

Homework 2 Solution

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1. List the total cost of all the books that were purchased in 2006.

$\mathcal{G}_{Sum(cost) \text{ as } total_cost}(\sigma_{Purchased_Year=2006}(book))$

2. List the cost of all the books in the library grouped by the publisher.

$Publisher_Code \mathcal{G}_{sum(cost)}(book)$

3. The price of a shelf is the cost of all the books on this shelf. Find the most expensive shelf.

$r1 \leftarrow Shelf_id \mathcal{G}_{sum(cost) \text{ as } shelfcost}(book)$

$r2 \leftarrow \mathcal{G}_{max(shelfcost) \text{ as } shelfcost}(Shelf_id \mathcal{G}_{sum(cost) \text{ as } shelfcost}(book))$

$\sigma_{shelfcost, Shelf_id}(r1 \bowtie r2)$

We need to get shelf_id, not only the cost of all the books.

4. Use the definition of computer science book from the first homework. Find the cost of computer science books that were purchased in 2007.

$\mathcal{G}_{sum(cost)}(\sigma_{"Computer Science" in Title \wedge Purchase_year=2007}(book))$

5. The income of a publisher in a year (from the library, of course) is the total cost of all the books from the publisher that the library purchased in the same year. Find the publisher with the highest income in the year 2006.

$r1 \leftarrow (Publisher_Code \mathcal{G}_{sum(cost) \text{ as } publisher_income}(\sigma_{Purchased_Year=2006}(book)))$

$r2 \leftarrow \mathcal{G}_{max(publisher_income) \text{ as } publisher_income}(Publisher_Code \mathcal{G}_{sum(cost) \text{ as } publisher_income}(\sigma_{Purchased_Year=2006}(book)))$

$\sigma_{publisher_income, publisher_id}(r1 \bowtie r2)$

6. Suppose that the book relation has an additional attribute called department whose value is the departmental code such as CS, EE, ME, etc. Suppose that the departments agree with the library they will contribute to the cost of purchasing the books in the following way: if the book has more than one copy, then the department pays for the cost of one copy. Assuming that the same book will cost the same amount of money and the copies of the same books are numbered 1,2,3,... (i.e., if $Copy_No > 1$ then the library has more than one copy of the book). Find the amount of money that each department needs to contribute for the year 2007. Your answer should be a relation with two attributes: the department code and the amount of the departments contribution.

$department \mathcal{G}_{sum(Cost) \text{ as } contribute}(\sigma_{ISBN, Cost, department}(\sigma_{Purchase_Year=2007 \wedge Copy_No > 1}(book)))$