    |       |
| d_addr    | varchar(50) | YES  |     | NULL    |       |
| d_contact | varchar(25) | YES  |     | NULL    |       |
+-----------+-------------+------+-----+---------+-------+
4 rows in set (0.048 sec)

MariaDB [lab3]> desc users;
+-----------+-------------+------+-----+---------+-------+
| Field     | Type        | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
| u_buildno | int(11)     | NO   | PRI | NULL    |       |
| u_name    | varchar(25) | YES  |     | NULL    |       |
| u_area    | varchar(25) | YES  |     | NULL    |       |
+-----------+-------------+------+-----+---------+-------+
```



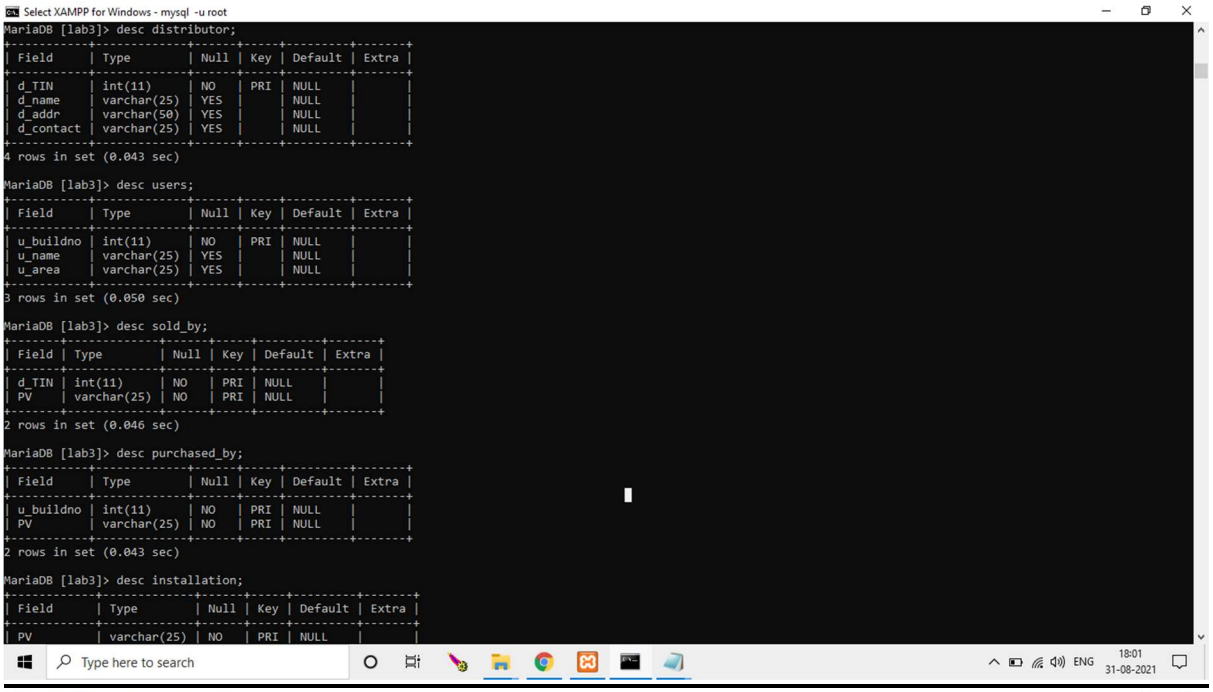
```
Select XAMPP for Windows - mysql  -u root
MariaDB [lab3]> desc sold_by;
+-------+-------------+------+-----+---------+-------+
| Field | Type        | Null | Key | Default | Extra |
+-------+-------------+------+-----+---------+-------+
| d_TIN | int(11)     | NO   | PRI | NULL    |       |
| PV    | varchar(25) | NO   | PRI | NULL    |       |
+-------+-------------+------+-----+---------+-------+
2 rows in set (0.049 sec)

MariaDB [lab3]> desc purchased_by;
+-----------+-------------+------+-----+---------+-------+
| Field     | Type        | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
| u_buildno | int(11)     | NO   | PRI | NULL    |       |
| PV        | varchar(25) | NO   | PRI | NULL    |       |
+-----------+-------------+------+-----+---------+-------+
2 rows in set (0.049 sec)

MariaDB [lab3]> desc installation;
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| PV         | varchar(25) | NO   | PRI | NULL    |       |
| u_buildno  | int(11)     | NO   | PRI | NULL    |       |
| d_TIN      | int(11)     | NO   | PRI | NULL    |       |
| ins_charge | int(11)     | YES  |     | NULL    |       |
| ins_type   | varchar(25) | YES  |     | NULL    |       |
| ins_date   | date        | YES  |     | NULL    |       |
+------------+-------------+------+-----+---------+-------+
6 rows in set (0.047 sec)

MariaDB [lab3]> desc solar_panel;
+----------+-------------+------+-----+---------+-------+
| Field    | Type        | Null | Key | Default | Extra |
+----------+-------------+------+-----+---------+-------+
| PV       | varchar(25) | NO   | PRI | NULL    |       |
| capacity | int(11)     | YES  |     | NULL    |       |
| price    | int(11)     | YES  |     | NULL    |       |
| warranty | int(11)     | YES  |     | NULL    |       |
| type     | varchar(25) | YES  |     | NULL    |       |
+----------+-------------+------+-----+---------+-------+
5 rows in set (0.072 sec)

MariaDB [lab3]> desc distributor;
```


Select XAMPP for Windows - mysql -u root
MariaDB [lab3]> desc distributor;
+-----------+-------------+------+-----+---------+-------+
| Field | Type | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
d_TIN	int(11)	NO	PRI	NULL	
d_name	varchar(25)	YES		NULL	
d_addr	varchar(50)	YES		NULL	
d_contact	varchar(25)	YES		NULL	
+-----------+-------------+------+-----+---------+-------+
4 rows in set (0.043 sec)
MariaDB [lab3]> desc users;
+-----------+-------------+------+-----+---------+-------+
| Field | Type | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
u_buildno	int(11)	NO	PRI	NULL	
u_name	varchar(25)	YES		NULL	
u_area	varchar(25)	YES		NULL	
+-----------+-------------+------+-----+---------+-------+
3 rows in set (0.050 sec)
MariaDB [lab3]> desc sold_by;
+-------+-------------+------+-----+---------+-------+
| Field | Type | Null | Key | Default | Extra |
+-------+-------------+------+-----+---------+-------+
| d_TIN | int(11) | NO | PRI | NULL | |
| PV | varchar(25) | NO | PRI | NULL | |
+-------+-------------+------+-----+---------+-------+
2 rows in set (0.046 sec)
MariaDB [lab3]> desc purchased_by;
+-----------+-------------+------+-----+---------+-------+
| Field | Type | Null | Key | Default | Extra |
+-----------+-------------+------+-----+---------+-------+
| u_buildno | int(11) | NO | PRI | NULL | |
| PV | varchar(25) | NO | PRI | NULL | |
+-----------+-------------+------+-----+---------+-------+
2 rows in set (0.043 sec)
MariaDB [lab3]> desc installation;
+------------+-------------+------+-----+---------+-------+
| Field | Type | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| PV | varchar(25) | NO | PRI | NULL | |
Type here to search
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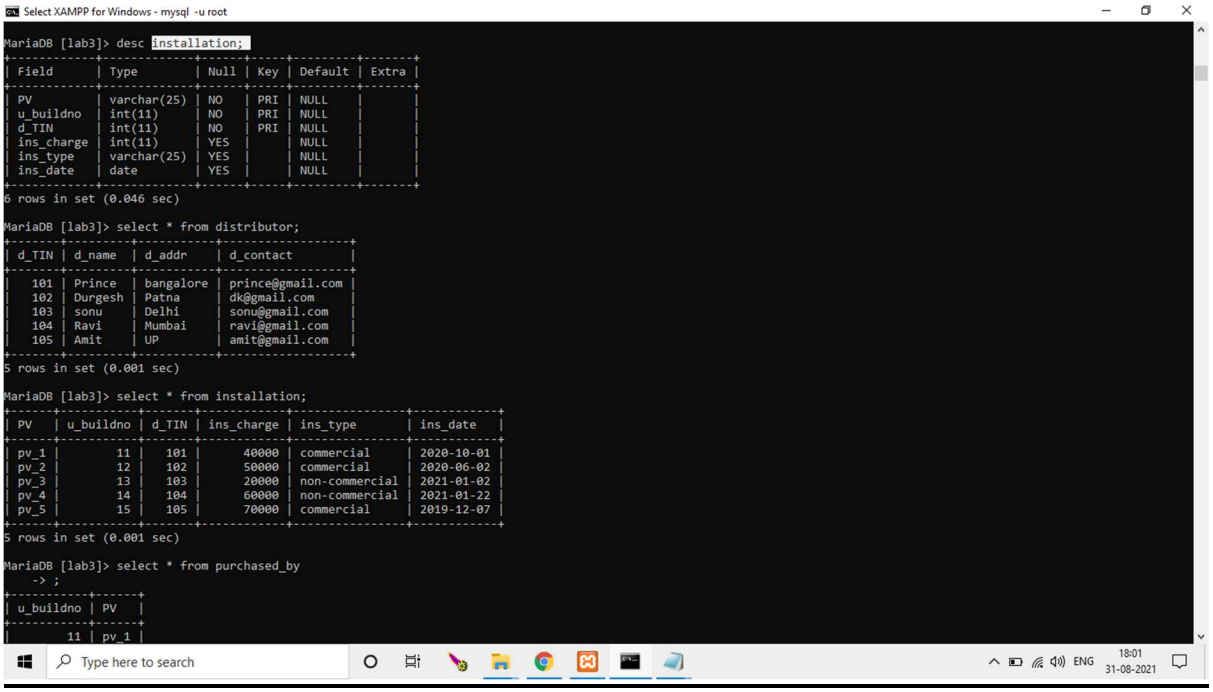
18:01
31-08-2021


Select XAMPP for Windows - mysql -u root
MariaDB [lab3]> desc installation;
+------------+-------------+------+-----+---------+-------+
| Field | Type | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
PV	varchar(25)	NO	PRI	NULL	
u_buildno	int(11)	NO	PRI	NULL	
d_TIN	int(11)	NO	PRI	NULL	
ins_charge	int(11)	YES		NULL	
ins_type	varchar(25)	YES		NULL	
ins_date	date	YES		NULL	
+------------+-------------+------+-----+---------+-------+
6 rows in set (0.046 sec)
MariaDB [lab3]> select * from distributor;
+-------+---------+-----------+------------------+
| d_TIN | d_name | d_addr | d_contact |
+-------+---------+-----------+------------------+
101	Prince	bangalore	prince@gmail.com
102	Durgesh	Patna	dk@gmail.com
103	sonu	Delhi	sonu@gmail.com
104	Ravi	Mumbai	ravi@gmail.com
105	Amit	UP	amit@gmail.com
+-------+---------+-----------+------------------+
5 rows in set (0.001 sec)
MariaDB [lab3]> select * from installation;
+------+-----------+-------+------------+---------------+------------+
| PV | u_buildno | d_TIN | ins_charge | ins_type | ins_date |
+------+-----------+-------+------------+---------------+------------+
pv_1	11	101	40000	commercial	2020-10-01
pv_2	12	102	50000	commercial	2020-06-02
pv_3	13	103	20000	non-commercial	2021-01-02
pv_4	14	104	60000	non-commercial	2021-01-22
pv_5	15	105	70000	commercial	2019-12-07
+------+-----------+-------+------------+---------------+------------+
5 rows in set (0.001 sec)
MariaDB [lab3]> select * from purchased_by
-> ;
+-----------+------+
| u_buildno | PV |
+-----------+------+
| 11 | pv_1 |
Type here to search
ENG
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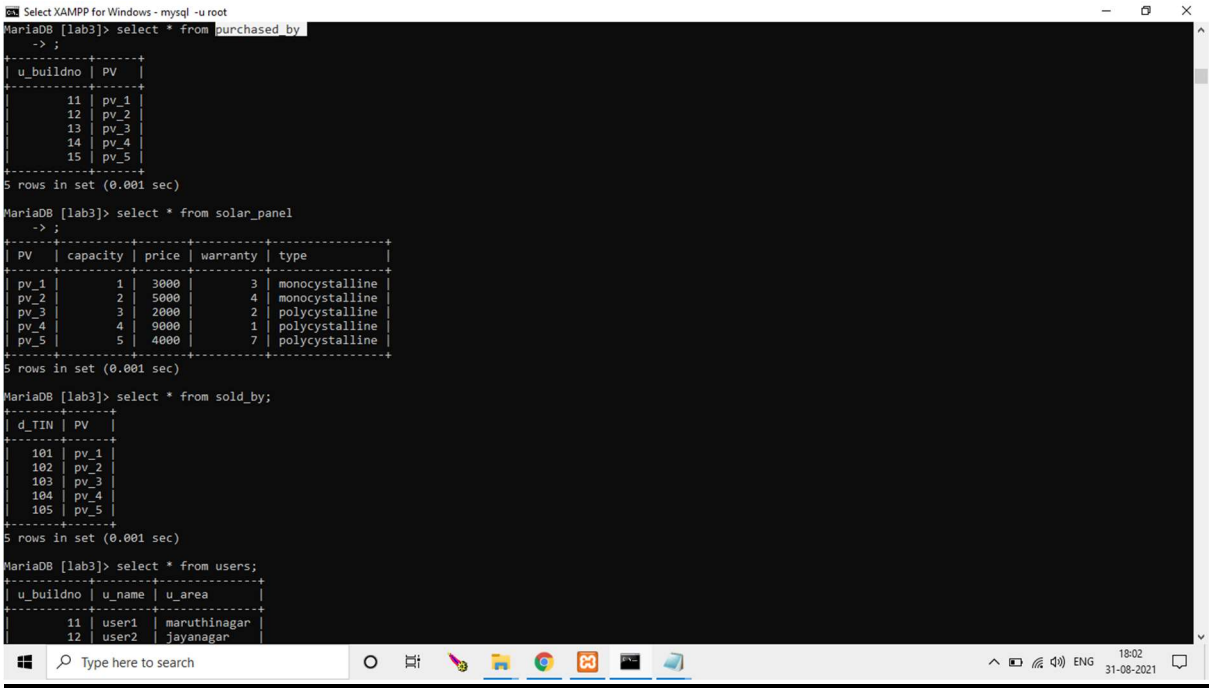
31-08-2021


Select XAMPP for Windows - mysql -u root
MariaDB [lab3]> select * from purchased_by
-> ;
+-----------+------+
| u_buildno | PV |
+-----------+------+
11	pv_1
12	pv_2
13	pv_3
14	pv_4
15	pv_5
+-----------+------+
5 rows in set (0.001 sec)
MariaDB [lab3]> select * from solar_panel
-> ;
+------+----------+-------+----------+----------------+
| PV | capacity | price | warranty | type |
+------+----------+-------+----------+----------------+
pv_1	1	3000	3	monocystalline
pv_2	2	5000	4	monocystalline
pv_3	3	2000	2	polycystalline
pv_4	4	9000	1	polycystalline
pv_5	5	4000	7	polycystalline
+------+----------+-------+----------+----------------+
5 rows in set (0.001 sec)
MariaDB [lab3]> select * from sold_by;
+-------+------+
| d_TIN | PV |
+-------+------+
101	pv_1
102	pv_2
103	pv_3
104	pv_4
105	pv_5
+-------+------+
5 rows in set (0.001 sec)
MariaDB [lab3]> select * from users;
+-----------+--------+--------------+
| u_buildno | u_name | u_area |
+-----------+--------+--------------+
| 11 | user1 | maruthinagar |
| 12 | user2 | jayanagar |
Type here to search
ENG
18:02
31-08-2021