1 Introduction

Consider a relation database:

$$\begin{array}{ll} Supplier & (\underline{SNO}, SNAME, SCITY) \\ Part & (\underline{PNO}, PNAME, COLOR, WEIGHT) \\ Project & (\underline{JNO}, JNAME, JCITY) \\ SPJ & (\underline{SNO, PNO, JNO}, QTY) \end{array} \tag{1}$$

This relation database is composed of 4 tables: Supplier, Part, Project and Supplier to Project. Supplier table has 3 keys representing his ID, NAME and CITY respectively. Part is composed of PNO, PNAME, COLOR and WEIGHT, which mean id, name, color and weight of a part. Project is constituted by its id number, name and city. Table SPJ contains all records of which supplier support which parts to which project with which amount.

2 Questions

Q1. Find the project name(s) in which suppliers from HK support parts with weight more than 30 kilograms.

Q2. Find the supplier id(s) who support project J1.

Q3. Find the supplier id(s) who support project J1 with red parts.

Q4. Find the project id(s) in which there is no red parts from HK suppliers.

Q5. Find the project id(s) in which all parts from supplier S1 are used.

3 Solutions

Q1.

$$\Pi_{JNAME}(\sigma_{SCITY=\text{“}HK\text{”}\wedge WEIGHT\geq 30}(Supplier \bowtie Part \bowtie Project \bowtie SPJ)) \tag{2}$$

Q2.

$$\Pi_{SNO}(\sigma_{JNO=\text{“}J1\text{”}}(SPJ)) \tag{3}$$

Q3.

$$\Pi_{SNO}(\sigma_{JNO=\text{“}J1\text{”}\wedge COLOR=\text{“}red\text{”}}(SPJ \bowtie Part)) \tag{4}$$

Q4.

$$\begin{aligned}&\rho(F1, \Pi_{JNO}(Project))\\&\rho(F2, \Pi_{JNO}(\sigma_{SCITY=\text{“}HK''\wedge COLOR=\text{“}red''}(SPJ \bowtie Part \bowtie Supplier)))\\&\Pi_{JNO}(F1 - F2)\end{aligned} \tag{5}$$

Q5.

$$\begin{aligned}&\rho(F1, \Pi_{PNO,JNO}(SPJ))\\&\rho(F2, \Pi_{PNO}(\sigma_{SNO=\text{“}S1''}(SPJ)))\\&\Pi_{JNO}(F1/F2)\end{aligned} \tag{6}$$