Trip Planner

Queries

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Designed by

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1. List all the cities which have more than 3 historical places to visit.

Ans1)

$$a \leftarrow \text{Locality} \bowtie_{\text{<locality\_id=PlacesToVisit.locality\_id>}} \text{PlacesToVisit}$$

$$b \leftarrow \sigma_{\text{<type = 'Historical'>}}(a)$$

$$c \leftarrow {}_{\text{city\_name}}\mathcal{G}_{\text{count(city\_name)}}(b) \text{ HAVING}_{\text{<ℸ<count> >=3>}}$$

$$D \leftarrow \pi_{\text{<city\_name>}}(c)$$

```sql
SELECT
    distinct city_name
from
    Locality as l
    join PlacesToVisit as ptv ON (l.locality_id = ptv.locality_id)
WHERE
    place_type = 'Historical'
group by(city_name)
HAVING
    count(city_name) >= 3;
```

```
201651017=> SELECT
201651017->
201651017->    distinct city_name
201651017->
201651017-> from
201651017->
201651017->    Locality as l
201651017->
201651017->    join PlacesToVisit as ptv ON (l.locality_id = ptv.locality_id)
201651017->
201651017-> WHERE
201651017->
201651017->    place_type = 'Historical'
201651017->
201651017-> group by(city_name)
201651017->
201651017-> HAVING
201651017->
201651017->    count(city_name) >= 3;
 city_name
-----------
 Ahmedabad
(1 row)
```

2. AC buses between Ahmedabad and Mumbai on date 17th April, 2018.

Ans 2)

a ← Bus ⋈$_{<Bus.bus\_id=BusReservation.bus\_id>}$ BusReservation

b ← σ$_{<source = 'Ahmedabad' \text{ and } destination = 'Mumbai' \text{ and } is\_active = True \text{ and } date =}$
$_{'2018-4-17'>}$(a)

c ← π$_{<bus\_id, bus\_service\_provider>}$(c)

```
SELECT
      b.bus_id,
      b.bus_service_provider
from
      Bus as b
      join BusReservation as br on (b.bus_id = br.bus_id)
where
      source = 'Ahmedabad'
      and destination = 'Mumbai'
      and departure_date = '2018-04-17'
      and is_ac = True;
```

```
201651017=> SELECT
201651017->       distinct b.bus_id,
201651017->       b.bus_service_provider
201651017-> from
201651017->       Bus as b
201651017->       join BusReservation as br on (b.bus_id = br.bus_id)
201651017-> where
201651017->       source = 'Ahmedabad'
201651017->       and destination = 'Mumbai'
201651017->       and departure_date = '2018-04-17'
201651017->       and is_ac = True;
 bus_id | bus_service_provider
--------+----------------------
 GJ1001 | Underwoods
(1 row)
```

3. Cities in which intra city traveling cost is greater than travelling to these cities with Ahmedabad as source.

Ans 3.)

$a \leftarrow \sigma_{<source = \text{'Ahmedabad'}>}(\text{BusReservation})$

$b \leftarrow \sigma_{<source = \text{'Ahmedabad'}>}(\text{TrainReservation})$

$c \leftarrow a \cup b$

$d \leftarrow {}_{destination}\mathcal{G}_{min(cost) \text{ as } min\_inter\_cost}(x)$

$e \leftarrow {}_{city\_name}\mathcal{G}_{min(cost\_per\_day) \text{ as } minn\_intra\_cost}(\text{Cabs})$

$f \leftarrow d \bowtie_{<destination = city\_name>} e$

$g \leftarrow \sigma_{<min\_intra\_cost > min\_inter\_cost>}(f)$

$h \leftarrow \pi_{<city\_name>}(g)$

```sql
SELECT
      city_name
FROM
      (
      SELECT
            destination,
            min(cost) as min_inter_cost
      from
            (
                  SELECT
                  bus_id,
                  NULL as train_id,
                  source,
                  destination,
                  cost
                  from
                  BusReservation
                  where
                  source = 'Ahmedabad'
                  union
                  SELECT
```

```sql
            NULL as bus_id,
            train_id,
            source,
            destination,
            fare as  cost
            from
            TrainReservation
            where
            source = 'Ahmedabad'
        ) as joined
    group by
        (destination)
    ) as inter_query
    join (
    SELECT
        city_name,
        min(cost_per_day) as min_intra_cost
    from
        Cabs
    group by
        (city_name)
    ) as intra_query on (inter_query.destination = intra_query.city_name)
where
    min_intra_cost > min_inter_cost;
```

```
201651017=> SELECT
201651017->     city_name
201651017-> FROM
201651017->     (
201651017(>         SELECT
201651017(>             destination,
201651017(>             min(cost) as min_inter_cost
201651017(>         from
201651017(>             (
201651017(>                 SELECT
201651017(>                     bus_id,
201651017(>                     NULL as train_id,
201651017(>                     source,
201651017(>                     destination,
201651017(>                     cost
201651017(>                 from
201651017(>                     BusReservation
201651017(>                 where
201651017(>                     source = 'Ahmedabad'
201651017(>                 union
201651017(>                 SELECT
201651017(>                     NULL as bus_id,
201651017(>                     train_id,
201651017(>                     source,
201651017(>                     destination,
201651017(>                     fare as  cost
201651017(>                 from
201651017(>                     TrainReservation
201651017(>                 where
201651017(>                     source = 'Ahmedabad'
201651017(>             ) as joined
201651017(>         group by
201651017(>             (destination)
201651017(>     ) as inter_query
201651017->     join (
201651017(>         SELECT
201651017(>             city_name,
201651017(>             min(cost_per_day) as min_intra_cost
201651017(>         from
201651017(>             Cabs
201651017(>         group by
201651017(>             (city_name)
201651017(>     ) as intra_query on (inter_query.destination = intra_query.city_name)
201651017-> where
201651017->     min_intra_cost > min_inter_cost;
```

```
201651017-> where
201651017->         min_intra_cost > min_inter_cost;
 city_name
 -----------
 Ujjain
 Mumbai
 Vadodara
 Surat
(4 rows)
```

4. Restaurants near the cheapest hotel in Ahmedabad.

Ans 4.)

$a \leftarrow$ hotels $\bowtie_{<hotel.locality\_id=locality.locality\_id>}$ locality

$b \leftarrow \sigma_{<city\_name = "Ahmedabad">}(a)$

$c \leftarrow \pi_{<min(cost)>}(b)$

$d \leftarrow \sigma_{<cost\ in\ c\ and\ city\_name = "Ahmedabad">}(b)$

$e \leftarrow d \bowtie_{<d.locality\_id=Restaurants.locality\_id>}$ Restaurants

$f \leftarrow \pi_{<city\_name>}(e)$

```sql
SELECT
      restaurant_name,
      cheapest_hotel.locality_id,
      cheapest_hotel.hotel_name
from
      (
      SELECT
            l.locality_id,
            hr.hotel_name,
            cost
      from
            HotelReservation as hr
            join Locality as l on (hr.locality_id = l.locality_id)
      where
            cost in (
                  SELECT
                  min(cost)
                  from
                  HotelReservation as hr
                  join Locality as l on (hr.locality_id = l.locality_id)
                  where
                  city_name = 'Ahmedabad'
            )
            and city_name = 'Ahmedabad'
      ) as cheapest_hotel
      JOIN Restaurants as r on(cheapest_hotel.locality_id = r.locality_id);
```

```
201651017=> SELECT
201651017->     restaurant_name,
201651017->     cheapest_hotel.locality_id,
201651017->     cheapest_hotel.hotel_name
201651017-> from
201651017->     (
201651017(>         SELECT
201651017(>             l.locality_id,
201651017(>             hr.hotel_name,
201651017(>             cost
201651017(>         from
201651017(>             HotelReservation as hr
201651017(>             join Locality as l on (hr.locality_id = l.locality_id)
201651017(>         where
201651017(>             cost in (
201651017(>                 SELECT
201651017(>                     min(cost)
201651017(>                 from
201651017(>                     HotelReservation as hr
201651017(>                     join Locality as l on (hr.locality_id = l.locality_id)
201651017(>                 where
201651017(>                     city_name = 'Ahmedabad'
201651017(>             )
201651017(>             and city_name = 'Ahmedabad'
201651017(>     ) as cheapest_hotel
201651017->     JOIN Restaurants as r on(cheapest_hotel.locality_id = r.locality_id);
 restaurant_name | locality_id |  hotel_name
-----------------+-------------+---------------
 Dine Ten        |           1 | Hotel Economy
 Furat           |           1 | Hotel Economy
 Satkar          |           1 | Hotel Economy
(3 rows)
```

5 . All means to travel from Ahmedabad to the city which can be reached in minimum time (from Ahmedabad).

ANS 5 .)

$a \leftarrow \sigma_{<source = \text{"Ahmedabad"}>}(BusJourneyHours)$

$b \leftarrow \sigma_{<source = \text{"Ahmedabad"}>}(TrainJourneyHours)$

$c \leftarrow a \cup b$

$d \leftarrow \pi_{<min(journey\_hours)>}(c)$

$e \leftarrow \sigma_{<journey\_hours\ in\ d>}(c)$

$$f \leftarrow \pi_{<bus\_id,\ train\_id,\ destination,\ journey\_hours>}(e)$$

```
SELECT
      bus_id,
      train_id,
      journey_hours
from
      (
      SELECT
            bus_id,
            NULL as train_id,
            source,
            destination,
            journey_hours
      from
            BusJourneyHours
      where
            source = 'Ahmedabad'
      UNION
      SELECT
            NULL as bus_id,
            train_id,
            source,
            destination,
            journey_hours
      from
            TrainJourneyHours
      where
            source = 'Ahmedabad'
      ) as all_travel_details
where
      journey_hours in (
      SELECT
            min(journey_hours)
      from
            (
                  SELECT
                  bus_id,
                  NULL as train_id,
                  source,
                  destination,
```

```sql
                    journey_hours
                    from
                    BusJourneyHours
                    where
                    source = 'Ahmedabad'
                    UNION
                    SELECT
                    NULL as bus_id,
                    train_id,
                    source,
                    destination,
                    journey_hours
                    from
                    TrainJourneyHours
                    where
                    source = 'Ahmedabad'
            ) as min_journey_cost
    );
```

```
201651017=> SELECT
201651017->      bus_id,
201651017->      train_id,
201651017->      all_travel_details.destination,
201651017->      journey_hours
201651017-> from
201651017->      (
201651017(>          SELECT
201651017(>              bus_id,
201651017(>              NULL as train_id,
201651017(>              source,
201651017(>              destination,
201651017(>              journey_hours
201651017(>          from
201651017(>              BusJourneyHours
201651017(>          where
201651017(>              source = 'Ahmedabad'
201651017(>          UNION
201651017(>          SELECT
201651017(>              NULL as bus_id,
201651017(>              train_id,
201651017(>              source,
201651017(>              destination,
201651017(>              journey_hours
201651017(>          from
201651017(>              TrainJourneyHours
201651017(>          where
201651017(>              source = 'Ahmedabad'
201651017(>      ) as all_travel_details
201651017-> where
201651017->      journey_hours in (
201651017(>          SELECT
201651017(>              min(journey_hours)
201651017(>          from
201651017(>              (
201651017(>                  SELECT
201651017(>                      bus_id,
201651017(>                      NULL as train_id,
201651017(>                      source,
201651017(>                      destination,
201651017(>                      journey_hours
201651017(>                  from
201651017(>                      BusJourneyHours
201651017(>                  where
201651017(>                      source = 'Ahmedabad'
```

```
201651017(>                                 journey_nours
201651017(>                         from
201651017(>                             BusJourneyHours
201651017(>                         where
201651017(>                             source = 'Ahmedabad'
201651017(>                         UNION
201651017(>                         SELECT
201651017(>                             NULL as bus_id,
201651017(>                             train_id,
201651017(>                             source,
201651017(>                             destination,
201651017(>                             journey_hours
201651017(>                         from
201651017(>                             TrainJourneyHours
201651017(>                         where
201651017(>                             source = 'Ahmedabad'
201651017(>                 ) as min_journey_cost
201651017(>        );
 bus_id | train_id | destination | journey_hours
--------+----------+-------------+---------------
        |     1501 | Vadodara    |             2
 GJ1003 |          | Vadodara    |             2
 GJ1002 |          | Vadodara    |             2
 GJ1004 |          | Vadodara    |             2
 GJ1001 |          | Vadodara    |             2
(5 rows)
```

6. Find restaurants which are nearby to the highest rated place to visit in Ahmedabad.

Ans 6.)

a ← PlacesToVisit $\bowtie_{<PlacesToVisit.locality\_id=Locality.locality\_id>}$ Locality

b ← $\sigma_{<city\_name = "Ahmedabad">}$(a)

c ← $\pi_{<max(rating)>}$(b)

d ← $\sigma_{<cost\ in\ c\ and\ city\_name = "Ahmedabad">}$(b)

e ← d $\bowtie_{<d.locality\_id=Restaurants.locality\_id>}$ Restaurants

$$f \leftarrow \pi_{<place\_name, restaurant\_name>}(e)$$

```sql
SELECT
    place_name,
    restaurant_name
FROM
    (
    SELECT
        place_name,
        l.locality_id,
        l.city_name
    from
        PlacesToVisit as ptv
        join Locality as l on (l.locality_id = ptv.locality_id)
    where
        rating in (
            SELECT
            max(ptv.rating)
            from
            PlacesToVisit as ptv
            join Locality as l on (l.locality_id = ptv.locality_id)
            where
            city_name = 'Ahmedabad'
        )
    ) as max_rated_place
    JOIN Restaurants as rest on (rest.locality_id =
max_rated_place.locality_id)
where
    max_rated_place.city_name = 'Ahmedabad';
```

```
201651017=> SELECT
201651017->     place_name,
201651017->     restaurant_name
201651017-> FROM
201651017->     (
201651017(>         SELECT
201651017(>             place_name,
201651017(>             l.locality_id,
201651017(>             l.city_name
201651017(>         from
201651017(>             PlacesToVisit as ptv
201651017(>             join Locality as l on (l.locality_id = ptv.locality_id)
201651017(>         where
201651017(>             rating in (
201651017(>                 SELECT
201651017(>                     max(ptv.rating)
201651017(>                 from
201651017(>                     PlacesToVisit as ptv
201651017(>                     join Locality as l on (l.locality_id = ptv.locality_id)
201651017(>                 where
201651017(>                     city_name = 'Ahmedabad'
201651017(>             )
201651017(>     ) as max_rated_place
201651017->     JOIN Restaurants as rest on (rest.locality_id = max_rated_place.locality_id)
201651017-> where
201651017->     max_rated_place.city_name = 'Ahmedabad';
   place_name    | restaurant_name
-----------------+-----------------
 Riverfront      | Dine Ten
 Riverfront      | Furat
 Riverfront      | Satkar
 Kankariya Lake  | Dine Ten
 Kankariya Lake  | Furat
 Kankariya Lake  | Satkar
(6 rows)
```

7. Find those hotels in Ahmedabad, which have those rooms available that can accomodate more than 1 person.

Ans.7)

a ← HotelReservation $\bowtie_{<HotelReservation.room\_type = TypeOfRoom.room\_type>}$ TypeOfRoom

b ← a $\bowtie_{<a.locality\_id = Locality.locality\_id>}$ Locality

c ← $\sigma_{<city\_name = \text{"Ahmedabad" and max\_accomodation > 1 and total\_available\_rooms > 1>}}$(b)

d ← $\pi_{<distinct\ hote\_name,\ room\_type>}$(c)

```sql
SELECT
      DISTINCT hotel_name,
      tor.room_type
from
      HotelReservation as hr
      join TypeOfRoom as tor on (hr.room_type = tor.room_type)
      join Locality as l on (l.locality_id = hr.locality_id)
where
      city_name = 'Ahmedabad'
      and max_accomodation > 1
      and total_available_rooms > 1;
```

```
201651017=> SELECT
201651017->      DISTINCT hotel_name,
201651017->      tor.room_type
201651017-> from
201651017->      HotelReservation as hr
201651017->      join TypeOfRoom as tor on (hr.room_type = tor.room_type)
201651017->      join Locality as l on (l.locality_id = hr.locality_id)
201651017-> where
201651017->      city_name = 'Ahmedabad'
201651017->      and max_accomodation > 1
201651017->      and total_available_rooms > 1;
    hotel_name      | room_type
--------------------+------------
 BB Hotel           | Double Bed
 Hotel Economy      | Double Bed
 Hotel Shahnamah    | Double Bed
 The Bhai Hotel     | Double Bed
 Hotel Bollywood    | Double Bed
 Hotel Piku         | Double Bed
 Renaissance Hotel  | Double Bed
(7 rows)
```

8.) All those cab service providers who can provide a 'sedan' cab in Ahmedabad.

Ans 8.)

$a \leftarrow Cabs \bowtie_{<Cabs.cab\_service\_id=CabService.cab\_service\_id>} CabService$

$b \leftarrow \sigma_{<cab\_type = "sedan" \ and \ city\_name = "Ahmedabad">}(a)$

$c \leftarrow \pi_{<cab\_service\_id, \ provider\_name>}(b)$

```
SELECT
    c.cab_service_id,
    cs.provider_name
from
    Cabs as c
    join CabService as cs on (cs.cab_service_id = c.cab_service_id)
where
    cab_type = 'Sedan'
    and city_name = 'Ahmedabad';
```

```
201651017=> SELECT
201651017->    c.cab_service_id,
201651017->    cs.provider_name
201651017-> from
201651017->    Cabs as c
201651017->    join CabService as cs on (cs.cab_service_id = c.cab_service_id)
201651017-> where
201651017->    cab_type = 'Sedan'
201651017->    and city_name = 'Ahmedabad';
 cab_service_id | provider_name
----------------+---------------
 C101           | Uber
 C102           | Ola
 C103           | Jugnoo
(3 rows)
```

9. List all the cities which have at least one historical place to visit.

Ans 9.)

$a \leftarrow$ PlacesToVisit $\bowtie_{<PlaceToVIsit.cab\_service\_id=Locality.cab\_service\_id>}$ Locality

$b \leftarrow \sigma_{<place\_type = 'Historical'>}(a)$

$c \leftarrow {}_{city\_name}\mathcal{G}\,(b)\,\text{HAVING}_{<\mho<count\,>=\,1>}$

$d \leftarrow \pi_{<city\_name>}(c)$

```sql
SELECT
      city_name
from
      PlacesToVisit as ptv
      join Locality as l on (ptv.locality_id = l.locality_id)
where
      place_type = 'Historical'
GROUP by(city_name)
HAVING
      count(place_type) >= 1;
```

```
201651017=> SELECT
201651017->      city_name
201651017-> from
201651017->      PlacesToVisit as ptv
201651017->      join Locality as l on (ptv.locality_id = l.locality_id)
201651017-> where
201651017->      place_type = 'Historical'
201651017-> GROUP by(city_name)
201651017-> HAVING
201651017->      count(place_type) >= 1;
 city_name
-----------
 Ahmedabad
 Surat
 Gwalior
 Vadodara
 Mumbai
(5 rows)
```

10.) All those buses traveling between from Ahmedabad to the city whose total no. of places to visit are greater than 3

And 10.)

$a \leftarrow$ PlacesToVisit $\bowtie_{<PlaceToVIsit.cab\_service\_id=Locality.cab\_service\_id>}$ Locality

$b \leftarrow {}_{city\_name}\mathcal{G}\,(a)$ HAVING$_{<\mathcal{J}<count\ >=\ 3>}$

$c \leftarrow b \bowtie_{<destination\ =\ city\_name>}$ BusJourneyHours

$d \leftarrow c \bowtie_{<c.bus\_id\ =\ Bus.bus\_id>}$ Bus

$e \leftarrow \sigma_{<source\ =\ "Ahmedabad">}(d)$

$f \leftarrow \pi_{<distinct\ bus\_id,\ bus\_service\_provider,\ city\_name>}(e)$

```sql
SELECT
    distinct b.bus_id,
    b.bus_service_provider,
    places.city_name
from
    (
    SELECT
        city_name
    from
        PlacesToVisit as ptv
        join Locality as l on(l.locality_id = ptv.locality_id)
    group by
        (city_name)
    HAVING
        count(city_name) >= 3
    ) as places
    join BusJourneyHours as bj on (bj.destination = places.city_name)
    join Bus as b on (b.bus_id = bj.bus_id)
where
    source = 'Ahmedabad';
```

```
201651017=> SELECT
201651017->     distinct b.bus_id,
201651017->     b.bus_service_provider,
201651017->     places.city_name
201651017-> from
201651017->     (
201651017(>         SELECT
201651017(>             city_name
201651017(>         from
201651017(>             PlacesToVisit as ptv
201651017(>             join Locality as l on(l.locality_id = ptv.locality_id)
201651017(>         group by
201651017(>             (city_name)
201651017(>         HAVING
201651017(>             count(city_name) >= 3
201651017(>     ) as places
201651017->     join BusJourneyHours as bj on (bj.destination = places.city_name)
201651017->     join Bus as b on (b.bus_id = bj.bus_id)
201651017-> where
201651017->     source = 'Ahmedabad';
 bus_id | bus_service_provider | city_name
--------+----------------------+----------
 GJ1001 | Underwoods           | Mumbai
 GJ1001 | Underwoods           | Surat
 GJ1002 | Underwoods           | Vadodara
 GJ1004 | Underwoods           | Vadodara
 GJ1003 | Underwoods           | Surat
 GJ1003 | Underwoods           | Vadodara
 GJ1001 | Underwoods           | Vadodara
 GJ1002 | Underwoods           | Surat
 GJ1002 | Underwoods           | Mumbai
(9 rows)
```

11.) All those cab service providers whose rating is greater than 3 and who provide a 'hatchback' cab in those cities which have a Hotel Shahnamah.

Ans 11.)

a ← Hotel ⋈$_{<Hotel.locality\_id = Locality.locality\_id>}$ Locality

b ← σ$_{<hotel\_name = 'Hotel Shahnamah'>}$(a)

c ← b ⋈$_{<b.city\_type = Cabs.city\_type>}$ Cabs

d ← c ⋈$_{<c.cab\_type = CabType.cab\_type>}$ CabType

e ← d ⋈$_{<d.cab\_service\_id = CabService.cab\_service\_id>}$ CabService

$f \leftarrow \sigma_{<\text{rating} > 3 \text{ and cab\_type = 'Hatchback'}>}(e)$

$g \leftarrow \pi_{<\text{provider\_name, city\_name}>}(f)$

```sql
SELECT
      cs.provider_name,
      c.city_name
from
      (
      SELECT
            *
      from
            Hotel as h
            join Locality as l on (l.locality_id = h.locality_id)
      where
            hotel_name = 'Hotel Shahnamah'
      ) as hotel_sham
      join Cabs as c on (c.city_name = hotel_sham.city_name)
      join cabtype  as ct on (c.cab_type = ct.cab_type)
      join cabservice as cs on (cs.cab_service_id = c.cab_service_id)
where
      cs.rating > 3
      and ct.cab_type = 'HatchBack';
```

```
201651017=> SELECT
201651017->     cs.provider_name,
201651017->     c.city_name
201651017-> from
201651017->     (
201651017(>         SELECT
201651017(>             *
201651017(>         from
201651017(>             Hotel as h
201651017(>             join Locality as l on (l.locality_id = h.locality_id)
201651017(>         where
201651017(>             hotel_name = 'Hotel Shahnamah'
201651017(>     ) as hotel_sham
201651017->     join Cabs as c on (c.city_name = hotel_sham.city_name)
201651017->     join cabtype  as ct on (c.cab_type = ct.cab_type)
201651017->     join cabservice as cs on (cs.cab_service_id = c.cab_service_id)
201651017-> where
201651017->     cs.rating > 3
201651017->     and ct.cab_type = 'HatchBack';
 provider_name | city_name
---------------+-----------
 Uber          | Ahmedabad
 Ola           | Ahmedabad
 Jugnoo        | Ahmedabad
 GozoCabs      | Ahmedabad
 Savaari       | Ahmedabad
 Uber          | Mumbai
 Ola           | Mumbai
 Jugnoo        | Mumbai
 GozoCabs      | Mumbai
 Savaari       | Mumbai
 Uber          | Gwalior
 Ola           | Gwalior
(12 rows)
```

12.) All those hotels which have rating greater than 4 located in the city which is nearby to Ahmedabad and has min. bus travelling cost (in a bus with available seats) with Ahmedabad as source .

Ans 12 .)

a ← BusReservation ⋈_{<destination = nearby_city>} NearbyCities

b ← σ_{<source ='Ahmedabad' and current_city = 'Ahmedabad'>}(a)

$c \leftarrow \pi_{<min(cost)>}(b)$

$d \leftarrow \sigma_{<cost\ in\ c>}(b)$

$e \leftarrow Hotel \bowtie_{<Hotel.locality\_id=\ Locality.locality\_id>} Locality$

$f \leftarrow \pi_{<hotel\_name,\ city\_name,\ rating>}(e)$

$g \leftarrow c \bowtie_{<city\_name\ =\ destination>} f$

$h \leftarrow \sigma_{<c,rating\ >\ 4>}(g)$

$i \leftarrow \pi_{<hotel\_name,\ city\_name>}(h)$

```sql
SELECT
      hotel_name,city_name
from
      (
      SELECT
            destination
      from
            BusReservation as br
            join NearbyCities as nc on(br.destination = nc.nearby_city)
      where
            br.cost in (
                  SELECT
                  min(cost)
                  from
                  BusReservation as br
                  join NearbyCities as nc on(br.destination =
nc.nearby_city)
                  where
                  br.source = 'Ahmedabad'
                  and nc.current_city = 'Ahmedabad'
            )
            and br.source = 'Ahmedabad'
            and nc.current_city = 'Ahmedabad'
      ) as min_cost_city
      join (
      SELECT
            hotel_name,
            city_name,
            h.rating
      from
```

```sql
        hotel as h
        join locality as l on (l.locality_id = h.locality_id)
    ) as hotel_info on (
    hotel_info.city_name = min_cost_city.destination
    )
    where hotel_info.rating >= 4;
```

```
201651017=> SELECT
201651017->     hotel_name,city_name
201651017-> from
201651017->     (
201651017(>         SELECT
201651017(>             destination
201651017(>         from
201651017(>             BusReservation as br
201651017(>             join NearbyCities as nc on(br.destination = nc.nearby_city)
201651017(>         where
201651017(>             br.cost in (
201651017(>                 SELECT
201651017(>                     min(cost)
201651017(>                 from
201651017(>                     BusReservation as br
201651017(>                     join NearbyCities as nc on(br.destination = nc.nearby_city)
201651017(>                 where
201651017(>                     br.source = 'Ahmedabad'
201651017(>                     and nc.current_city = 'Ahmedabad'
201651017(>             )
201651017(>             and br.source = 'Ahmedabad'
201651017(>             and nc.current_city = 'Ahmedabad'
201651017(>     ) as min_cost_city
201651017->     join (
201651017(>         SELECT
201651017(>             hotel_name,
201651017(>             city_name,
201651017(>             h.rating
201651017(>         from
201651017(>             hotel as h
201651017(>             join locality as l on (l.locality_id = h.locality_id)
201651017(>     ) as hotel_info on (
201651017(>         hotel_info.city_name = min_cost_city.destination
201651017(>     )
201651017->     where hotel_info.rating >= 4;
    hotel_name     | city_name
-------------------+-----------
 The New Age Hotel | Vadodara
 The Namo Hotel    | Vadodara
 Renaissance Hotel | Vadodara
(3 rows)
```