Design Notes:

1. We have 3 original data tables i.e. **brand_table, receipt_table, user_table** as specified in Relational Diagram.
2. We also have an additional table generated from Receipts data called **ReceiptItem_Table** table which consists of *receipt_id, brand_id,* and all the normalized fields from **rewardsReceiptitemList field**. This can be used to join between receipt and brand table enabling us to maintain a relational structure in our data model
3. Available Tables :

receipt_table
brand_table
user_table
ReceiptItem_Table

SQL 1: What are the top 5 brands by receipts scanned for the most recent month?

```
SELECT
    brandcode,
    Count(*) AS receipt_count

FROM   receiptitem_table src
    JOIN receipt_table tgt
     ON src.receipt_id = tgt.receipt_id

WHERE  tgt.createdate >= Date_format(Last_day(Curdate() - INTERVAL 1 month)
                + INTERVAL 1 day, '%Y-%m-01')
    AND tgt.createdate < Date_format(Last_day(Curdate()), '%Y-%m-01')

GROUP  BY brand code
ORDER  BY receipt_count DESC
LIMIT  5;
```

```
WITH recentmonth
AS
 (
     SELECT  brandcode,
         count(*)                AS receipt_count,
         rank() over (ORDER BY count(*) DESC) AS ranking
     FROM    receiptitem_table src
     JOIN    receipt_table tgt
     ON      src.receipt_id = tgt.receipt_id
     WHERE   tgt.createdate >= date_sub(date_sub(curdate(), INTERVAL dayofmonth(curdate())-1 day), INTERVAL
0 month)
     AND     tgt.createdate < last_day(date_sub(date_sub(curdate(), INTERVAL dayofmonth(curdate())-1 day),
INTERVAL 0 month))
     GROUP BY brandcode
     ORDER BY receipt_count DESC
     LIMIT   5 ),


 previousmonth AS
 (
     SELECT  brandcode,
         count(*) AS receipt_count,
         rank() over (ORDER BY count(*) DESC) AS ranking
     FROM    receiptitem_table src
     JOIN    receipt_table tgt
     ON      src.receipt_id = tgt.receipt_id
     WHERE
tgt.createdate >= date_sub(date_sub((date_sub(@current_date, INTERVAL dayofmonth(@current_date)-1 day),
INTERVAL 0 month)), INTERVAL 1 month)
     AND tgt.createdate < last_day(date_sub(@start_recent_month, INTERVAL 1 month))

     GROUP BY brandcode
     ORDER BY receipt_count DESC
     LIMIT   5 )


 SELECT
     recentmonth.brandcode   AS recent_brand,
     recentmonth.ranking     AS recent_ranking,
     previousmonth.brandcode AS previous_brand,
     previousmonth.ranking   AS previous_ranking
 FROM    recentmonth
 LEFT JOIN previousmonth

ON      recentmonth.brandcode = previousmonth.brandcode

ORDER BY  recent_ranking;
```

SQL 3: When considering average spend from receipts with 'rewardsReceiptStatus' of 'Accepted' or 'Rejected', which is greater?

```
SELECT rewardsReceiptStatus, SUM(totalSpent) as totalSpent
FROM receipt_table
where rewardsReceiptStatus in ('Accepted', 'Rejected')
GROUP BY rewardsReceiptStatus
ORDER BY totalSpent DESC
LIMIT 1;
```

SQL 4: When considering total number of items purchased from receipts with 'rewardsReceiptStatus' of 'Accepted' or 'Rejected', which is greater?

```
SELECT rewardsreceiptstatus,
    Sum(purchaseditemcount) AS purchasedItemCount
FROM   receipt_table
WHERE  rewardsreceiptstatus IN ( 'Accepted', 'Rejected' )
GROUP  BY rewardsreceiptstatus
ORDER  BY purchaseditemcount DESC
LIMIT  1;
```

SQL 5: Which brand has the most spend among users who were created within the past 6 months?

```
SELECT brandcode,
    Sum(finalprice * quantitypurchased) AS totalSpent
FROM   receiptitem_table src
    JOIN receipt_table tgt
     ON src.receipt_id = tgt.receipt_id
-- joining to get user_id field from receipts table
WHERE  tgt.userid IN (SELECT _id
            FROM   user_table
            WHERE  From_unixtime(createdate / 1000) >
                Date_sub(Now(), INTERVAL 6 month))
GROUP  BY brandcode
ORDER  BY totalspent DESC
LIMIT  1
```

SQL 6: Which brand has the most transactions among users who were created within the past 6 months?

```
SELECT
     brandcode,
    Count(*) AS transaction_count
FROM   receiptitem_table src
    JOIN receipt_table tgt
     ON src.receipt_id = tgt.receipt_id

WHERE  tgt.userid IN (SELECT _id
           FROM   user_table
           WHERE  From_unixtime(createdate / 1000) >
               Date_sub(Now(), INTERVAL 6 month))

GROUP  BY brandcode
ORDER  BY totalspent DESC
LIMIT  1;
```