Problem 1:

a) $\sigma_{Name = "Bob"}\ (Users)$

b) $\sigma_{Categories\ LIKE\ \%Mexican\%}\ (Businesses)$

c) $\pi_{UserID}(\pi_{UserID}((\pi_{BusinessID}\ \sigma_{Name = "Taco\ bell"}\ Businesses) \bowtie Reviews) \bowtie Users)$

d) $\pi_{UserID}(\pi_{UserID}((\pi_{BusinessID}\ \sigma_{Categories\ LIKE\ \%Mexican\%}\ Businesses) \bowtie Reviews) \bowtie Users)$

e) $\sigma_{YEAR(Yelping\ since) = 2018}\ (\pi_{UserID}((\pi_{BusinessID}\ \sigma_{Name = "Pita\ Jungle"}\ Businesses) \bowtie Reviews) \bowtie Users)$

f)

Solution 1:

$$\sigma_{BusinessID > 0}\ (\pi_{BusinessID}((\pi_{UserID}\ \sigma_{YEAR(Yelping\ since) = 2016 \vee YEAR(Yelping\ since) = 2018}\ Users) \bowtie Reviews) \bowtie Businesses)$$

Solution 2:

$$\rho\ (Temp1, \sigma_{YEAR(Yelping\ since) = 2016}\ Users)$$
$$\rho\ (Temp2, \sigma_{YEAR(Yelping\ since) = 2018}\ Users)$$
$$\rho\ (Temp3, Temp1 \cup Temp2)$$
$$\rho\ (Temp4, (\pi_{UserID}\ Temp3) \bowtie Reviews)$$
$$\sigma_{BusinessID > 0}\ ((\pi_{BusinessID}\ Temp4) \bowtie Businesses)$$

g) Find users who have rated every single business except Chinese restaurants

$$\sigma_{Categories\ NOT\ LIKE\ \%Chinese\%}\ (Businesses)$$
$$\sigma_{BusinessID\ != Chinese}\ (Businesses)$$

Problem 2:

a)

e.
```
SELECT   U *
FROM     Users U, Businesses B, Reviews R
WHERE    U.Yelping_Since LIKE '2018%' AND U.UserID = R.UserID AND
         R.BusinessID = B.BusinessID AND B.Name = 'Pita jungle'
```

f.
```
SELECT   B *
FROM     Businesses B, Users U, Reviews R
WHERE    B.BusinessID = R.BusinessID AND R.UserID = U.UserID
         AND (U.Yelping_Since LIKE '2016%' OR U.Yelping_Since LIKE '2018%')
```

g.
```
SELECT
FROM
WHERE
```

b)

a.
```
SELECT   U *
FROM     Users U
WHERE    U.Yelping_Since BETWEEN (LIKE '2016%' AND LIKE '2018%')
```

b.
```
SELECT   U.UserID
FROM     Users U, Businesses B, Reviews R
WHERE    U.UserID = R.UserID AND R.BusinessID = B.BusinessID AND
         (B.Categories LIKE 'Mexican%' OR B.Categories LIKE 'Chinese%')
```

c.
```
SELECT   B.BusinessID
FROM     Businesses B, Users U, Reviews R
WHERE    B.Name = 'BurgerKing' AND B.BussinessID = R.BusinessID
         AND R.UserID = U.UserID AND U.Yelping_Since LIKE '2018%'
```

```
SELECT   B.BusinessID
FROM     Businesses B, Reviews R
WHERE    B.Name = 'BurgerKing' AND R.BusinessID = B.BusinessID
UNION
SELECT   U.UserID
FROM     Users U, Review R
SELECT   U.UserID = R.UserID AND U.Yelping_Since LIKE '2018%'
```

d.
```
SELECT   B *
FROM     Businesses B, Reviews R
WHERE    B.BusinessID = R.BusinessID AND (AVG(R.Review) > 4.0)
```