

CENG 351 Data Management and File Structures  
Fall 2013 –Written Assignment #2  
Answers

1.

$$\rho \left( Tr, \pi_{countryID} \left( \sigma_{cName='Turkey'} (Country) \right) \right)$$

$$\rho \left( TrShops, \pi_{shopID} (Tr \bowtie \pi_{shopID, countryID} CoffeeShop) \right)$$

$$\rho \left( TrServedProducts, \pi_{productID} (TrShops \bowtie Serves) \right)$$

$$\rho \left( OutTr, \pi_{countryID} \left( \sigma_{cName \neq 'Turkey'} (Country) \right) \right)$$

$$\rho \left( OutTrShops, \pi_{shopID} (OutTr \bowtie \pi_{shopID, countryID} CoffeeShop) \right)$$

$$\rho \left( OutTrServedProducts, \pi_{productID} (OutTrShops \bowtie Serves) \right)$$

$$\rho (OnlyTrProducts, (TrServedProducts - OutTrServedProducts))$$

$$\rho \left( Result, \pi_{pName} (OnlyTrProducts \bowtie ProductNames \bowtie Tr) \right)$$

2.

$$\rho \left( Italy, \pi_{countryID} \left( \sigma_{cName='Italy'} (Country) \right) \right)$$

$$\rho (Pnames, (Italy \bowtie ProductNames))$$

$$\rho \left( pNormale, \pi_{productID} \left( \sigma_{pName='Caffe normale'} (Pnames) \right) \right)$$

$$\rho (pIDs, \sigma_{size='venti'} (pNormale \bowtie Product))$$

$$\rho \left( ItalianServe, \pi_{productID, city} (Italy \bowtie CoffeeShop \bowtie Serves) \right)$$

$$\rho \left( Result, \pi_{city} (ItalianServe \bowtie pIDs) \right)$$

3.

$$\rho \left( AllServedProducts, (\pi_{productID} Serves \bowtie \pi_{productID, pName} ProductNames) \right)$$

$$\rho (Temp1 (1 \rightarrow P1, 2 \rightarrow N1, 3 \rightarrow P2, 4 \rightarrow N2), AllServedProducts \times AllServedProducts)$$

$$\rho \left( AtLeastTwoNames, \pi_{productID} (\rho_{P1=P2 \wedge N1 \neq N2} Temp1) \right)$$

$$\rho \left( \text{Result}, \pi_{pName} \left( \left( \pi_{productID} \text{Serves} - \text{AtLeastTwoNames} \right) \bowtie \text{ProductNames} \right) \right)$$

4.

$$\rho \left( \text{Italy}, \pi_{countryID} \left( \sigma_{cName='Italy'} (\text{Country}) \right) \right)$$

$$\rho \left( \text{Spain}, \pi_{countryID} \left( \sigma_{cName='Spain'} (\text{Spain}) \right) \right)$$

$$\rho \left( \text{ItalyServes}, \pi_{productID} \left( \text{Italy} \bowtie \pi_{shopID, countryID} \text{CoffeeShop} \bowtie \text{Serves} \right) \right)$$

$$\rho \left( \text{SpainServes}, \pi_{productID} \left( \text{Spain} \bowtie \pi_{shopID, countryID} \text{CoffeeShop} \bowtie \text{Serves} \right) \right)$$

$$\rho \left( \text{Result}, \left( \text{ItalyServes} \cap \text{SpainServes} \right) \right)$$

5.

$$\rho \left( \text{Fiorio}, \pi_{shopID} \left( \sigma_{sName='CaffeFiorio'} (\text{CoffeeShop}) \right) \right)$$

$$\rho \left( \text{FiorioServes}, \pi_{productID} (\text{Serves} \bowtie \text{Fiorio}) \right)$$

$$\rho \left( \text{FiorioNOTServes}, \pi_{productID} \left( \pi_{productID} \text{Serves} - \text{FiorioServes} \right) \right)$$

$$\rho \left( \text{tmp1}, \pi_{shopID} (\text{Serves} / \text{FiorioServes}) \right) \text{--this includes shops that serve what Caffe Fiorio serves+additional products that Fiorio does not serve.}$$

$$\rho \left( \text{Result}, \pi_{sName} \left( \text{CoffeeShop} \bowtie \pi_{shopID} \left( \text{tmp1} - \pi_{shopID} (\text{FiorioNOTServes} \bowtie \text{Serves}) \right) \right) \right)$$

6.

$$\rho \left( \text{AllServedProducts}, \left( \pi_{productID} \text{Serves} \bowtie \pi_{productID, pName} \text{ProductNames} \right) \right)$$

$$\rho \left( \text{Temp1} \left( 1 \rightarrow P1, 2 \rightarrow N1, 3 \rightarrow P2, 4 \rightarrow N2 \right), \quad \text{AllServedProducts} \times \text{AllServedProducts} \right)$$

$$\rho \left( \text{Result}, \pi_{productID} \left( \rho_{P1=P2 \wedge N1 \neq N2} \text{Temp1} \right) \right)$$