Relational Algebra Practice Questions

I need to practice my relational algebra expressions. For our midterm exam, we willl be given a database schema (about anything really, ships, airplanes, zoo, anything) with around 4-6 tables each with some instances on each table. Then, for each question, we are asked to write a relational algebra expression that returns something from the schema. Here are some sample questions rfom previous exams. Do not worry about answering these questions, but use them to generate new ones.
Consider the following database schema and example instance for a flight information system:
airline
lCode lName country
AE American Airlines USA
DAL Delta Airlines USA
AC Air Canada Canada
DHL Lufthanse Germany
flight
lCode flightNumber fromAirport toAirport lengthHours
AE 367 JFK DEL 8
AC 555 ORD YYZ 2
AC 73 YYZ DEL 16
airport
aCode aName country city
JFK John F Kennedy International USA New York
DEL Indira Gandhi International Airport India Delhi
ORD Chicago O'Hare International USA Chicago
YYZ Lester B. Pearson International Canada Toronto
schedule
lCode flightNumber date time capacity
AE 367 2013-05-04 12:40 245
AC 555 2013-07-07 02:00 80
AC 73 2013-08-08 04:00 100
AC 73 2013-08-09 04:00 100
booked
customer lCode flightNumber date time
Peter Fullbright AE 367 2013-05-04 11:00
Alice Bobsen AC 555 2013-07-07 02:00 Hints:
• Attributes with grey background form the primary key of a relation (.e.g, lCode for relation airline)
• The attribute fromAirport of relation flight is a foreign key to aCode of relation airport. The attribute
toAirport of relation flight is a foreign key to aCode of relation airport. The attribute lCode of relation
flight is a foreign key to lCode in relation airline.
• The attributes lCode and flightNumber of relation schedule form a foreign key to lCode and flightNumber
in relation flight.
• The attributes lCode, flightNumber, date, time of relation booked form a foreign key to relation

schedule.
• All foreign keys have been created with the CASCADE option.
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Part 1.1 Relational Algebra (Total: 30 Points)
Question 1.1.1 (7 Points)
Write a relational algebra expression that returns the names of all airlines from Germany.
Solution
πlName(σcountry=0Germany0 (airline))
Question 1.1.2 (7 Points)
Write a relational algebra expression that returns the total capacity of all scheduled flights per airline. Return
pairs of airline codes (lCode) and total capacity. For example, if American Airlines flight 555 is scheduled for
two times, both with capacity 100, then this would be counted as 200 when calculating the total capacity for
American Airlines.
Solution
lCodeGsum(capacity)(schedule)
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Question 1.1.3 (7 Points)
Write a relational algebra expression that returns cities from the USA that have an airport.
Solution
πcity(σcountry=0USA0 (airport))
Question 1.1.4 (8 Points)
Write a relational algebra expression that returns the names of all customers together with the destination
city of flights they have booked.

Do not focus on the solutions, just the question format. I would like you to generate a database schema with instances for a random topic, and then give me 10 questions that will require me to write a relational algrebra expression to retrieve stuff from the schema. I will try my best to answer the questions correctly, and will give you my answers so tha you can grade my midterm.