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1. Product (pid, name, price, category, maker-cid)
Purchase (buyer-ssn, seller-ssn, quantity, pid)
Company (cid, name, stock price, country)
person (ssn, name, phone number, city)

a. $\Pi_{pid, name}$ ($\sigma_{price>500}$ $\wedge$ country = "china" (instructor $\bowtie_{maker\_cid=cid}$ company))

b. product → $\Pi_{price*1.1}$ ($\sigma\sigma_{category = "television"}$ (product))

2. employee (person-name, street, city)
works (person-name, company-name, salary)
company (company-name, city)
manages (person-name, manager-name)

a. $\Pi_{person\text{-}name}$ (employee $\bowtie$ company)

b. company-name $\mathcal{G}_{avg(salary)\ as\ avg\text{-}sal}$ (works $\bowtie$ company)

3. account (account-number, branch-name, balance)
branch (branch-name, branch-city, assets)
customer (customer-name, customer-street, customer-city
loan (loan-number, branch-name, amount)
depositor (customer-name, account-number)
borrower (customer-name, loan-number)

a. $r_1 \leftarrow \sigma_{customer\text{-}city = "Kathmandu"}$ (borrower $\bowtie$ customer)
$r_2 \leftarrow \Pi_{loan\text{-}number}$ (r_1)
$\Pi_{customer\text{-}name, amount}$ ($r_2 \bowtie$ loan)

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b. $account \leftarrow \pi_{balance * 1.05}(\sigma_{branch\_name = \text{"Lalitpur"}}(account \bowtie branch))$

4. Employee (eid, name, address, supervisor_eid)
Department (dept_id, name)
Project (pid, title, dept_id)
Works_on (eid, pid, hours)

C a. $project \leftarrow project - \pi_{pid, title, dept\_id}(\sigma_{name = \text{"Electrical"}}(department \bowtie project))$

d. $name\ \mathcal{G}_{count(pid)\ as\ no\_of\_projects}(department \bowtie project)$