Homework Assignment 1 – Database Systems

Total Points: 100
Post your solutions to Learn as a PDF or Word Document.

Use the following relations to answer the questions. All questions may not have a valid answer. If they do not, indicate why. An ID field can be between 1 and 6 digits.

Products

ID_PRODUCT	PRODUCT_NAME	SKU	Price
1	Zojjed!	WALK-001	16.95
2	Race Walk Like a Champion	WALK-002	23.95
3	The Evolution of Race Walking	WALK-003	14.95
4	Race Walking Done Right	WALK-006	14.95
5	Walk Like an Athlete	WALK-010	24.95
6	Non Existent Fountains	TFG-001	100.00
7	Race Walk Like a Champion	WALK-011	49.95
8	Olympic 50K	WALK-012	100.00

RefProductCategories

ID_CATEGORY	CATEGORY_DESC
1	Walking
2	Photography
3	Fiction
4	Computer Science

RefProductTypes

ID_PROD_TYPE	PROD_TYPE_DESC
1	Book
2	DVD
3	T-Shirt
4	Photograph

ProductCategories

ID_PRODUCT	ID_CATEGORY
1	3
2	1
3	1
4	1
5	1
6	2
7	1
8	1
8	2

ProductTypes	
ID_PRODUCT	ID_PROD_TYPE
1	1
2	1
3	3
4	3
5	1
6	4
7	2
8	4

(20 points)
1. What relation is the result of the following queries (show your answer for each part):

A. σ ID_PROD_TYPE < 5 (RefProductTypes)

B. σID_ PROD_TYPE >=2 (RefProductTypes)

C. Π(ID_PRODUCT((σ ID_PRODUCT >= 2 and ID_PRODUCT < 5 (Products))) ∪ Π(ID_PRODUCT (σ ID_PRODUCT >6 (Products)))

D. Π(ID_PRODUCT((σ ID_PRODUCT >= 2 and ID_PRODUCT < 5 (Products))) ∩ Π(ID_PRODUCT (σ ID_PRODUCT >6 (Products)))

E. (ProductTypes) ∩ (RefProductTypes)

(10 points)
2. What relation is the result of the following queries (show your answer for each part):

A. ΠPRODUCT_NAME, CATEGORY_DES(Products |X| ProductCategories |X| RefProductCategories)

B. ΠPRODUCT_NAME, CATEGORY_DESC(Products ROJ ProductCategories ROJ RefProductCategories)

(10 Points)
3. Write a relational algebra query to return the SKUS of all Products that have a product category of ”Fiction” and a Product type of “DVD”.

(10 points)

4. Write the query, in relational algebra, to get the names of all products that do not have any product types assigned to them. (You may use the joins we discussed in class)

(10 points)
5. Write the query, in relational algebra, to get the name of the lowest id_category in the RefProductCategories table (You may use the joins in class, but not the aggregate functions)

(questions 6-8, you may **NOT** use the join conditions learned in class) (i.e. inner, natural, left, right, and full)

(10 points)
6. Write a query in relational algebra to return product names of all products with no categories assigned to them.

(10 points)
7. Write the query, in relational algebra, to names of the products that have a category of “Wedding” and also have a product type of “Gown”.

(10 points)
8. Write the query, in relational algebra, to get a complete list of products (NAME, SKU, PRICE), and the descriptions of all product types associated with them.

(10 points)
9. Write a query, in relational algebra, to return the name of products that have Product Types but not Product Categories.