CSCI 5333.2 & .3 DBMS Fall 2021

Suggested Solution for HW #4

(1)

(a) {(city) | (12, city,_, _) ϵ city}

(b) {(city) | (_, city, _, country_id, _) ϵ city, (country_id, 'Bangladesh', _) ϵ country}

(c) {(address) | (_, address, _, _ city_id, _, _, _, _) ϵ address, (city_id, _, country_id, _) ϵ city, (country_id, 'Bangladesh', _) ϵ country}

(d) {(first_name, last_name)|(customer_id, _, first_name, last_name,_,_,_,_,_) ϵ customer, (_,_,inventory_id,customer_id,_,_,_) ϵ rental, (inventory_id, film_id,_,_) ϵ inventory, (1, film_id,_) ϵ film_actor}

(e) {(first_name, last_name)|(customer_id, _, first_name, last_name,_,_,_,_,_) ϵ customer, (_,_,inventory_id_1,customer_id,_,_,_) ϵ rental, (inventory_id_1, film_id_1,_,_) ϵ inventory, (1, film_id_1,_) ϵ film_actor, (_,_,inventory_id_2,customer_id,_,_,_) ϵ rental, (inventory_id_2, film_id_2,_,_) ϵ inventory, (2, film_id_2,_) ϵ film_actor}

Using multiple steps:

R1 <- {(first_name, last_name)|(customer_id, _, first_name, last_name,_,_,_,_,_) ϵ customer, (_,_,inventory_id,customer_id,_,_,_) ϵ rental, (inventory_id, film_id,_,_) ϵ inventory, (1, film_id,_) ϵ film_actor}

R2 <- {(first_name, last_name)|(customer_id, _, first_name, last_name,_,_,_,_,_) ϵ customer, (_,_,inventory_id,customer_id,_,_,_) ϵ rental, (inventory_id, film_id,_,_) ϵ inventory, (2, film_id,_) ϵ film_actor}

R <- {(first_name, last_name)| (first_name, last_name) ϵ R1, (first_name, last_name) ϵ R2}

(f)

R1 <- {(first_name, last_name)|(customer_id, _, first_name, last_name,_,_,_,_,_) ϵ customer, (_,_,inventory_id,customer_id,_,_,_) ϵ rental, (inventory_id, film_id,_,_) ϵ inventory, (1, film_id,_) ϵ film_actor}

R2 <- {(first_name, last_name)|(customer_id, _, first_name, last_name,_,_,_,_,_) ϵ customer, (_,_,inventory_id,customer_id,_,_,_) ϵ rental, (inventory_id, film_id,_,_) ϵ inventory, (2, film_id,_) ϵ film_actor}

R <- {(first_name, last_name)| (first_name, last_name) ϵ R1, (first_name, last_name) ∉ R2}

(g) {(title) | (film_id, title,_,_,_,_,_,_,_,_) ϵ film, (film_id,_,_) ∉ film_actor}

(2)

(a) {(c.city) | c ϵ city, c.city_id = 12}

(b) {(c.city) | c ϵ city, cty ϵ country, c.country_id=cty.country_id, cty.country= 'Bangladesh'}

(c) {(a.address) | a ϵ address, c ϵ city, cty ϵ country, a.city_id = c.city_id, c.country_id=cty.country_id, cty.country= 'Bangladesh'}

(d) {(c.first_name, c.last_name) | c ϵ customer, r ϵ rental, i ϵ inventory, fa ϵ film_actor, c.customer_id = r.customer_id, r.inventory_id = i.inventory_id, i.film_id = fa.film_id, fa.actor_id = 1}

(e)

R1 <- {(c.first_name, c.last_name) | c ϵ customer, r ϵ rental, i ϵ inventory, fa ϵ film_actor, c.customer_id = r.customer_id, r.inventory_id = i.inventory_id, i.film_id = fa.film_id, fa.actor_id = 1}

R2 <- {(c.first_name, c.last_name) | c ϵ customer, r ϵ rental, i ϵ inventory, fa ϵ film_actor, c.customer_id = r.customer_id, r.inventory_id = i.inventory_id, i.film_id = fa.film_id, fa.actor_id = 2}

R <- {c | c ϵ R1, c ϵ R2}

(f)

R1 <- {(c.first_name, c.last_name) | c ϵ customer, r ϵ rental, i ϵ inventory, fa ϵ film_actor, c.customer_id = r.customer_id, r.inventory_id = i.inventory_id, i.film_id = fa.film_id, fa.actor_id = 1}

R2 <- {(c.first_name, c.last_name) | c ϵ customer, r ϵ rental, i ϵ inventory, fa ϵ film_actor, c.customer_id = r.customer_id, r.inventory_id = i.inventory_id, i.film_id = fa.film_id, fa.actor_id = 2}

R <- {c | c ϵ R1, c ∉ R2}

(g)

{(f.title) | f ϵ film, (fa ∉ film_actor V fa.film_id <> f.film_id)}