

Homework 1 (Due at 11:59pm on 2016-09-09)

Instruction

This is a written homework. Given the following descriptions for a mediated schema for monitors and a set of sources, you need to answer the questions below.

Mediated schema:

Assume that the values for all the attributes in the schema are strings or numbers (not object ids, or other special identifiers).

- **Monitor** (*productCode*, *brandName*, *size*, *dispTech*), “productCode” is the unique identifier for a monitor, “brandName” is the name of the brand that produces the monitor, “size” is the size of the monitor in inches, “dispTech” is the display technology which can take the value “4kUHD”, “FullHD”, “HD+”, or “HD”.
- **Brand** (*brandName*, *country*, *year*), “country” is the name of the origin country of the brand, and “year” is the year of establishment of the brand.
- **Distributor** (*sellerName*, *productCode*, *price*), the distributor “sellerName” sells “productCode” at price “price”.

Sources

- **S1** (*productCode*, *brandName*, *country*, *dispTech*), which is a table with all monitors with size greater than or equal to 21 inches (including the country of origin)
- **S2** (*productCode*, *brandName*), which is a table of all “FullHD” monitors made by brands from “Japan” with size smaller than 17 inches
- **S3** (*productCode*, *brandName*, *size*), which is a table of monitors from all “Korea” brands established on or after 1990
- **S4** (*sellerName*, *productCode*, *price*), which is a table of distributors selling monitors

Please turn in a report on Blackboard with your answers to the following questions with reference to the above schema and sources. Submit the report in **PDF** format, which should be named as **hw1_[firstname]_[lastname].PDF**

Questions (100 points)

1. Write Local-As-View (LAV) rules to describe each source. (20 points)
2. Given the query that searches for all the “FullHD” monitors produced by Korean brands with size greater than or equal to 21 inches and outputs the distributors selling these monitors and their price. Write the query using the mediated schema and reformulate the query in LAV using the Bucket algorithm. Show the derivations for each step. (40 points: 10 for writing the query, 15 for computing the buckets, and 15 for combining the buckets and showing the final rewriting).

3. For the same query as in question 2 give the inverse rules program that answers the query, and simplify the program. Explain each simplification step that you take, and show the final simplified program.

(40 points: 20 for the inverse rules program, 20 for the reasoned simplification).