Assignment 02
Basic Operation

A	B
1	2
4	2
4	5
2	5
1	2

A	B	C
2	5	3
2	5	4
4	5	6
1	2	3

1. Suppose relation R(A,B,C) has the following tuples;

a. Compute the selection $\sigma_{A=1}(R)$

b. Compute the projection $\pi_{C,B}(R)$

Answer

a. Compute the selection $\sigma_{A=1}(R)$

Output:

A	B	C
1	2	3
1	2	6

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b. Compute the projection $\pi_{C,B}(R)$

Output:

B	C
2	3
2	3
5	6
5	3
2	6

2. Suppose relation R(A,B,C) has the following tuples and relation S(A,B,C) has the following tuples:

a. Compute the Union of RUS.

b. Compute the different of R-S.

c. Compute the intersection of R∩S.

d. Compute the cross product of R x S.

Answer

a. Compute the Union of RUS.

Output:

A	B	C
1	2	3
4	2	3
4	5	6
2	5	3
1	2	6
2	5	4

b. Compute the different of R-S.

A	B	C
4	2	3
1	2	5

c. Compute the intersection of R∩S.

A	B	C
1	2	3
4	5	6
2	5	3

d. Compute the cross product of R x S.

A	B	C	A	B	C
1	2	3	2	5	6
1	2	3	2	5	4
1	2	3	4	5	6
1	2	3	1	2	3
4	2	3	2	5	3
4	2	3	2	5	4
4	2	3	4	5	6
4	2	3	1	2	3
4	5	6	2	5	3
4	5	6	2	5	4
4	5	6	4	5	6
4	5	6	1	2	3
2	5	3	2	5	3
2	5	3	2	5	4
2	5	3	4	5	6
2	5	3	1	2	3

1	2	6	2	5	3
1	2	6	2	5	4
1	2	6	4	5	6
1	2	6	1	2	3

3. Consider the following relation Product(ID, description, finish, standard_price), write Relation Algebra expression for each of the questions below.

ID	description	finish	standard_price
3000	Book Shelf	Natural Ash	35.00
3001	Duplex Book Shelf	White Ash	80.00
4001	Duplex Table Lamp	White Ash	40.00
9999	Keyboard	Plastic	20.00
1001	Manager's Desk	Red Oak	199.00
2001	Manager's Desk	Natural Oak	129.00
2000	Office Chair	Cherry	75.00
1000	Office Desk	Cherry	95.00
4000	Table Lamp	Natural Ash	15.00

Product

a. Show product with description “Manager’s Desk”.
b. Show the description of all product.
c. Show all cherry finish products.
d. Show product with the standard_price less than 100.
e. Show product description with the standard_price less than 100 and higher than 50.
f. Show the finish and standard_price of product number 2001.

Answer

a. Show product with description “Manager’s Desk”.

Solution: $\sigma_{\text{description = ”Manager’s Desk”}}(\text{Product})$

Output:

ID	description	finish	Standard_price
1001	Manager’s Desk	Red Oak	199.00

2001	Manager's Desk	Natural Oak	129.00

b. Show the description of all product.

Solution: $\sigma_{1=1}$(Product)

Output:

ID	description	finish	Standard_price
3000	Book Shelf	Natural Ash	35.00
3001	Duplex Book shelf	White Ash	80.00
4001	Duplex Table Lamp	White Ash	40.00
9999	Keyboard	Plastic	20.00
1001	Manager's Desk	Red Oak	199.00
2001	Manager's Desk	Natural Oak	129.00
2000	Office Chair	Cherry	75.00
1000	Office Desk	Cherry	95.00
4000	Table Lamp	Natural Ash	15.00

c. Show all cherry finish products.

Solution: $\sigma_{\text{finish = "cherry"}}$(Product) Output:

ID	description	finish	Standard_price
2000	Office Chair	Cherry	75.00
1000	Office Desk	Cherry	95.00

d. Show product with the standard_price less than 100

Solution: $\sigma_{\text{standard\_price} < 100}$(Product) Output:

ID	Description	finish	Standard_price
3000	Book Shelf	Natural Ash	35
3001	Duplex Book Shelf	White Ash	80
4001	Duplex Table Lamp	White Ash	40
9999	Keyboard	Plastic	20

2000	Office Chair	Cherry	75
1000	Office Desk	Cherry	95
4000	Table Lamp	Natural Ash	15

e. Show product description with the standard_price less than 100 and higher than 50.

Solution: $\pi_{\text{description}}(\sigma_{\text{standard\_price} < 100 \text{ and } \text{standard\_price} > 50}(\text{Product}))$

Output:

Description
Duplex Book Shelf
Office Chair
Office Desk

f. Show the finish and standard_price of product number 2001.

Solution: $\pi_{\text{finish, standard\_price}}(\sigma_{\text{product number} = 2001}(\text{Product}))$

Output:

finish	Standard_price
Natural Oak	129.00