

Solution tutorial N°05

Exercise 01 :

Q1. Provide the list of names and colors of all products.

A1: $\{P.Name-pro, P.Color \mid P \in PRODUCT\}$

Q2. Find the names and stock quantities of red-colored products.

A2: $\{P.Name-pro, P.Qte-Stock \mid P \in PRODUCT \wedge P.Color='red'\}$

Q3. For each product in stock with a quantity greater than 100 and red in color, provide the supplier name who sold the product, and customer name who bought the product.

A3: $\{P.Num-pro, T.Name-Supplier, S.Name-Client \mid P \in PRODUCT \wedge P.Color='red' \wedge P.Qte-Stock > 100 \wedge T \in PURCHASE \wedge S \in SALE \wedge P.Num-pro = T.Num-pro \wedge P.Num-pro = S.Num-pro\}$

Exercise 02:

Q1: Provide the names of all employees.

A1: $\{E.Name \mid E \in EMPLOYEE\}$

Q2: Find the names and budgets of all projects.

A2: $\{P.Name-Proj, P.Budget \mid P \in PROJECT\}$

Q3: Identify the job positions that have at least one employee.

A3: $\{E.Position \mid E \in EMPLOYEE\}$

Q4: Find the employees who work in Algiers.

A4: $\{E.Num-E, E.Name \mid E \in EMPLOYEE \wedge W \in WORK \wedge P \in PROJECT \wedge P.City-Proj = 'Algies' \wedge E.Num-E = W.Num-E \wedge W.Num-Proj = P.Num-Proj\}$

Q5: Determine the cities that contain either an employee or a project.

A5: $\{C \mid (E \in EMPLOYEE \wedge E.City-E = C) \vee (P \in PROJECT \wedge P.City-Proj = C)\}$

Q6: Identify the cities that contain projects but no employees.

A6: $\{C \mid (P \in PROJECT \wedge P.City-Proj = C) \wedge \forall E \neg (E \in EMPLOYEE \wedge E.City-E = C)\}$

Q7: Provide the names of projects with a budget greater than 1000000 DA.

A7: $\{P.Name-Proj \mid P \in PROJECT \wedge P.Budget > 1000000\}$

Q8: Find the names and budgets of projects where employee number 20 works.

A8: $\{P.Name-Proj, P.Budget \mid P \in PROJECT \wedge W \in WORK \wedge W.Num-E = 20 \wedge P.Num-Proj = W.Num-Proj\}$

Q9: Find the names of employees living in a city where there is at least one project.

A9: $\{E.Name \mid E \in EMPLOYEE \wedge \exists P \in PROJECT \wedge E.City-E = P.City-Proj\}$

Q10: List the cities that contain both a project and an employee.

A10: $\{C \mid E \in EMPLOYEE \wedge E.City-E=C \wedge P \in PROJECT \wedge P.City-Proj=C\}$

Q11: Provide the names of employees working on a project with a budget exceeding 1,000,000 DA.

A: $\{E.Name \mid E \in EMPLOYEE \wedge P \in PROJECT \wedge P.Budget > 1000000 \wedge \exists W \in WORK \wedge E.Num-E = W.Num-E \wedge W.Num-Proj = P.Num-Proj\}$

Q12: Identify the positions held by employees working on projects located in their own city of residence.

A12: $\{E.Position \mid E \in EMPLOYEE \wedge W \in WORK \wedge P \in PROJECT \wedge E.Num-E = W.Num-E \wedge P.Num-Proj = W.Num-Proj \wedge P.City-Proj = E.E.City-E\}$

Q13: Find the employees who are not working on any project.

A13: $\{E.Name \mid E \in EMPLOYEE \wedge \forall W \neg (W \in Work \wedge E.Num-E = W.Num-E)\}$

Q14: Find the employees who have worked more than 30 days on at least one project.

A14: $\{E.Name \mid E \in EMPLOYEE \wedge \exists W \in Work \wedge W.Duration > 30 \wedge E.Num-E = W.Num-E\}$

Exercise 03:

Q1: Identify vegetarian meals chosen by at least one guest.

A1: $\{M.Meal-Name \mid \exists I \in INVITE \wedge M \in MEAL \wedge M.Type = \text{"vegetarian"} \wedge I.Meal-ID = M.Meal-ID\}$

Q2: Find the names of guests who have not yet chosen a meal.

A2: $\{G.Name \mid G \in GUEST \wedge \forall I \neg (I \in INVITE \wedge I.Guest-ID = G.Guest-ID)\}$

Q3: List the names and cities of guests who have chosen a meal with a price exceeding 500 DA.

A3: $\{G.Name, G.City \mid G \in GUEST \wedge I \in INVITE \wedge M \in MEAL \wedge M.Price > 500 \wedge G.Guest-ID = I.Guest-ID \wedge I.Meal-ID = M.Meal-ID\}$

Q4: Find meals ID that have been chosen by all guest.

$\{I.Meal-ID \mid I \in INVITE \wedge \forall G (G \in GUEST \rightarrow \exists T \in INVITE \wedge T.Meal-ID = I.Meal-ID \wedge T.Date = I.Date \wedge T.Guest-ID = G.Guest-ID)\}$