1. List the total number of connections made.

QUERY:

SELECT

COUNT(DISTINCT (ConnectID)) AS connect_count

FROM

connect;

RESULT:

connect_count

'68680'

OUTPUT:

05:20:24   SELECT   COUNT(DISTINCT (ConnectID)) AS connect_count
FROM   connect LIMIT 0, 10   1 row(s) returned   0.016 sec / 0.000 sec

2. List all the staff whose address contains the character string 'st' ignoring the case.

QUERY:

SELECT

StaffID, Surname

FROM

staff

WHERE

LCASE(Address) LIKE '%st%';

RESULT:

StaffID, Surname

'1', 'VELLA'

'3', 'HILTON'

'6', 'SUMMERS'

'7', 'KNOL'

'8', 'PORTELLI'

'9', 'KHOR'

OUTPUT:

05:40:26   SELECT   StaffID, Surname FROM   staff WHERE
LCASE(Address) LIKE '%st%' LIMIT 0, 10 6 row(s) returned   0.000 sec / 0.000
sec

3.   List all the customers who are not active.

QUERY:

    SELECT DISTINCT

      (c.CustomerID),

      CONCAT(c.Surname, ' ', c.Given) AS InctiveCustomersName

    FROM

      customer c

        JOIN

      mobile m ON (c.CustomerID = m.CustomerID)

    WHERE

      m.Cancelled IS NOT NULL;

RESULT:

    # CustomerID, InctiveCustomersName

    '20002', 'RAJOO THINH MINH'

    '20004', 'PHONGWATCHARARUK JERZY MIROSLAW'

    '20006', 'CHOW SOW LIM'

    '20008', 'LIVERIADIS TONY'

    '20030', 'BALTAS AARON BRYCE'

    '20032', 'MOODIE CAHAL JOSEPH'

    '20034', 'BENHAM SUSIE MEI YUN'

    '20036', 'DWYER ANDREW ANTHONY'

    '20052', 'VAGG CHEE HONG'

    '20068', 'BENSON TIMOTHY FRANCIS'

OUTPUT:

    16:33:06   SELECT DISTINCT   (c.CustomerID),   CONCAT(c.Surname, ' ', c.Given) AS InctiveCustomersName FROM   customer c   JOIN   mobile m ON (c.CustomerID = m.CustomerID) WHERE   m.Cancelled IS NOT NULL LIMIT 0, 10   10 row(s) returned   0.000 sec / 0.000 sec

4.   Which plan gives the second biggest data allowance?

QUERY:

    SELECT

      PlanName

FROM

   plan

ORDER BY DataAllowance DESC

LIMIT 1 , 1;

RESULT:

\# PlanName

'Medium'

OUTPUT:

05:45:41   SELECT   PlanName FROM   plan ORDER BY DataAllowance

DESC LIMIT 1 , 1   1 row(s) returned   0.000 sec / 0.000 sec

5.   List the staff who gets more than the average hourly rate.

QUERY:

SELECT

   StaffID, Surname, Given

FROM

   staff

WHERE

   RatePerHour > (SELECT

      AVG(RatePerHour)

    FROM

      staff);

RESULT:

\# StaffID, Surname, Given

'1', 'VELLA', 'SARATH AJITH L'

'2', 'MARZELLA', 'PATRICK MICHAEL'

'3', 'HILTON', 'HARRY RODNEY E'

'6', 'SUMMERS', 'TED'

'8', 'PORTELLI', 'CATHERINE MARY'

'10', 'SCANLON', 'MICHAEL JOHN'

OUTPUT:

05:50:07   SELECT   StaffID, Surname, Given FROM   staff WHERE

RatePerHour > (SELECT   AVG(RatePerHour)   FROM   staff)

LIMIT 0, 10   6 row(s) returned   0.000 sec / 0.000 sec

6.   List the top two selling plans.

QUERY:

SELECT

   PlanName, COUNT(PlanName) AS count

FROM

   mobile

GROUP BY PlanName

ORDER BY count DESC

LIMIT 2;

RESULT:

\# PlanName, count

'Budget1', '246'

'ExtraSmall', '240'

OUTPUT:

05:54:58   SELECT   PlanName, COUNT(PlanName) AS count FROM
mobile GROUP BY PlanName ORDER BY count DESC LIMIT 2 2 row(s) returned
     0.000 sec / 0.000 sec

7.   List all the customers on "Extra small" plan.

QUERY:

SELECT

   CustomerID, Surname, Given

FROM

   customer

WHERE

   CustomerID IN (SELECT

     CustomerID

  FROM

    mobile

  WHERE

    PlanName = 'ExtraSmall');

RESULT:

CustomerID, Surname, Given

'20002', 'RAJOO', 'THINH MINH'

'20004', 'PHONGWATCHARARUK', 'JERZY MIROSLAW'

'20006', 'CHOW', 'SOW LIM'

'20010', 'SAMARAWICKRAMA', 'JANE'

'20032', 'MOODIE', 'CAHAL JOSEPH'

'20050', 'JAMES', 'AMANDA CLARE'

'20068', 'BENSON', 'TIMOTHY FRANCIS'

'20070', 'HOSIE', 'MANG YAH JOHN'

'20088', 'DUONG', 'XUONG DAN'

'20136', 'VERCOE', 'SIN THENG'

OUTPUT:

05:57:26   SELECT   CustomerID, Surname, Given FROM   customer WHERE   CustomerID IN (SELECT   CustomerID   FROM mobile   WHERE   PlanName = 'ExtraSmall') LIMIT 0, 10   10   row(s) returned   0.016 sec / 0.000 sec

8.   From which towerId was the most recent call made?

QUERY:

SELECT

   t2.TowerID,

   DATEDIFF(CURRENT_TIMESTAMP(), t1.CallDate) AS recency

FROM

   calls t1,

   connect t2

WHERE

   t1.CallsID = t2.CallsID

ORDER BY recency ASC

LIMIT 1;

RESULT:

TowerID, recency

'290', '793'

OUTPUT:

06:06:30   SELECT   t2.TowerID,   DATEDIFF(CURRENT_TIMESTAMP(), t1.CallDate) AS recency FROM   calls t1,   connect t2 WHERE   t1.CallsID = t2.CallsID ORDER BY recency ASC LIMIT 1   1 row(s) returned   0.078 sec / 0.000 sec

9.   List all the customers who owned a phone of the same colour as the customer 'Rajoo' (i.e. surname).

QUERY:

```
SELECT
    CustomerID, Surname, Given
FROM
    customer
WHERE
    CustomerID IN (SELECT DISTINCT
        (CustomerID)
    FROM
        mobile
    WHERE
        PhoneColour IN (SELECT
            PhoneColour
        FROM
            mobile
        WHERE
            CustomerID IN (SELECT
                CustomerID
            FROM
                customer
            WHERE
                Surname = 'Rajoo')));
```

RESULT:

```
# CustomerID, Surname, Given
'22212', 'COX', 'D H CAROLINE KURUPPU'
'22124', 'JOY', 'SARVO SARVENDRAN'
```

'22106', 'COLEGRAVE', 'ALEX'

'22082', 'CHEN', 'TEDDY'

'22036', 'LOPEZ', 'KAREN LOUISE'

'22000', 'FISHER', 'YUAN NAN'

'21948', 'AITKEN', 'GREG ANDREW'

'21940', 'UNANTENNE', 'KELVIN'

'21930', 'GAO', 'LESLIE IRVING'

'21862', 'GOWERS', 'GLEN'

OUTPUT:

06:10:24 SELECT CustomerID, Surname, Given FROM customer WHERE CustomerID IN (SELECT DISTINCT (CustomerID) FROM mobile WHERE PhoneColour IN (SELECT PhoneColour FROM mobile WHERE CustomerID IN (SELECT CustomerID FROM customer WHERE Surname = 'Rajoo'))) LIMIT 0, 10 10 row(s) returned 0.015 sec / 0.000 sec

10. List all the customers (customer Id and name) having more than one mobile number.

QUERY:

SELECT

   c.CustomerID, c.Surname, c.Given

FROM

   customer c,

   (SELECT

     CustomerID, COUNT(CustomerID) AS number_of_phone

   FROM

     mobile

   GROUP BY CustomerID

   HAVING number_of_phone > 1) many_phone

WHERE

   c.CustomerID = many_phone.CustomerID;

RESULT:

CustomerID, Surname, Given

'20002', 'RAJOO', 'THINH MINH'

'20006', 'CHOW', 'SOW LIM'

'20008', 'LIVERIADIS', 'TONY'

'20010', 'SAMARAWICKRAMA', 'JANE'

'20012', 'GILTRAP', 'ELIZABETH JANE'

'20028', 'DE ALWIS', 'DAVID GEORGE A'

'20032', 'MOODIE', 'CAHAL JOSEPH'

'20036', 'DWYER', 'ANDREW ANTHONY'

'20052', 'VAGG', 'CHEE HONG'

'20068', 'BENSON', 'TIMOTHY FRANCIS'

OUTPUT:

06:14:09   SELECT   c.CustomerID, c.Surname, c.Given FROM   customer c, (SELECT   CustomerID, COUNT(CustomerID) AS number_of_phone   FROM mobile   GROUP BY CustomerID   HAVING number_of_phone > 1) many_phone WHERE   c.CustomerID = many_phone.CustomerID LIMIT 0, 10   10   row(s) returned   0.000 sec / 0.000 sec

11.   The company decided to re-name the budget3 plan to budget3Extra.

(a)   How many customers will be affected? Show SQL to justify your answer.

QUERY:

SELECT

   COUNT(DISTINCT(CustomerID))

FROM

   mobile

WHERE

   PlanName = 'Budget3';

RESULT:

COUNT(DISTINCT(CustomerID))

'0'

OUTPUT:

06:27:41   SELECT   COUNT(DISTINCT(CustomerID)) FROM   mobile WHERE   PlanName = 'Budget3' LIMIT 0, 10   1 row(s) returned   0.000 sec / 0.000 sec

(b)   Write an SQL query which will update the database to reflect the upgrades?

QUERY:

```sql
SET SQL_SAFE_UPDATES = 0;

UPDATE mobile
SET
    PlanName = 'Budget3Extra'
WHERE
    PlanName = 'Budget3';

UPDATE plan
SET
    PlanName = 'Budget3Extra'
WHERE
    PlanName = 'Budget3';

SET SQL_SAFE_UPDATES = 1;
```
RESULT:
OUTPUT:

07:17:43   SET SQL_SAFE_UPDATES = 0   0 row(s) affected   0.000 sec

07:17:43   UPDATE mobile   SET   PlanName = 'Budget3Extra' WHERE PlanName = 'Budget3'0 row(s) affected Rows matched: 0   Changed: 0   Warnings: 0   0.000 sec

07:17:43   UPDATE plan   SET   PlanName = 'Budget3Extra' WHERE PlanName = 'Budget3'1 row(s) affected Rows matched: 1   Changed: 1   Warnings: 0   0.015 sec

07:17:43   SET SQL_SAFE_UPDATES = 1   0 row(s) affected   0.000 sec

12.   List the names of all the staff who have a supervisor, along with their supervisor's name.

QUERY:

```sql
SELECT
    staff_with_supervisor.StaffID,
    staff_with_supervisor.Surname,
```

staff_with_supervisor.Given,

    CONCAT(s.Surname, ', ', s.Given) AS Supervisor_Names

FROM

    staff s,

    (SELECT

      StaffID, Surname, Given, SupervisorID

    FROM

      staff

    WHERE

      SupervisorID > 0) staff_with_supervisor

WHERE

    staff_with_supervisor.SupervisorID = s.StaffID;

RESULT:

StaffID, Surname, Given, Supervisor_Names

'2', 'MARZELLA', 'PATRICK MICHAEL', 'VELLA, SARATH AJITH L'

'4', 'JAMIESON', 'TERRENCE IAN', 'VELLA, SARATH AJITH L'

'5', 'SANDERS', 'RICHARD ANTHONY', 'VELLA, SARATH AJITH L'

'6', 'SUMMERS', 'TED', 'VELLA, SARATH AJITH L'

'7', 'KNOL', 'VINCENZO', 'HILTON, HARRY RODNEY E'

'8', 'PORTELLI', 'CATHERINE MARY', 'VELLA, SARATH AJITH L'

'9', 'KHOR', 'GLENDA JEAN', 'VELLA, SARATH AJITH L'

'10', 'SCANLON', 'MICHAEL JOHN', 'HILTON, HARRY RODNEY E'

OUTPUT:

07:49:25   SELECT   staff_with_supervisor.StaffID, staff_with_supervisor.Surname,   staff_with_supervisor.Given, CONCAT(s.Surname, ', ', s.Given) AS Supervisor_Names FROM   staff s, (SELECT   StaffID, Surname, Given, SupervisorID   FROM   staff WHERE   SupervisorID > 0) staff_with_supervisor WHERE staff_with_supervisor.SupervisorID = s.StaffID LIMIT 0, 10   8 row(s) returned 0.000 sec / 0.000 sec

13. Who is the longest serving staff? Display the StaffId, full name, date joined and the total years served.

QUERY:

```
SELECT
    StaffID,
    CONCAT(Surname, ', ', Given) AS FullName,
    DATE(Joined) AS Joined,
    TIMESTAMPDIFF(YEAR, Joined, CURDATE()) AS TotalYears
FROM
    staff
ORDER BY TotalYears DESC
LIMIT 1;
```

RESULT:

```
# StaffID, FullName, Joined, TotalYears
'1', 'VELLA, SARATH AJITH L', '2012-04-16', '10'
```

OUTPUT:

08:02:40   SELECT   StaffID,   CONCAT(Surname, ', ', Given) AS FullName, DATE(Joined) AS Joined,   TIMESTAMPDIFF(YEAR, Joined, CURDATE()) AS TotalYears FROM   staff ORDER BY TotalYears DESC LIMIT 1 1 row(s) returned   0.000 sec / 0.000 sec

14. List all plans that have never been used by any customer. Show the query using:

i.   Nested Query

QUERY:

```
SELECT
    PlanName
FROM
    plan
WHERE
    PlanName NOT IN (SELECT DISTINCT
        (PlanName)
    FROM
        mobile);
```

RESULT:

PlanName

'Budget3Extra'

OUTPUT:

08:13:19   SELECT   PlanName FROM   plan WHERE   PlanName NOT IN (SELECT DISTINCT   (PlanName)   FROM   mobile) LIMIT 0, 10   1 row(s) returned   0.000 sec / 0.000 sec

ii.   SQL Join

QUERY:

SELECT DISTINCT

  (p.PlanName)

FROM

  plan p

    LEFT JOIN

  mobile m ON (p.PlanName = m.PlanName)

WHERE

  m.PlanName IS NULL;

RESULT:

PlanName

'Budget3Extra'

OUTPUT:

09:18:17   SELECT DISTINCT   (p.PlanName) FROM   plan p   LEFT JOIN   mobile m ON (p.PlanName = m.PlanName) WHERE   m.PlanName IS NULL LIMIT 0, 10   1 row(s) returned   0.000 sec / 0.000 sec

15.   List the customer ID, customer name, phone number and the total number of hours (assume call duration is in seconds) the customer was on the phone during August of 2019 from each phone number the customer owns. Order the list from highest to the lowest number of hours.

QUERY:

SELECT

  cs.CustomerID,

  CONCAT(cs.Surname, ', ', cs.Given) AS CustomerName,

  m.PhoneNumber,

```
        SUM(c.CallDuration) / 3600 AS TotalHours
    FROM
        calls c
            JOIN
        mobile m ON c.MobileID = m.MobileID
            JOIN
        customer cs ON m.CustomerID = cs.CustomerID
    WHERE
        (MONTHNAME(c.CallDate) = 'August'
            AND YEAR(c.CallDate) = 2019)
    GROUP BY m.PhoneNumber
    ORDER BY TotalHours DESC;
```

RESULT:

```
# CustomerID, CustomerName, PhoneNumber, TotalHours
'20144', 'THOMAS, CLAIRE JOY', '412228640', '0.8675'
'20210', 'YII, NICHOLAS VINCENT', '410242566', '0.8194'
'21066', 'PAESLER, KELVIN', '413637577', '0.7422'
'20092', 'OSHEA, SAMANTHA MARIE', '412407185', '0.6761'
'20934', 'TIWARI, BRUCE LYLE', '412300282', '0.6550'
'20344', 'CHIENG, THAI DUY HONG', '413349000', '0.6508'
'20068', 'BENSON, TIMOTHY FRANCIS', '410497755', '0.6375'
'21462', 'SCOTT, KURT', '411235428', '0.6322'
'21998', 'CHIA, IOANNIS', '410742690', '0.6128'
'20012', 'GILTRAP, ELIZABETH JANE', '411607013', '0.6044'
```

OUTPUT:

11:17:01   SELECT   cs.CustomerID,   CONCAT(cs.Surname, ', ', cs.Given) AS CustomerName,   m.PhoneNumber,   SUM(c.CallDuration) / 3600 AS TotalHours FROM   calls c   JOIN   mobile m ON c.MobileID = m.MobileID JOIN   customer cs ON m.CustomerID = cs.CustomerID WHERE (MONTHNAME(c.CallDate) = 'August'   AND YEAR(c.CallDate) = 2019) GROUP BY m.PhoneNumber ORDER BY TotalHours DESC LIMIT 0, 10   10 row(s) returned   0.015 sec / 0.000 sec

16. i. Create a view that shows the popularity of each plan (i.e. how many plans are on each phone).

ii. Use this view in a query to determine the most popular plan.

QUERY:

CREATE VIEW PopularityView AS

  SELECT

    PlanName, COUNT(PlanName) AS populaity

  FROM

    mobile

  GROUP BY PlanName;

SELECT

  PlanName

FROM

  PopularityView

ORDER BY populaity DESC

LIMIT 1;

RESULT:

\# PlanName

'Budget1'

OUTPUT:

11:49:17   CREATE VIEW PopularityView AS   SELECT   PlanName, COUNT(PlanName) AS populaity   FROM   mobile   GROUP BY PlanName   0 row(s) affected   0.015 sec

11:49:17   SELECT   PlanName FROM   PopularityView ORDER BY populaity DESC LIMIT 1   1 row(s) returned   0.000 sec / 0.000 sec

17. List the total number of connections made on each tower location after 2018.

QUERY:

SELECT

  t.Location, COUNT(t.Location) AS TotalConnections

FROM

connect co

    JOIN

calls ca ON (co.CallsID = ca.CallsID)

    JOIN

tower t ON (co.TowerID = t.TowerID)

WHERE

    YEAR(CallDate) > 2018

GROUP BY t.Location;

RESULT:

\# Location, TotalConnections

'WINDSOR', '61'

'WERRIBEE', '144'

'MT WAVERLEY', '168'

'BENTLEIGH', '93'

'HAWTHORN', '310'

'EAST DONCASTER', '182'

'CLAYTON', '90'

'BOX HILL', '119'

'GLENROY', '81'

'MENTONE', '150'

OUTPUT:

14:34:44   SELECT   t.Location, COUNT(t.Location) AS TotalConnections FROM   connect co   JOIN   calls ca ON (co.CallsID = ca.CallsID)   JOIN tower t ON (co.TowerID = t.TowerID) WHERE   YEAR(CallDate) > 2018 GROUP BY t.Location LIMIT 0, 10   10 row(s) returned   0.109 sec / 0.000 sec

18.   List all the details of the most recently joined and oldest joined Samsung phone user.

QUERY:

(SELECT

    c.*,

    m.BrandName,

    TIMESTAMPDIFF(YEAR, m.Joined, CURDATE()) AS YearofUsage

FROM

    customer c

```
        JOIN
     mobile m ON (c.CustomerID = m.CustomerID)
WHERE
     (m.BrandName = 'Samsung')
ORDER BY YearofUsage
LIMIT 1) UNION ALL (SELECT
     c.*,
     m.BrandName,
     TIMESTAMPDIFF(YEAR, m.Joined, CURDATE()) AS YearofUsage
FROM
     customer c
        JOIN
     mobile m ON (c.CustomerID = m.CustomerID)
WHERE
     (m.BrandName = 'Samsung')
ORDER BY YearofUsage DESC
LIMIT 1);
```

RESULT:

\# CustomerID, Surname, Given, DOB, Sex, PhoneHome, PhoneWork, PhoneFax, Address, Suburb, State, Postcode, BrandName, YearofUsage

'20002', 'RAJOO', 'THINH MINH', '1963-05-31', 'M', '7842728', '8251837', '6955849', '11 HILDA CRES', 'WINDSOR', 'VIC', '3181', 'Samsung', '4'

'22228', 'MARRIOTT', 'JEFFREY DANIEL', '1993-10-17', 'M', '7061596', '8474802', '4264865', 'H525 RSD CRESWICK ROAD', 'NORTH BLACKBURN', 'VIC', '3130', 'Samsung', '22'

OUTPUT:

14:58:30   (SELECT   c.*,   m.BrandName,   TIMESTAMPDIFF(YEAR, m.Joined, CURDATE()) AS YearofUsage FROM   customer c   JOIN   mobile m ON (c.CustomerID = m.CustomerID) WHERE   (m.BrandName = 'Samsung') ORDER BY YearofUsage LIMIT 1) UNION ALL (SELECT   c.*, m.BrandName,   TIMESTAMPDIFF(YEAR, m.Joined, CURDATE()) AS YearofUsage FROM   customer c   JOIN   mobile m ON (c.CustomerID =

m.CustomerID) WHERE   (m.BrandName = 'Samsung') ORDER BY YearofUsage DESC LIMIT 1)   2 row(s) returned   0.000 sec / 0.000 sec

19.   Produce a list of staff who joined on the same month. Order the result in the following format:

Month	JoinedDate	Name
July	2012-07-12 00:00:00	TERRENCE IANJAMIESON
July	2012-07-21 00:00:00	VINCENZOKNOL

QUERY:

SELECT

    MONTHNAME(Joined) AS JoinedMonth,

    Joined AS JoinedDate,

    CONCAT(Surname, ' ', Given) AS StaffName

FROM

    staff

ORDER BY JoinedMonth DESC;

RESULT:

JoinedMonth, JoinedDate, StaffName

'September', '2012-09-23 00:00:00', 'PORTELLI CATHERINE MARY'

'September', '2012-09-15 00:00:00', 'KHOR GLENDA JEAN'

'October', '2011-10-18 00:00:00', 'HILTON HARRY RODNEY E'

'May', '2013-05-29 00:00:00', 'SUMMERS TED'

'March', '2012-03-09 00:00:00', 'MARZELLA PATRICK MICHAEL'

'March', '2012-03-18 00:00:00', 'SCANLON MICHAEL JOHN'

'July', '2012-07-12 00:00:00', 'JAMIESON TERRENCE IAN'

'July', '2012-07-21 00:00:00', 'KNOL VINCENZO'

'January', '2013-01-21 00:00:00', 'SANDERS RICHARD ANTHONY'

'April', '2012-04-16 00:00:00', 'VELLA SARATH AJITH L'

OUTPUT:

16:08:52 SELECT MONTHNAME(Joined) AS JoinedMonth, Joined AS JoinedDate, CONCAT(Surname, ' ', Given) AS StaffName FROM staff ORDER BY JoinedMonth DESC 10 row(s) returned 0.000 sec / 0.000 sec

20. In not more than 200 words, explain at least two ways to improve this database based on what you have learned in weeks 1-8. Draw specific examples from the database to support your argument.

   ANSWER: