

**San Jose State University**  
Department of Computer Science  
Introduction to Database Management Systems (CS 157-A, Section 7)

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Homework #1 Preview

**RDBMS Data Model**

The purpose of this quick assignment is to make sure everyone is familiar with the RDBMS data model; this is an individual assignment.

1. How many different ways (order of tuples and attributes) are there for a relation with m tuples and n attributes:

**Answer)**

For M tuples and all attributes are independent, then number of combinations = X

For N attributes and all attributes are independent, then number of combinations = Y

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	.		
	.		

Total number of combinations =  $X! * Y!$

2. For the following schema:

Product(maker, model, type)

PC(model, speed, ram, hd, price)      ← hd: hard disk

Laptop(model, speed, ram, hd, screen, price)

Printer(model, color, type, price)

Write expression of relational algebra to answer the following queries and given the sample data for the above tables [1.5 pts]:

a) What PC models have a speed of at least 3.00?

Answer)

$R1 := \sigma_{\text{speed} \geq 3.00}(\text{PC})$

$R2 := \pi_{\text{model}}(R1)$

model
1005
1006
1013

3. For the above schema <product, PC, Laptop, Printer> tables, express the following constraints. Also, for the data samples given above, indicate any violations to your constraints [2 pts]:

Product(maker, model, type)

PC(model, speed, ram, hd, price)      ← hd: hard disk

Laptop(model, speed, ram, hd, screen, price)

Printer(model, color, type, price)

- a) A PC with a processor speed < 2.00 must not sell for more than \$500?

Answer)

The constraint:  $\sigma_{\text{speed} < 2.00 \text{ AND price} > 500}(\text{PC}) = \emptyset$

You need to execute the above query and check if the result is an empty set? If yes, then the given data set comply with the constraints. If not then identify the data (in this case, identify the PC model) that violates the above given constraint.