CSCI 5333.1 DBMS Fall 2021

Suggested Solution for HW #3

(1) For example:

(a)

```
PROJECT [city] (SELECT [country_id=15] (city));
```

(b)

```
PROJECT [city] (CITY JOIN (PROJECT [country_id] (SELECT [country='Bangladesh'] (COUNTRY))));
```

(c)

```
PROJECT [address]
(ADDRESS JOIN
 (PROJECT [city_id] (CITY JOIN (PROJECT [country_id] (SELECT [country='Bangladesh'] (COUNTRY))))));
```

(d)

```
PROJECT [first_name, last_name]
(customer JOIN
  (PROJECT [customer_id]
    (rental JOIN
            (PROJECT [inventory_id]
                    (inventory JOIN
                      PROJECT [film_id] (SELECT [actor_id = 1] (film_actor)))))));
```

(e)

```
PROJECT [first_name, last_name]
(customer JOIN
  ((PROJECT [customer_id]
    (rental JOIN
            (PROJECT [inventory_id]
                    (inventory JOIN
                      PROJECT [film_id] (SELECT [actor_id = 1] (film_actor))))))
  INTERSECT
  (PROJECT [customer_id]
    (rental JOIN
            (PROJECT [inventory_id]
                    (inventory JOIN
```

PROJECT [film_id] (SELECT [actor_id = 2] (film_actor))))))));

(f)

PROJECT [first_name, last_name]
(customer JOIN
((PROJECT [customer_id]
(rental JOIN
(PROJECT [inventory_id]
(inventory JOIN
PROJECT [film_id] (SELECT [actor_id = 1] (film_actor))))))
MINUS
(PROJECT [customer_id]
(rental JOIN
(PROJECT [inventory_id]
(inventory JOIN
PROJECT [film_id] (SELECT [actor_id = 2] (film_actor))))))));

(g)

PROJECT [title]
(film JOIN
((PROJECT [film_id] (film))
MINUS
(PROJECT [film_id] (film_actor))));

(2) For examples:

(a) π_{city} ($\sigma_{country\_id=12}$ (city))

(b) π_{city} (city |x| $\pi_{country\_id}$($\sigma_{country='Bangladesh'}$ (country)))

(c) $\pi_{address}$ (address |x|π_{city_id} (city |x| $\pi_{country\_id}$($\sigma_{country='Bangladesh'}$ (country)))))

(d) $\pi_{first\_name,\ last\_name}$ (customer |x| $\pi_{customer\_id}$ (rental |x| $\pi_{inventory\_id}$(inventory |x| π_{film_id} ($\sigma_{actor\_id=1}$ (film_actor)))))

(e) $\pi_{first\_name,\ last\_name}$ (customer |x|

($\pi_{customer\_id}$ (rental |x| $\pi_{inventory\_id}$(inventory |x| π_{film_id} ($\sigma_{actor\_id=1}$ (film_actor)))) $\cap$

$\pi_{customer\_id}$ (rental |x| $\pi_{inventory\_id}$(inventory |x| π_{film_id} ($\sigma_{actor\_id=2}$ (film_actor))))))

(f) $\pi_{first\_name,\ last\_name}$ (customer |x|

$(\pi_{customer\_id}$ (rental |x| $\pi_{inventory\_id}$(inventory |x| π_{film_id} ($\sigma_{actor\_id=1}$ (film_actor)))) -

$\pi_{customer\_id}$ (rental |x| $\pi_{inventory\_id}$(inventory |x| π_{film_id} ($\sigma_{actor\_id=2}$ (film_actor))))))

(g) π_{title}(film |x| (π_{film_id}(film) - π_{film_id}(film_actor)))