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CSCI3170 Assignment 2

Part 1

1. $\prod_{name}(\sigma_{cid='c1'}(Price) \bowtie Customer)$
2. $\prod_{sid}(\sigma_{title='milk'}(Commodity) \bowtie Price)$
3. It cannot be expressed as standard algebra since we do not have 'count' operator
4. $\prod_{sid}(\sigma_{title='milk'}(Commodity) \bowtie Price) \cap \prod_{sid}(\sigma_{title='bread'}(Commodity) \bowtie Price)$
5. $\prod_{sid}\left(\sigma_{(title='milk') \vee (title='hamburger')}(Commodity) \bowtie Price\right)$
6. $\prod_{sid,name}(Customer) - \prod_{sid,name}(Customer) \bowtie \prod_{sid}(\sigma_{title='milk'}(commodity) \bowtie Price)$

Part 2

1. It cannot be expressed as standard algebra since we do not have 'sum' operator
2. $\rho\left(A(predator \to food), \prod_{predator}\left(\sigma_{food='frog'}(FoodChain)\right)\right)$
   $\prod_{predator}(FoodChain \bowtie A)$
3. $\rho\left(A(predator \to food), \prod_{predator}\left(\sigma_{food='bird}(FoodChain)\right)\right)$
   $\prod_{predator,food}(FoodChain)/A$
4. $\rho(A, FoodChain)$
   $\rho(B, FoodChain)$
   $\rho(C, FoodChain)$
   $\rho(D, FoodChain)$
   $\rho\left(E, \sigma_{A.food=B.food=C.food \wedge A.predator \neq B.predator \neq C.predator}(A \times B \times C)\right)$
   $\rho\left(F, \sigma_{(A.food=B.food=C.food=D.food) \wedge (A.predator \neq B.predator \neq C.predator \neq D.predator)}(A \times B \times C \times D)\right)$
   $\prod_{A.food} E - \prod_{A.food} F$
5. $\rho(A(name \to predator), \prod_{name}(Creature))$
   $\rho(B(name \to food), \prod_{name}(Creature))$
   $\rho\left(C, \sigma_{predator=food}(A \times B)\right)$
   $\rho\left(D, \left(C \cup \prod_{predator,food}(FoodChain)\right)/B\right)$
   $D - \prod_{predator}\left(\sigma_{predator=food}(FoodChain)\right)$
