

QBE Practice Questions

1. Consider the schema:

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

Provide expressions in QBE for the following:

- a) $\Pi_{e\text{-name}, street, city} (\sigma_{(c\text{-name} = \text{'Humongous Bank'} \wedge salary > 60000)} works \bowtie employee)$
- b) $\{ \langle e\text{-name} \rangle \mid \exists street, city, c\text{-name}, salary (\langle e\text{-name}, street, city \rangle \in employee \wedge \langle e\text{-name}, c\text{-name}, salary \rangle \in works \wedge \langle c\text{-name}, city \rangle \in company) \}$
- c) $\{ t \mid \exists l \in employee \exists m \in manages \exists r \in employee (l[e\text{-name}] = m[ename] \wedge m[m\text{-name}] = r[e\text{-name}] \wedge l[street] = r[street] \wedge l[city] = r[city] \wedge t[e\text{-name}] = l[e\text{-name}]) \}$
- d) Find the names of all employees in the database who do not work for 'Humongous Bank'. Assume that all people work for exactly one company.
2. Let $R = (A, B, C)$ and r_1 and r_2 both be relations on schema R . Give expressions in QBE, equivalent to each of the following queries.

a) $r_1 \cap r_2$

b) $r_1 - r_2$

c) $\Pi_{AB}(r_1) \bowtie \Pi_{BC}(r_2)$