9.4 Domain Relational Calculus: Query Language for Relational Databases

Query Examples: (These are the queries from problem 7.18 of the El-Masri/Navathe text).

(1) Get names of all employees in department 5 who work more than 10 hours/week on the ProductX project.

\{ x,y,z \mid (\exists s,a,b,c,d,e) (\text{employee}(x,y,z,s,a,b,c,d,e,5) \land \\
(\exists p,h) (\text{works_on}(s,p,h) \land \\
(\exists o,q) (\text{project}('ProductX',p,o,q) \land h \geq 10 )))) \}

(2) Get names of all employees who have a dependent with the same first name as themselves.

\{ x,y,z \mid (\exists s,a,b,c,d,e,f) (\text{employee}(x,y,z,s,a,b,c,d,e,f) \land \\
(\exists g,h,i) (\text{dependent}(s,x,g,h,i))) \}

(3) Get the names of all employees who are directly supervised by Franklin Wong.

\{ x,y,z \mid (\exists a,b,c,d,e,s,f) (\text{employee}(x,y,z,a,b,c,d,e,s,f) \land \\
(\exists m,n,p,q,r,t) (\text{employee}(\text{'Franklin',m,'Wong',s,n,o,p,q,r,t})) \}

(4) Get the names of all employees who work on every project.

\{ x,y,z \mid (\exists s,a,b,c,d,e,f) (\text{employee}(x,y,z,s,a,b,c,d,e,f) \land \\
(\forall n,p,q,r) (\text{project}(n,p,q,r) \rightarrow \\
(\exists h) (\text{works_on}(s,p,h)))) \}

(5) Get the names of employees who do not work on any project.

\{ x,y,z \mid (\exists s,a,b,c,d,e,f) (\text{employee}(x,y,z,s,a,b,c,d,e,f) \land \\
\text{not} (\exists p,h) (\text{works_on}(s,p,h))) \}
(6) Get the names and addresses of employees who work for at least one project located in Houston but whose department does not have a location in Houston.

\{ x,y,z \mid (\text{Exists } s,a,b,c,d,e,f) \ ( \\
\text{employee}(x,y,z,s,a,b,c,d,e,f) \text{ and} \\
(\text{Exists } p,h,n,q) (\text{works_on}(s,p,h) \text{ and} \\
\text{project}(n,p,'Houston',q)) \text{ and} \\
\text{not dept_locations}(f,'Houston') ) ) \}

(7) Get the names and addresses of employees who work for at least one project located in Houston or whose department does not have a location in Houston. (Note: this is a slight variation of the previous query with 'but' replaced by 'or').

\{ x,y,z \mid (\text{Exists } s,a,b,c,d,e,f) \ ( \\
\text{employee}(x,y,z,s,a,b,c,d,e,f) \text{ and} \\
((\text{ Exists } p,h,n,q) (\text{works_on}(s,p,h) \text{ and} \\
\text{project}(n,p,'Houston',q)) \text{ or} \\
\text{not dept_locations}(f,'Houston') ) ) ) \}

(8) Get the last names of all department managers who have no dependents.

\{ z \mid (\text{Exists } x,y,s,a,b,c,d,e,f) (\text{employee}(x,y,z,s,a,b,c,d,e,f) \text{ and} \\
(\text{Exists } m,n,q)(\text{department}(m,n,s,q) \text{ and} \\
\text{not (Exists } h,i,j,k)(\text{dependent}(s,h,i,j,k)))) ) \}