HW8.1c

These two expressions are not equivalent. Here is a sample that shows that these two expressions are not equivalent.

Consider this instance of the database:

Customer with ID 22 made purchases on an item named “Lays” on 11-20-2020 and a item named “Doritos” on 11-22-2020

Customer with ID 1 made purchases on an item named “Bagel” on 11-25-2020

Running E1 over this instance would return:

Lays 11-20-2020

Doritos 11-20-2020

Bagel 11-20-2020

Lays 11-22-2020

Doritos 11-22-2020

Bagel 11-25-2020

In summary, it would produce a cross of all the dates that customer 22 made a purchase on with all the item names in the item relation.

Running E2 over this instance would return:

Lays 11-20-2020

Doritos 11-22-2020

In summary, it would display all the items that the customer with ID=22 purchased as well as the date he/she purchased them.

As you can see from this example instance, E1 and E2 are not equivalent.

HW8.4

Subquery	Size	Cost	Plan
AB	150,000	0	AB
AC	150,000	0	CA
AD	250,000	0	AD
BC	125,000	0	CB
BD	200,000	0	BD
CD	62,500	0	CD
ABC	4,687,500	2,500	(AB)C
ABD	7,500,000	2,500	(AB)D
BCD	2,500,000	4,000	(BD)C
ACD	3,125,000	62,500	(CD)A

From this table, It appears that the plan ((AB)C)D is the most optimal.