c. Find the name of the manager of the manager of "Jones."

d. Find those employees who earn more than all employees living in the city "Mumbai."

Answer:

a. $\{ t \mid \exists m \in \text{manages} \ (t[\text{person\_name}] = m[\text{person\_name}] \\
\land m[\text{manager\_name}] = \text{"Jones"}) \}$

b. $\{ t \mid \exists m \in \text{manages} \exists e \in \text{employee} (t[\text{person\_name}] = m[\text{person\_name}] \\
\land m[\text{manager\_name}] = \text{"Jones"} \\
\land e[\text{city}] = t[\text{city}] \}$

c. $\{ t \mid \exists m1 \in \text{manages} \exists m2 \in \text{manages} (m1[\text{manager\_name}] = m2[\text{person\_name}] \\
\land m1[\text{person\_name}] = \text{"Jones"} \\
\land m2[\text{person\_name}] = \text{"Jones"}) \}$

d. $\{ t \mid \exists u1 \in \text{works} \exists u2 \in \text{works} (u1[\text{salary}] < u2[\text{salary}] \\
\land u2[\text{person\_name}] = e2[\text{person\_name}] \\
\land e2[\text{city}] = \text{"Mumbai"}) \}$

SQL Solutions:

a) SELECT person\_name FROM manages WHERE manager\_name = "Jones"
b) SELECT city FROM employee JOIN manages ON employee.person\_name = 
manages.person\_name WHERE manager\_name = "Jones"
c) SELECT m2.manager\_name FROM manages AS m1, manages AS m2 WHERE 
m1.person\_name = "Jones" AND m1.manager\_name = m2.person\_name
d) SELECT person\_name FROM works, (SELECT max(salary) as salary FROM 
works JOIN company ON works.company\_name = company.company\_name
WHERE city = "Mumbai") AS maxSal, WHERE works.salary > maxSal.salary